APPENDIX RTC-1

COMMENTS ON THE DRAFT EIR

CALIFORNIA Water Boards

GAVIN NEWSOM
GOVERNOR

YANA GARCIA
SECRETARY FOR
ENVIRONMENTAL PROTECTION

State Water Resources Control Board

October 14, 2024

Julie Newton
Sacramento County
827 7th Street, Room 225
Sacramento, CA 95814

COMMENT LETTER ON THE SACRAMENTO COUNTY (COUNTY), ENVIRONMENTAL IMPACT REPORT (ENVIRONMENTAL DOCUMENT) FOR THE PLNP2018-00284 UPPER WESTSIDE SPECIFIC PLAN PROJECT (PROJECT); STATE CLEARINGHOUSE #2020100069

Dear Julie Newton:

Thank you for the opportunity to review the Environmental Document for the proposed Project. The State Water Resources Control Board, Division of Drinking Water (State Water Board, DDW) is responsible for regulating public water systems and issuing water supply permits pursuant to the Safe Drinking Water Act. This Project is within the jurisdiction of the State Water Board, DDW's Sacramento District. 1-1

If the above noted project results in the formation of a new public water system, an application must be submitted, and a permit must be obtained from the DDW Sacramento District before water can be provided for human consumption. "Human consumption" means the use of water for drinking, bathing or showering, hand washing, oral hygiene, or cooking, including, but not limited to, preparing food and washing dishes." Health & Saf. Code § 116275 subd. (e).

Note, Health & Saf. Code § 116527 subd. (b) requires that any person submitting a permit application for a proposed new public water system must first submit a technical report at least six months before initiating construction of any drinking water-related improvements. The technical report must include an examination of the possibility of connecting to or being annexed by an existing adjacent community water system. 1-2

A permit amendment must also be obtained from the DDW Sacramento District when changes are made to a permitted domestic water supply source, storage, or treatment and for the operation of new water system components- as specified in the Cal. Code Regs. § 64556. 1-3

<u>The State Water Board, DDW, as a responsible agency under the California Environmental Quality Act has the following comments on the County's Environmental Document:</u>

- The Project will be served domestic water by a new or existing public water system. Under section 2. "Project Description", "Intended Uses of the EIR" please add "The State Water Board, Division of Drinking Water" as an approving agency and "water supply permit" as the approval (PDF page 221-223). 1-4
- The City of Sacramento (City), through an agreement with the Sacramento County Water Agency (SCWA), will provide potable water for the Project as a wholesaler [PDF Page 207]. The Sacramento County Local Agency Formation Commission will need to approve an annexation of the service area to the SCWA (PDF page 182). Please clearly disclose if a new "public water system", pursuant to Health and safety Code section 116275 subd. (h), will be created under the authority of SCWA. The State Water Board, DDW encourages projects that would otherwise create a new public water system to connect with nearby community water systems, where possible, instead of forming a new public water system. If no nearby systems will agree to serve the Project, the applicant will need to submit a technical report to DDW Sacramento District pursuant to Health and Saf. Code § 116527 subd. (b). 1-5
- The City plans to sell water to the new development. The City has domestic wells in both the North American Groundwater Basin and the South American Groundwater Basin (PDF page 815). The South American Groundwater Basin is designated as a high priority groundwater basin by Department of Water Resources (Sustainable Groundwater Management Act Basin Prioritization Dashboard), but the Project impacts on this basin were not discussed in the Environmental Document. If water will be pumped from the South American Basin for the Project, please discuss the amount of water that will be pumped and the impacts of that pumping on the South American Groundwater Basin. 1-6
- The City will provide 4,313 acre-feet per year of treated water to meet the Project's total water demand (PDF page 841). Please explain why the City water system can't directly serve the Project and needs to provide treated water. 1-7
    - Will other sources of water besides purchased water from the City be used to serve the Project? If so please explain these sources and discuss the impacts of the use of these sources, as needed.
- Please disclose if the existing groundwater wells are on the Project site. If so, explain what actions will be taken to protect water quality. Has a well assessment or will a well assessment for the existing wells occur? Are there plans to use any of the wells as domestic supply or destroy them for the protection of water quality? 1-8
- Cal. Code. Regs. § 64572 requires separation of drinking water service lines from sources of potential contamination such as irrigation drainage channels, sewer mains, and stormwater detention basins. The Project site includes existing irrigation drainage channels and will also install new irrigation drainage channels, sewer mains, and four stormwater detention basins (PDF pages 206, 209, and 616). Please indicate if separation requirements can be met or if a waiver or alternative to Waterworks Standards (Cal. Code. Regs. § 64551.100) 1-9

will be needed. If a waiver is needed, the water system will need to provide the DDW Sacramento District with the alternative plans and a waiver approval should be listed as part of the needed DDW approvals in the Environmental Document.

1-9 cont.

Once the Environmental Document is certified, please forward the following items in support of water system's permit application to the State Water Board, DDW Sacramento District Office at DWPDIST09@waterboards.ca.gov:

- A copy of the Environmental Document and Mitigation Monitoring and Reporting Plan (MMRP);
- A copy of comment letters received and the lead agency responses as appropriate;
- A copy of the Resolution or Board Minutes certifying the Environmental Document and adopting the MMRP; and
- A copy of the date stamped Notice of Determination filed at the County Clerk's Office and the Governor's Office of Planning and Research, State Clearinghouse.

1-10

Please contact Lori Schmitz of the State Water Board at (916) 449-5285 or Lori.Schmitz@waterboards.ca.gov, for questions regarding this comment letter.

Sincerely,

Lori Schmitz
Environmental Scientist
Division of Financial Assistance
Special Project Review Unit
1001 I Street, 16th floor
Sacramento, CA 95814

Cc:

Office of Planning and Research, State Clearinghouse

Austin Peterson
District Engineer
Sacramento District

CALIFORNIA Water Boards

GAVIN NEWSOM
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SECRETARY FOR
ENVIRONMENTAL PROTECTION

Central Valley Regional Water Quality Control Board

14 October 2024

Julie Newton
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COMMENTS TO REQUEST FOR REVIEW FOR THE DRAFT ENVIRONMENTAL IMPACT REPORT, PLNP2018-00284 UPPER WESTSIDE SPECIFIC PLAN, SCH#2020100069, SACRAMENTO COUNTY

Pursuant to the State Clearinghouse's 30 August 2024 request, the Central Valley Regional Water Quality Control Board (Central Valley Water Board) has reviewed the *Request for Review for the Draft Environmental Impact Report* for the PLNP2018-00284 Upper Westside Specific Plan, located in Sacramento County.

Our agency is delegated with the responsibility of protecting the quality of surface and groundwaters of the state; therefore our comments will address concerns surrounding those issues.

I. Regulatory Setting

Basin Plan

The Central Valley Water Board is required to formulate and adopt Basin Plans for all areas within the Central Valley region under Section 13240 of the Porter-Cologne Water Quality Control Act. Each Basin Plan must contain water quality objectives to ensure the reasonable protection of beneficial uses, as well as a program of implementation for achieving water quality objectives with the Basin Plans. Federal regulations require each state to adopt water quality standards to protect the public health or welfare, enhance the quality of water and serve the purposes of the Clean Water Act. In California, the beneficial uses, water quality objectives, and the Antidegradation Policy are the State's water quality standards. Water quality standards are also contained in the National Toxics Rule, 40 CFR Section 131.36, and the California Toxics Rule, 40 CFR Section 131.38.

2-1

The Basin Plan is subject to modification as necessary, considering applicable laws, policies, technologies, water quality conditions and priorities. The original Basin Plans were adopted in 1975, and have been updated and revised periodically as required, using Basin Plan amendments. Once the Central Valley Water Board has adopted a Basin Plan amendment in noticed public hearings, it must be approved by

the State Water Resources Control Board (State Water Board), Office of Administrative Law (OAL) and in some cases, the United States Environmental Protection Agency (USEPA). Basin Plan amendments only become effective after they have been approved by the OAL and in some cases, the USEPA. Every three (3) years, a review of the Basin Plan is completed that assesses the appropriateness of existing standards and evaluates and prioritizes Basin Planning issues. For more information on the *Water Quality Control Plan for the Sacramento and San Joaquin River Basins*, please visit our website: http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/ 2-1 cont.

Antidegradation Considerations

All wastewater discharges must comply with the Antidegradation Policy (State Water Board Resolution 68-16) and the Antidegradation Implementation Policy contained in the Basin Plan. The Antidegradation Implementation Policy is available on page 74 at: https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr_201805.pdf

In part it states:

Any discharge of waste to high quality waters must apply best practicable treatment or control not only to prevent a condition of pollution or nuisance from occurring, but also to maintain the highest water quality possible consistent with the maximum benefit to the people of the State.

This information must be presented as an analysis of the impacts and potential impacts of the discharge on water quality, as measured by background concentrations and applicable water quality objectives.

The antidegradation analysis is a mandatory element in the National Pollutant Discharge Elimination System and land discharge Waste Discharge Requirements (WDRs) permitting processes. The environmental review document should evaluate potential impacts to both surface and groundwater quality. 2-2

II. Permitting Requirements

Construction Storm Water General Permit

Dischargers whose project disturb one or more acres of soil or where projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit), Construction General Permit Order No. 2009-0009-DWQ. Construction activity subject to this permit includes clearing, grading, grubbing, disturbances to the ground, such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). For more information on the Construction General Permit, visit the State Water Resources Control Board website at: 2-3

http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml

2-3 cont.

Phase I and II Municipal Separate Storm Sewer System (MS4) Permits[1]

The Phase I and II MS4 permits require the Permittees reduce pollutants and runoff flows from new development and redevelopment using Best Management Practices (BMPs) to the maximum extent practicable (MEP). MS4 Permittees have their own development standards, also known as Low Impact Development (LID)/post-construction standards that include a hydromodification component. The MS4 permits also require specific design concepts for LID/post-construction BMPs in the early stages of a project during the entitlement and CEQA process and the development plan review process.

For more information on which Phase I MS4 Permit this project applies to, visit the Central Valley Water Board website at: http://www.waterboards.ca.gov/centralvalley/water_issues/storm_water/municipal_permits/

For more information on the Phase II MS4 permit and who it applies to, visit the State Water Resources Control Board at: http://www.waterboards.ca.gov/water_issues/programs/stormwater/phase_ii_municipal.shtml

2-4

Clean Water Act Section 404 Permit

If the project will involve the discharge of dredged or fill material in navigable waters or wetlands, a permit pursuant to Section 404 of the Clean Water Act may be needed from the United States Army Corps of Engineers (USACE). If a Section 404 permit is required by the USACE, the Central Valley Water Board will review the permit application to ensure that discharge will not violate water quality standards. If the project requires surface water drainage realignment, the applicant is advised to contact the Department of Fish and Game for information on Streambed Alteration Permit requirements. If you have any questions regarding the Clean Water Act Section 404 permits, please contact the Regulatory Division of the Sacramento District of USACE at (916) 557-5250.

2-5

Clean Water Act Section 401 Permit – Water Quality Certification

If an USACE permit (e.g., Non-Reporting Nationwide Permit, Nationwide Permit, Letter of Permission, Individual Permit, Regional General Permit, Programmatic General Permit), or any other federal permit (e.g., Section 10 of the Rivers and Harbors Act or Section 9 from the United States Coast Guard), is required for this project due to the disturbance of waters of the United States (such as streams and wetlands), then a Water Quality Certification must be obtained from the Central

2-6

[1] Municipal Permits = The Phase I Municipal Separate Storm Water System (MS4) Permit covers medium sized Municipalities (serving between 100,000 and 250,000 people) and large sized municipalities (serving over 250,000 people). The Phase II MS4 provides coverage for small municipalities, including non-traditional Small MS4s, which include military bases, public campuses, prisons and hospitals.

Valley Water Board prior to initiation of project activities. There are no waivers for 401 Water Quality Certifications. For more information on the Water Quality Certification, visit the Central Valley Water Board website at: https://www.waterboards.ca.gov/centralvalley/water_issues/water_quality_certification/

2-6 cont.

Waste Discharge Requirements – Discharges to Waters of the State

If USACE determines that only non-jurisdictional waters of the State (i.e., "non-federal" waters of the State) are present in the proposed project area, the proposed project may require a Waste Discharge Requirement (WDR) permit to be issued by Central Valley Water Board. Under the California Porter-Cologne Water Quality Control Act, discharges to all waters of the State, including all wetlands and other waters of the State including, but not limited to, isolated wetlands, are subject to State regulation. For more information on the Waste Discharges to Surface Water NPDES Program and WDR processes, visit the Central Valley Water Board website at:https://www.waterboards.ca.gov/centralvalley/water_issues/waste_to_surface_water/

2-7

Projects involving excavation or fill activities impacting less than 0.2 acre or 400 linear feet of non-jurisdictional waters of the state and projects involving dredging activities impacting less than 50 cubic yards of non-jurisdictional waters of the state may be eligible for coverage under the State Water Resources Control Board Water Quality Order No. 2004-0004-DWQ (General Order 2004-0004). For more information on the General Order 2004-0004, visit the State Water Resources Control Board website at: https://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2004/wqo/wqo2004-0004.pdf

Dewatering Permit

If the proposed project includes construction or groundwater dewatering to be discharged to land, the proponent may apply for coverage under State Water Board General Water Quality Order (Low Threat General Order) 2003-0003 or the Central Valley Water Board's Waiver of Report of Waste Discharge and Waste Discharge Requirements (Low Threat Waiver) R5-2018-0085. Small temporary construction dewatering projects are projects that discharge groundwater to land from excavation activities or dewatering of underground utility vaults. Dischargers seeking coverage under the General Order or Waiver must file a Notice of Intent with the Central Valley Water Board prior to beginning discharge.

2-8

For more information regarding the Low Threat General Order and the application process, visit the Central Valley Water Board website at: http://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2003/wqo/wqo2003-0003.pdf

For more information regarding the Low Threat Waiver and the application process, visit the Central Valley Water Board website at: https://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/waivers/r5-2018-0085.pdf

Limited Threat General NPDES Permit

If the proposed project includes construction dewatering and it is necessary to discharge the groundwater to waters of the United States, the proposed project will require coverage under a National Pollutant Discharge Elimination System (NPDES) permit. Dewatering discharges are typically considered a low or limited threat to water quality and may be covered under the General Order for *Limited Threat Discharges to Surface Water* (Limited Threat General Order). A complete Notice of Intent must be submitted to the Central Valley Water Board to obtain coverage under the Limited Threat General Order. For more information regarding the Limited Threat General Order and the application process, visit the Central Valley Water Board website at: https://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/general_orders/r5-2016-0076-01.pdf

2-9

NPDES Permit

If the proposed project discharges waste that could affect the quality of surface waters of the State, other than into a community sewer system, the proposed project will require coverage under a National Pollutant Discharge Elimination System (NPDES) permit. A complete Report of Waste Discharge must be submitted with the Central Valley Water Board to obtain a NPDES Permit. For more information regarding the NPDES Permit and the application process, visit the Central Valley Water Board website at: https://www.waterboards.ca.gov/centralvalley/help/permit/

2-10

If you have questions regarding these comments, please contact me at (916) 464-4684 or Peter.Minkel2@waterboards.ca.gov.

Peter G. Minkel
Engineering Geologist

cc: State Clearinghouse unit, Governor's Office of Planning and Research, Sacramento

State of California – Natural Resources Agency
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GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

October 30, 2024

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Subject: Upper Westside Specific Plan
DRAFT ENVIRONMENTAL IMPACT REPORT (DEIR)
SCH No. 2020100069

Dear Julie Newton:

The California Department of Fish and Wildlife (CDFW) received and reviewed the Notice of Availability of a DEIR from Sacramento County for the Upper Westside Specific Plan (Project) pursuant the California Environmental Quality Act (CEQA) statute and guidelines.[1]

Thank you for the opportunity to provide comments and recommendations regarding those activities involved in the Project that may affect California fish, wildlife, native plants, and their habitat. Likewise, we appreciate the opportunity to provide comments regarding those aspects of the Project that CDFW, by law, may need to exercise its own regulatory authority under the Fish and Game Code.

CDFW ROLE

CDFW is California's Trustee Agency for fish and wildlife resources and holds those resources in trust by statute for all the people of the State (Fish & G. Code, §§ 711.7, subd. (a) & 1802; Pub. Resources Code, § 21070; CEQA Guidelines § 15386, subd. (a).) CDFW, in its trustee capacity, has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species. (Fish & G. Code, § 1802.) Similarly for purposes of CEQA, CDFW provides, as available, biological expertise during public agency environmental review efforts, focusing specifically on projects and related activities that have the potential to adversely affect fish and wildlife resources.

[1] CEQA is codified in the California Public Resources Code in section 21000 et seq. The "CEQA Guidelines" are found in Title 14 of the California Code of Regulations, commencing with section 15000.

CDFW may also act as a Responsible Agency under CEQA. (Pub. Resources Code, § 21069; CEQA Guidelines, § 15381.) CDFW expects that it may need to exercise regulatory authority as provided by the Fish and Game Code. As proposed, for example, the Project may be subject to CDFW's lake and streambed alteration regulatory authority. (Fish & G. Code, § 1600 et seq.) Likewise, to the extent implementation of the Project as proposed may result in "take" as defined by State law of any species protected under the California Endangered Species Act (CESA) (Fish & G. Code, § 2050 et seq.), the Project proponent may seek related take authorization as provided by the Fish and Game Code.

PROJECT DESCRIPTION SUMMARY

The Project site is located in unincorporated Sacramento County adjacent to the existing City of Sacramento communities of North and South Natomas. The Upper Westside Specific Plan (UWSP) area is bounded by Fisherman's Lake Slough to the north, the West Drainage Canal (Witter Canal) to the east, I-80 to the south, and Garden Highway to the west.

The Project consists of construction of a new development on 2,066 acres of unincorporated land in northwestern Sacramento County. The UWSP would provide a mix of residential and non-residential land uses to accommodate 9,356 housing units with a mixture of densities that support all population segments, and over 3 million square feet of commercial, retail, and office uses that serve the community's needs. Key features of the UWSP would include a mixed-use Town Center, 10 active parks, and an extensive system of greenbelts and multi-use trails with linkages to downtown Sacramento. Development would be limited to a 1,532-acre Development Area while the remaining 534 acres would serve as an agricultural buffer (Ag Buffer) along the western edge of the UWSP area.

COMMENTS AND RECOMMENDATIONS

CDFW offers the comments and recommendations below to assist Sacramento County (the County) in adequately identifying and, where appropriate, mitigating the Project's significant, or potentially significant, direct and indirect impacts on fish and wildlife (biological) resources. Based on the potential for the Project to have a significant impact on biological resources, CDFW concludes that an Environmental Impact Report is appropriate for the Project.

CDFW is primarily concerned with the Project impacts to the West Drainage Canal, agricultural land, nesting birds, burrowing owl (BUOW), Swainson's hawk (SWHA), and their habitats.

COMMENT 1: Cumulative Agricultural Land Loss and Covered Species Habitat Loss, Conversion of Farmland to Nonagricultural Uses and Conflict with Natomas Basin HCP and Metro Air Park HCP, page numbers 5-20 to 5-23, 7-76 to 7-84

3-1

Issue: The Project is near the boundaries of the Natomas Basin Habitat Conservation Plan (NBHCP) Area and Metro Air Park Habitat Conservation Plan (MAP HCP) Area. CEQA

Guidelines section 15125(d) states that EIRs must discuss any inconsistencies between projects and applicable plans (including habitat conservation plans/natural community conservation plans). The HCPs anticipate a certain amount of acreage to sustain the agricultural land that Covered Species can utilize for habitat (foraging, nesting, dispersal, cover, etc.). Since the HCPs' implementation, projects in the Natomas Basin have resulted in a decrease in the amount of agricultural land available to Covered Species. CDFW is concerned that this Project will further contribute to the habitat loss and a reduction in the effectiveness of the NBHCP's Conservation Strategy. When the NBHCP was first implemented in 2003 it was anticipated that 15,095 acres of agricultural land would remain, specifically as buffers for habitat reserves and supporting ecological functions of the Covered Species that rely on agricultural resources (Natomas Basin Habitat Conservation Plan, Page IV-11 through Page IV-13). However, agricultural land remaining for Covered Species has decreased since the NBHCP was adopted, through projects such as Greenbriar (1041 acres) and the Sacramento Area Flood Control Agency Natomas Levee Improvement Project (1600 acres). Further development projects under consideration, including this Project, Airport South Industrial Project (353.5 acres), and Grandpark (5676 acres) will further decrease the remaining agricultural lands. CDFW is concerned that further agricultural land loss will contribute to significant cumulative impacts to biological resources and will make maintaining 15,095 acres of agricultural land, as described in the NBHCP, unreachable.

3-1 cont.

Recommendation or Recommended Mitigation Measure: To identify any potential inconsistencies with the NBHCP and MAP HCP, CDFW recommends that the DEIR analyze Project related impacts from developing up to 1532 acres within areas anticipated to remain in agricultural uses and providing available habitat for NBHCP and MAP HCP Covered Species. CDFW also recommends the DEIR discuss the persistence of the NBHCP and MAP HCP Covered Species, critical for the success of both plans, including what actions are needed to sustain the appropriate levels of habitat to support all Covered Species within the NBHCP and MAP HCP boundaries. Additionally, CDFW recommends the DEIR include a discussion on how the County will ensure that implementation of the Project will not impede the NBHCP and MAP HCP's biological goals and measurable objectives as it relates to agricultural lands.

COMMENT 2: Conservation Strategy for Upland Habitat, Page 7-84

Issue: The NBHCP conservation strategy for upland habitat is to avoid development in the Swainson's Hawk Zone (SHZ) (and to preserve upland habitat within and outside of the Swainson's Hawk Zone). The SHZ encompasses undeveloped land in the Natomas Basin that is within 1 mile of the inside toe of the levee along the Sacramento River from the Natomas Cross Canal south to Interstate 80. The SHZ was derived from the high density of Swainson's hawk nests within this area and scientific evidence for the value of the habitat (NBHCP 2003). The NBHCP recognizes the importance of the SHZ to this species and the viability of their plan which resulted in substantial effort from the City of Sacramento and Sutter County to replan development outside of this area. Replanning efforts in the SHZ have been vital to preserve the area's ecological value and the overall goals of the NBHCP, despite the associated economic and political opportunity costs. The

3-2

NBHCP states that the "greatest impact of urban development on the Swainson's hawk in the Natomas Basin would occur if significant portions of the Swainson's Hawk Zone were developed." CEQA Guidelines section 15125(d) states that EIRs must discuss any inconsistencies between projects and applicable plans (including habitat conservation plans/natural community conservation plans). The UWSP describes 975 acres of permanent habitat impacts within the SHZ, which is inconsistent with the NBHCP and therefore potentially significant as analyzed in the DEIR.

Mitigation Measure BR-7b of the DEIR proposes to minimize any potential conflict with this NBHCP strategy through applying a higher mitigation ratio (1:1) for conservation of Swainson's hawk foraging habitat than proposed in the NBHCP (0.5:1); however, the NBHCP does not propose *any* additional development (and subsequent mitigation) within this area because of its ecological value, so only providing a comparison of the ratios without further analysis does not justify mitigation to a level of less than significant. At a 1:1 ratio, the current Mitigation Measure BR-7b will incur a net loss of available habitat for Swainson's hawk in addition to the loss of a highly productive area within the SHZ. 3-2 cont.

Recommendation or Recommended Mitigation Measure: CDFW recommends to further analyze the impact to the SHZ by providing further discussion on the Project's 1) biological impact in an ecologically valuable area; 2) the effect that Project development in the SHZ will have on the continued implementation and viability of the NBHCP, as well as the MAP HCP and 3) a comprehensive justification for how the mitigation proposed mitigates the impacts to a significant habitat.

COMMENT 3: Non-Special Status Migratory Bird and Raptor Survey Radius, BR-5 Avoid and Minimize Impacts on Nesting Birds, page number 7-53

Issue: The DEIR states that surveys shall be performed for the Project area, vehicle and equipment staging areas, and suitable habitat within 250 feet to locate any active passerine (perching bird) nests and within 500 feet to locate any active raptor (bird of prey) nests. CDFW believes a larger survey buffer with a minimum of 500 feet for migratory birds and 0.5-mile for raptors, as well as conducting them no more than seven (7) calendar days before construction commences would be more appropriate and protective for species that rebuild a nest quickly. 3-3

Recommendation or Recommended Mitigation Measure: CDFW recommends the DEIR describe how the considerations identified below will be implemented and incorporated into the appropriate DEIR section(s):

1. CDFW recommends the Project proponent add specific avoidance and minimization measures to the Mitigation Measures section. Project-specific avoidance and minimization measures may include, but not be limited to: Project phasing and timing, monitoring of Project-related noise (where applicable), sound walls, visual barriers, and buffers, where appropriate. The DEIR should include appropriate preconstruction surveys for non-listed migratory birds at a minimum radius of 500 feet (for migratory birds) and 0.5-mile (for raptors) around the Project area that can

be accessed by the Project proponent. The DEIR should include specific avoidance and minimization measures that will be implemented should a nest be located within the Project site. One example is a nest buffer radius which can be determined by monitoring the active nests and determining the distance at which the activities will disturb the nesting birds.

2. CDFW recommends including performance-based protection measures for avoiding all nests protected under the Migratory Bird Treaty Act and Fish and Game Code. While some birds may tolerate disturbance within 500 feet of construction activities, other birds may have a different disturbance threshold and "take" could occur if the temporary disturbance buffers are not designed to reduce stress to that individual pair. It is the Project proponent's responsibility to confirm that the buffer is sufficient to avoid take/nest failure.

3. CDFW recommends a final preconstruction bird survey be required no more than seven (7) calendar days prior to the start of vegetation clearing or ground disturbance activities, as instances of nesting could be missed in earlier surveys. Monitoring of potential nesting activities in the Project area should continue, at a minimum, until the end of the avian nesting season (September 1). If a lapse in Project-related work of seven (7) calendar days or longer occurs, another focused bird survey should be completed before Project work can be reinitiated. It is the Project proponent's responsibility to comply with Fish and Game Code Sections 3503, 3503.5, and 3513, regardless of the time of year.

4. CDFW recommends that any removal of known raptor nest trees, even outside of the nesting season, be replaced with an appropriate native tree species planting at a ratio of 3:1 at or near the Project area or in another area that will be protected in perpetuity to reduce impacts resulting from the loss of nesting habitat.

3-3 cont.

COMMENT 4: SWHA's Nesting Habitat Mitigation, Swainson's Hawk Mitigation Measures, page numbers 7-58 to 7-61

Issue: The DEIR lists mitigation measures for impacts to SWHA, including compensation for permanent impacts on SWHA foraging habitat (Measure BR-7b). However, there is no mitigation measure for potential impacts on SWHA nesting habitat. Recent surveys indicated that 14 Swainson's hawk nests are present within the Project area or within a 0.5-mile radius that Project activities may impact (TNBC 2019-2024, CDFW 2020-2024). The UWSP area also contains a number of mature trees that are planned to be removed by the Project which can be utilized for nesting by the SWHA. There is high likelihood that the Project may result in the take of SWHA through the removal of a nest (nesting tree) that is considered active within the last 5 years. The DEIR fails to provide a mitigation proposal for potential permanent impacts to an active SWHA nest and the measures in the DEIR (environmental training, preconstruction survey, avoidance and minimization plan, and biological monitor) are insufficient to reduce Project impacts to a less and significant level.

3-4

Recommendation or Recommended Mitigation Measure: Projects with potential impacts to active SWHA nests are required to comply with CESA. CDFW recommends that the Project proponent obtain an incident take permit (ITP) for the Project if potential take of any active SWHA nests cannot be avoided during the life of the Project. CDFW recommends the DEIR include more detailed measures for how the UWSP will mitigate for potential permanent impacts to SWHA nesting habitat before construction commences. These measures can include purchasing SWHA nesting mitigation credits from a CDFW-approved conservation bank, purchasing and placing a conservation easement on nearby biologically suitable, occupied SWHA nesting habitat, or any other method approved by CDFW. The additional measure should be incorporated into the appropriate DEIR section(s). 3-4 cont.

COMMENT 5: BUOW's CESA Protection, Burrowing Owl Mitigation Measures, page number 7-22

Issue: The BUOW is listed as a State Species of Special Concern in the DEIR. On October 10, 2024, the California Fish and Game Commission granted the western burrowing owls candidate species protections under CESA. The candidacy designation temporarily affords the BUOW broad CESA protections (including prohibitions against "take" without permit authorization) throughout the entirety of California over the next 12-18 months while CDFW conducts a species status review to confirm whether (and where) listing is warranted and to recommend management and recovery actions. Projects with potential Project impacts to the burrowing owl will now be required to comply with CESA. In the event that CDFW does confirm that listing is warranted for the BUOW in the future when the Project's construction phase is to occur and take of BUOW and its nest is unavoidable, the Project proponent will be required to comply with CESA and provide suitable mitigation for loss of nesting habitat. 3-5

Recommendation or Recommended Mitigation Measure: CDFW recommends the relevant DEIR section should be modified to note the recent CESA candidate status of the BUOW. If take of BUOW cannot be avoided, then CDFW recommends the Project proponent obtain an ITP and provide suitable mitigation that fully mitigates the Project impacts.

COMMENT 6: Streambed Alteration Agreement, Table PD-3: Subsequent Permits, Approvals, Review, and Consultation Requirements, page number 2-61

Issue: The DEIR contains a table which lists the various permits and approvals required from government agencies in order for the Project to be constructed. However, the table is missing the Streambed Alteration Agreement issued by CDFW. On page 2-55 of the DEIR, various off-site improvements are listed that may impact the West Drainage Canal. This includes the upgrades to the West Drainage Canal (Witter Canal) culvert south of the El Centro Road and Natomas Central Drive/Arena Boulevard intersection, construction of the new bike trail crossing bridge, and the levee bank reinforcement (bank armoring) for the stormwater pump discharge location. These activities will require notification for a Streambed Alteration Agreement. 3-6

Recommendation or Recommended Mitigation Measure: CDFW recommends that Table PD-3 be modified to include the Project's need for a Streambed Alteration Agreement from CDFW. CDFW also recommends the DEIR clearly state that notification for a Streambed Alteration Agreement will be required for the three Project activities listed above as well as any other activities that will impact the West Drainage Canal. The notification should include mitigation proposals for compensation to any permanent impacts to the canal which may include the purchase of suitable mitigation credits at a 3:1 replacement to loss ratio, habitat restoration/enhancement onsite or offsite, habitat connectivity enhancements (wildlife crossings), partnership with other agencies or non-profit groups on restoration projects, or other mechanisms pre-approved by CDFW. 3-6 cont.

ENVIRONMENTAL DATA

CEQA requires that information developed in environmental impact reports and negative declarations be incorporated into a database which may be used to make subsequent or supplemental environmental determinations (Pub. Resources Code, § 21003, subd. (e).) Accordingly, please report any special-status species and natural communities detected during Project surveys to the California Natural Diversity Database (CNDDB). The CNNDB field survey form can be found at the following link: https://www.wildlife.ca.gov/Data/CNDDB/Submitting-Data. The completed form can be submitted online or mailed electronically to CNDDB at the following email address: CNDDB@wildlife.ca.gov. 3-7

FILING FEES

The Project, as proposed, would have an impact on fish and/or wildlife, and assessment of filing fees is necessary. Fees are payable upon filing of the Notice of Determination by the Lead Agency and serve to help defray the cost of environmental review by CDFW. Payment of the fee is required in order for the underlying Project approval to be operative, vested, and final. (Cal. Code Regs, tit. 14, § 753.5; Fish & G. Code, § 711.4; Pub. Resources Code, § 21089.) 3-8

CONCLUSION

Pursuant to Public Resources Code § 21092 and § 21092.2, CDFW requests written notification of proposed actions and pending decisions regarding the proposed Project. Written notifications shall be directed to: California Department of Fish and Wildlife North Central Region, 1701 Nimbus Road, Rancho Cordova, CA 95670 or emailed to R2CEQA@wildlife.ca.gov. 3-9

CDFW appreciates the opportunity to comment on the DEIR for the Upper Westside Specific Pan to assist Sacramento County in identifying and mitigating Project impacts on biological resources. CDFW personnel are available for consultation regarding biological resources and strategies to minimize and/or mitigate impacts. Questions regarding this letter or further coordination should be directed to Harvey Tran, Senior Environmental Scientist (Specialist) at (916) 358-4035 or harvey.tran@wildlife.ca.gov.

Sincerely,

DocuSigned by:
Morgan Kilgour
C3A86764C0AD4F6...

Morgan Kilgour
Regional Manager

ec: Dylan Wood, Senior Environmental Scientist (Supervisory)
Harvey Tran, Senior Environmental Scientist (Specialist)
California Department of Fish and Wildlife

Office of Planning and Research, State Clearinghouse, Sacramento

REFERENCES

2016 Five-year Status Review of the Swainson's Hawk (*Buteo swainsoni*) in California, California Department of Fish and Wildlife, Available at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=133622&inline

2023 Biological Effectiveness Monitoring Report for the Natomas Basin HCP Area, Available at: https://natomasbasin.org/reports/monitoring-reports/

California Department of Transportation

DISTRICT 3
703 B STREET | MARYSVILLE, CA 95901-5556
(530) 821-8401
www.dot.ca.gov

November 6, 2024

GTS# 03-SAC-2022-01943
SCH# 2020100069

Ms. Julie Newton
Environmental Coordinator
Sacramento County
Community Development Department
827 7th Street, Room 225
Sacramento, CA 95814

PLNP2018-00284 - Upper Westside Specific Plan Draft Environmental Impact Report

Dear Ms. Newton:

Thank you for including the California Department of Transportation (Caltrans) in the review process for the project referenced above. We reviewed this local development for impacts to the State Highway System (SHS) in keeping with our mission, vision, and goals, some of which includes addressing equity, climate change, and safety, as outlined in our statewide plans such as the California Transportation Plan, Caltrans Strategic Plan, and Climate Action Plan for Transportation Infrastructure.

The project encompasses approximately 2,066 acres in the unincorporated Natomas community of Sacramento County, approximately 3.5 miles from downtown Sacramento. The Project area is bounded by Interstate 80 (I-80) to the south, the West Drainage Canal to the east, Fisherman's Lake Slough to the north, and Garden Highway to the west. The Project is located outside of the County's Urban Policy Area and Urban Services Boundary and is bounded on three sides by the City of Sacramento, bordering the communities of North and South Natomas. The Specific Plan would encompass a 1,532± acre Development Area and a 534± acre Ag Buffer Area that is located west of the Development Area, providing a transition to the Garden Highway. The Upper Westside Specific Plan, which would construct an urban, commercial mixed-use town center district near the intersection of El Centro Road and West El Camino Avenue in Sacramento County. The plan includes 9,356 residential dwelling units and 3.1 million square-feet of commercial uses, with three K-8 school sites, one high school site, and several public parks. Other amenities include trail networks, a greenbelt and urban farm corridor, and a canal system that will

encourage pedestrian and bicycle activity by providing connections between neighborhoods. Based on the Draft Environmental Impact Report (DEIR) provided, Caltrans has the following requests and recommendations:

Freeway Operations / Traffic Safety

The submittal of the DEIR includes its appendices, which contain the Transportation Impact Analysis (TIA) (Appendix TR-1), and Local Transportation Impact Analysis (LTA) (Appendix TR-2). Both documents inform the conclusions of the Transportation chapter of the DEIR (Chapter 18) and were prepared March 2022 by Fehr & Peers in accordance with the Sacramento County *Transportation Analysis Guidelines*. However, the appendices and technical calculations of the TIA and LTA were not included in the appendix of the DEIR, and therefore were not reviewed by Freeway Operations. Freeway Operations requests the technical calculations and files used for these analyses to verify their accuracy and validity. 4-1

Comments on the DIER are as follows:

- For Plate TR-5, please include which Regional Transit routes operate/will operate along the navy path shown. Please clarify does the gold route represent the "on-site shuttle" described in the last paragraph on page 10. If so, please consider using consistent terminology between the text and the figure so it is clearer. 4-2
    - The legend includes conceptual stop locations for the gold route, but none are shown on the map. Please clarify will these be determined at a later date. If so, please consider removing or including a note that explains why they are not on the map. 4-3
    - Please include a description of the headways and hours of operation for these transit routes. 4-4

- On page 18-33, there is discussion that states that the off-ramp queue that exceeds available storage on the I-5 southbound ramp to J Street during the peak hour with the addition of the project. It argues that this is not a significant impact because the speed differential between the off-ramp queue and adjacent travel lane would be less than 30 miles per hour. Please provide technical calculations that show support this statement. 4-5
- Plate TR-8 shows a potential configuration for improvements to the I-80/West El Camino Avenue interchange. The figure includes the widening of West El Camino Avenue to 6 lanes as well as the widened intersection of West El Camino Avenue/El Centro Road. 4-6

- The West El Camino Avenue/El Centro Road intersection includes two channelized right-turn lanes on the westbound approach that would operate with free operation. Please clarify what will be done to accommodate pedestrian crossings that conflict with this movement (i.e., pedestrians on the north leg of the intersection). 4-6 cont.
- Please provide what are the safety implications of the triple left-turn lanes on the southbound approach the dual right-turn lanes on the northbound approach, and the dual right-turn lanes on the westbound approach of the West El Camino Avenue/El Centro Road intersection. 4-7

- Mitigation Measure TR-3a lists improvements on West El Camino Avenue and El Centro Road. One of these improvements is channelizing the dual westbound right-turn (WBR) lanes at the West El Camino Avenue/El Centro Road intersection. This movement will be extremely heavy with the addition of the project during peak hours and will conflict with the crosswalk that will be added to the north leg of the intersection. As mentioned previously, Freeway Operations has concerns over the safety of pedestrians using the crosswalk. Please clarify whether additional enhancements or accommodations be added to this intersection to protect pedestrians. The LTA specifically mentions grade-separated pedestrian overcrossings for the north and west legs. 4-8

Comments on Appendix TR-1, the TIA, are as follows:

- For Figure 1, the city boundary is very faint and difficult to see. Please consider revising so the boundary in the map matches the legend more closely. 4-9
- Previous comments on Plate TR-5 in the DEIR apply to Figure 5. 4-10
- On page 22, please clean up the grammar in this sentence: "By definition, one VMT occurs when a vehicle is driven one mile." 4-11
- Please refer to previous comments on Plate TR-8 from the DEIR, as they apply to Figure 11. 4-12
- Please refer to previous comments on the I-5 SB/J Street off-ramp queue exceeding available storage during the AM peak hour under Existing Plus Project conditions in the DEIR. 4-13
- For the results in Table 14, Please clarify what assumptions were made for the ramp metering at the I-80/West El Camino Avenue interchange. With these improvements, it is very likely that the HOV preferential lane (HOVPL) would be metered along with the GP lanes. 4-14
- One page 53, Mitigation TR-2 states that the Garden Highway on-ramp existing operational issue is "caused in part by Caltrans' decision to apply metering rates 4-15

of about 800 vehicles per hour (due to congestion along I-5)." These ramp meters currently operate with metering rates of 900+ vehicles per hour. 4-15 cont.

- On page 55, there is discussion of a potential sidewalk on the south side of West El Camino Avenue east of El Centro Road across the interchange. The paragraph states that this sidewalk may not be built, as pedestrians using it would encounter three on/off ramps carrying considerable levels of traffic. However, the Class I path along the north side of West El Camino Avenue would also encounter similar conflicts. 4-16

Comments on Appendix TR-2, the LTA, are as follows:

- Table ES-1 lists operational improvements that would address operational deficiencies that result from the addition of the project under Existing Plus Project conditions.
    - In Table ES-1, the improvements at the I-80/West El Camino Avenue interchange include installation of two metered lanes on the I-80 westbound (WB)/diagonal loop on-ramp. However, in Table 14 of the TIA, the ramp meter analysis assumed there would be 1 GP lane and 1 HOVPL at the West El Camino Avenue on-ramp to I-80 eastbound (EB). Please explain why this improvement is not included in Table ES-1. 4-17
    - Please explain why the improvements are described in the Mitigations TR-2, TR-3, and TR-5b from the TIA not included in Table ES-1. Some of these improvements address "operational deficiencies." 4-18
    - These comments also apply to Table 20.

- Table ES-2 lists operational improvements that would address operational deficiencies that result from the addition of the project under Cumulative conditions.
    - In Table ES-2, the improvements at the I-80/West El Camino Avenue interchange include installation of two metered lanes on the I-80 WB/diagonal loop on-ramp. However, in Table 17 of the TIA, the ramp meter analysis assumed there would be 1 GP lane and 1 HOVPL at the West El Camino Avenue on-ramp to I-80 EB. Please explain why this improvement is not included in Table ES-2. 4-19
    - Please explain why the improvements are described in Mitigations TR-8 not included in Table ES-2 and Figure ES-1. Some of these improvements address "operational deficiencies," such as the widening of the I-5 SB diagonal on-ramp at Del Paso Road from 1 to 2 GP lanes in order to avoid 4-20

  - severely over-capacity conditions along Del Paso Road and El Centro Road. 4-20 cont.
  - These comments also apply to Table 23 and Figure 22. 4-21

- Please refer to previous comments on Figures 1 and 5 on the TIA, as they apply to Figures 1 and 5 of the LTA. 4-22
- Please consider including a note that the 7th Edition of the *Highway Capacity Manual* (published February 2022) was not available at the time the analysis was conducted. 4-23
- Page 38 of the LTA states that a peak hour factor (PHF) of 1.0 was applied for this analysis in accordance with current practices from City of Sacramento and Sacramento County. The effective PHF of SimTraffic is 0.98. However, it is likely that the PHF is lower than 1.0 or 0.98, so can we be certain that the conclusions around queueing for the off- and on-ramps are accurate. Please determine the PHF at/near the study interchanges so we can be informed of the difference between actual conditions and what was modeled. 4-24
- Chapter 4 (on page 83) describes the lack of land use assumptions for the redevelopment of the Sleep Train Arena area at the time of analysis. In February 2022, plans for the proposed Innovation Park were approved by the City Council of Sacramento. Please clarify whether sensitivity tests be conducted with both the Innovation Park and Upper Westside Specific Plans to determine the effects on transportation and circulation for both projects. 4-25
- On page 106, the LTA states that traffic signals were not re-optimized between Cumulative No Project and Cumulative Plus Project conditions. However, it is probably safe to assume that traffic signals would be optimized to accommodate the 2040 level of project traffic, regardless of the project is built or not. 4-26
- The description of improvements for the I-80 WB Ramps/West El Camino Avenue intersection on page 119 is confusing because the off-ramp is regarded as the westbound approach, but the intersection peak hour turning movements/lane configurations figures show it as the southbound approach. Please consider revising for consistency. 4-27
- The intersection peak hour turning movement/lane configurations diagrams for intersection 33 show 3 through lanes and 2 free right-turn lanes on the eastbound approach. However, the diagram in Figure 20 shows 2 through lanes, 1 shared through/right-turn lane, and one free-right turn lane on this approach at this intersection. However, these changes are not described or justified in the list of improvements on page 119. Please revise. 4-28

- Page 121 includes discussion of grade-separated pedestrian overcrossings for the north and west legs of the West El Camino Avenue/El Centro Road intersection. These were ultimately ruled out as design features because they did not yield improved operations in the microsimulation models and would reduce pedestrian inconvenience. Freeway Operations has a few rebuttals to these statements:
    - The microsimulation models used for this analysis were created in SimTraffic, which does not model pedestrian activity as well as other softwares such as VISSIM. The crosswalk across the WBR channelization at this intersection will conflict with over 2200 vehicles during the PM peak hour under Cumulative Plus Project conditions, that will operate with free operation. Please clarify what were the pedestrian demands assumed in the SimTraffic model, and can the consultant confirm that the pedestrians using the north leg crosswalk also used the crosswalk across the WBR channelization. 4-29
    - Furthermore, the safety implications of this set-up are not discussed, nor are the safety implications of the triple left-turn lanes on the westbound and northbound approaches as well as the dual right-turn lanes on the northbound approach. 4-30

- Please consider including more discussion as to what effect the geometric improvements on West El Camino Avenue and El Centro Road would have on Cumulative Plus Project conditions. Please include screenshots of SimTraffic, bar charts of percent demand served, etc. 4-31
- Please confirm that the dual right turn lanes on the westbound approach of West El Camino Avenue/El Centro Road Intersection is not a free operation and is signalized as is mentioned in TR-3a. 4-32

Forecasting & Modeling

In the CEQA Transportation Impact Analysis Final Report of Fehr & Peers, which is in the file titled "Upper_Westside_SP_DEIR_Appendix_Aug_2024," it says that the project will result in a net decrease in VMT. Yet, the SACOG residential VMT HEX map shows that the project's site has parcels with residential VMT that is more than 85% of that of the regional average. Similarly, some parcels of the project's site have work related VMT that is higher than 85% of that of the regional average as per the SACOG work related VMT HEX map. Please provide an explanation for the discrepancy between the results of the VMT analysis that are documented in the CEQA Transportation Impact Analysis Final Report and what the SACOG VMT HEX maps are showing. 4-33

Right of Way

As project moves forward, Caltrans requests the County show the State right of way (ROW) delineated in the site plans. Caltrans record maps for State Highway ROW can be by contacting: d3rwmaprequest@dot.ca.gov

- Caltrans recommends showing any monument preservation plans (if applicable) to identify any vulnerable survey monuments that will need to be perpetuated, as required.

4-34

Hydraulics

Upper Westside Specific Plan has large footprint that will invariably alter the drainage pattern of the area. The project's net new impervious layer may result in runoff increase in a 100-year storm event which may trigger erosion and siltation. The owner should show how these concerns will be reduced to a less than significant level on Caltrans/State's drainage facilities. Developer may be held liable for future damages due to impacts for which adequate mitigation was not undertaken or sustained.

4-35

Encroachment Permit

Any project or work, including access modification and drainage work, that takes place along or within the State's ROW requires an encroachment permit issued by Caltrans. To apply, a completed encroachment permit application, environmental documentation, and five sets of plans clearly indicating State ROW must be submitted to Encroachment Permits Offices as indicated below:

4-36

Hikmat Bsaibess
California Department of Transportation
District 3, Office of Permits
703 B Street
Marysville, CA 95901
D3encpermit@dot.ca.gov

Please provide our office with copies of any further actions regarding this proposal. We would appreciate the opportunity to review and comment on any changes related to this development.

If you have any questions regarding these comments or require additional information, please contact Satwinder Dhatt, Local Development Review Coordinator, by phone (530) 821-8261 or via email at satwinder.dhatt@dot.ca.gov.

Sincerely,

GARY ARNOLD, Branch Chief
Local Development Review and Complete Streets
Division of Planning, Local Assistance, and Sustainability
California Department of Transportation, District 3

SACRAMENTO AREA
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September 24, 2024

County of Sacramento Department of Community Development -
Planning and Environmental Review Division
827 7th Street, Room 225
Sacramento, CA 95814

Subject: **NOTICE OF AVAILABILITY OF A DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE UPPER WESTSIDE SPECIFIC PLAN (SCH# 2020100069)**
Project No: **PLNP2018-00284**

Dear Environmental Coordinator,

The Sacramento Area Sewer District (SacSewer) has reviewed the subject document and has the following comments.

The Upper Westside Specific Plan Project area (Project) encompasses approximately 2,066 acres in the unincorporated Natomas community of Sacramento County, approximately 3.5 miles from downtown Sacramento. The Project area is bounded by Interstate 80 to the south, the West Main Drainage Canal to the east, Fisherman's Lake Slough to the north, and Garden Highway to the west.

The Specific Plan would encompass a 1,532-acre development area and a 534-acre ag buffer area that is located west of the development area, providing a transition to the Garden Highway. Within the development area, the project proposes an urban, commercial, mixed-use town center district near the intersection of El Centro Road and West El Camino Avenue, surrounded by neighborhoods. The development area includes 9,356 dwelling units and 3,096,245 square feet of commercial uses, with three K-8 school sites, one high school site, and several parks.

The Project area is located outside the SacSewer service areas. As such, SacSewer has not planned, designed, or constructed facilities to provide service to the Project area. To receive sewer service, annexation into SacSewer's Collection service area and the SacSewer Treatment and Resource Recovery service area will be required. The Project applicant should work closely with the Sacramento Local Agency Formation Commission (https://saclafco.saccounty.net) to begin the annexation process. 5-1

Upon annexation from LAFCo, SacSewer will provide local sewer service for the Project area via its collection system, which conveys sewage from the collection system to the EchoWater Resource Recovery Facility for treatment, resource recovery, and disposal.

Upper Westside Specific Plan
SCH# 2020100069
PLNP2018-00284
September 24, 2024

Note: Effective January 1, 2024, the Sacramento Regional County Sanitation District and the Sacramento Area Sewer District merged into one district called the Sacramento Area Sewer District, or SacSewer for short.

5-2

SacSewer is not a land-use authority and plans and designs its sewer systems using information from land-use authorities. SacSewer bases the projects identified within its planning documents on growth projections provided by these land-use authorities.

To receive sewer service, the project proponent must complete Sewer Master Plans that include connection points and phasing information to assess the existing and buildout available capacity of the collection systems and determine if the current facilities can convey the additional flows generated by the Project area.

5-3

The Project proponents propose connecting the Project area's sewage collection facilities to the SacSewer New Natomas Pump Station (NNPS) through proposed and existing SacSewer facilities. The Project area was never intended to be provided service by the SacSewer NNPS, Lower Northwest Interceptor (LNWI), or the South River Pump Station (SRPS) during the design of these facilities. Allowing connection of the Project area may result in significant capacity constraints within the existing SacSewer collections and interceptor systems. These capacity constraints must be thoroughly addressed by the project proponent before receiving service from SacSewer. Entitlements located in the Project area may require projects to be constructed with improvements to store and meter flow into the collection system. The Project proponents should work closely with SacSewer to ensure proper connection to any existing SacSewer facilities.

This environmental impact report should contemplate the onsite and offsite environmental impacts associated with extending sewer service to the Project area.

5-4

In March 2021, the SacSewer Board of Directors approved the most current SacSewer planning document, the 2020 System Capacity Plan Update (SCP). In February 2013, the SacSewer Board of Directors adopted the Interceptor Sequencing Study (ISS). The SCP and ISS are on the SacSewer website at System Capacity Plans - Sacramento Area Sewer District (sacsewer.com).

5-5

Customers receiving service from SacSewer are responsible for rates and fees outlined within the latest SacSewer ordinance. Fees for connecting to the sewer system recover the capital investment of sewer and treatment facilities that serve new customers. SacSewer does not guarantee sewer service or system capacity to the Project site until the proper permits are obtained to connect to the system and all facility impact (capacity) fees are paid. The SacSewer ordinances are on the SacSewer website at Ordinances - Sacramento Area Sewer District (sacsewer.com).

5-6

- *References to the Sacramento Regional Wastewater Treatment Plant (SRWTP) are to be revised to accurately reflect the new name as the EchoWater Resource Recovery Facility (EchoWater Facility) throughout the document. Please revise any references to this in the document.*

5-7

- *References to the Sacramento Area Sewer District (SASD) are to be revised to accurately reflect the new name as the Sacramento Area Sewer District (SacSewer) throughout the document. Please revise any references to this in the document.*

5-8

If you have any questions regarding these comments, please call me at (916) 876-6104.

Sincerely,

Robb Armstrong

Robb Armstrong
Policy & Planning

SACRAMENTO METROPOLITAN
AIR QUALITY
MANAGEMENT DISTRICT

October 7, 2024

Sacramento County, Planning and Environmental Review
Environmental Coordinator
827 7th Street, Room 225
Sacramento, CA 95814
CEQA@saccounty.gov

Re: Comments on Draft Environmental Impact Report (DEIR) for Upper Westside Specific Plan (SAC201902113)(PLNP2018-00284)

Dear Julie,

Thank you for allowing the Sac Metro Air District (District) the opportunity to review the Draft Environmental Impact Report (DEIR) for Upper Westside Specific Plan. The Project encompasses approximately 2,066 acres in the unincorporated Natomas community of Sacramento County, approximately 3.5 miles from downtown Sacramento. The Project area is bounded by Interstate 80 to the south, the West Drainage Canal to the east, Fisherman's Lake Slough to the north, and Garden Highway to the west. The Project is located outside of the County's Urban Policy Area and Urban Services Boundary, and is bounded on three sides by the City of Sacramento, bordering the communities of North and South Natomas. Below are our comments:

The following comments pertain to the Upper Westside Specific Plan DEIR Mitigation Measures.

Mitigation Measure AQ1B

Super-Compliant VOC Architectural Coating during Operations

To ensure compliance into the future, please consider having an appropriate successor agency (such as the HOA) and not the project sponsor be responsible for implementation of this mitigation measure. 6-1

Best Available Emissions Controls for Stationary Emergency Generators

When evaluating BACT we include NOx with VOC/ROG and PM when looking at technology that reduces multiple pollutants. Under Best Available Emissions Controls for Stationary Emergency Generators, please revise the first bullet, last sentence to read *If the CARB adopts future emissions standards that exceed the Tier 4 requirement, the emissions standards resulting in the lowest ~~ROG and DPM~~ emissions shall apply, up to and including zero emissions.* 6-2

Promote Use of Green Consumer Products

Promoting the use of green consumer products is a good idea, but individuals can have different interpretations of what this means, and the term can be vague and misleading, 6-3

leading to confusion. Please consider focusing this mitigation measure on specific, actionable education campaigns that a successor agency (such as the HOA) can implement. Examples include waste diversion programs at local schools, promoting tips to save electricity, energy savings tools and conserving energy at home. 6-3 cont.

Mitigation Measure AQ 4B

Not all eligible existing receptors may have heating, ventilation, and air conditioning (HVAC) systems that are compatible with MERV-13 or higher filers. Please consider revising the language to clarify that indoor air filtration for the project may, if an HVAC system is not compatible, either upgrade the HVAC systems to use MERV-13 or higher (for vulnerable populations such as schools and nursing homes, MERV-14 or higher should be used) capable of at least 0.5 air exchanges per hour or provide California certified portable air-cleaning devices. Residential users should be provided with at least one air-cleaning device per occupied bedroom, with sufficient air flow to complete at least two air exchanges per hour. Residents will be trained on their use, optimal placement, and are encouraged to move the air-cleaning device(s) to where they will be breathing. 6-4

Mitigation Measure AQ4C

While we appreciate the specificity of the language, due to climate change and urban forestry practices, we recommend generalizing language on the last bullet. For example, redwoods may be an inappropriate choice due to current climate. Last sentence would read, "Trees that are best suited to trapping PM shall be planted, ~~including one or more of the following species~~ such as ……. 6-5

The following comments pertain to the Air Quality Section of the Upper Westside Specific Plan DEIR Report

Chapter 6.0 Air Quality

Page 6-15, Table AQ-4 and the second paragraph on page 6-14 refers to Sacramento County as an attainment-maintenance area for both CO and PM-10. Sacramento County is no longer a maintenance area and is in attainment now for CO (for both 1 and 8 hour CO)– see https://ww2.arb.ca.gov/resources/documents/2023-carbon-monoxide-sip-revision but is still an attainment-maintenance area for PM-10. Table AQ-4 should be corrected to refer to ozone as severe-15 and not moderate for 8-hour ozone. 6-6

Local, Sacramento Metro Air Quality Management District

The most recent Ozone Air Quality Plan for Ozone is for the 2008 NAAQS (not for the 1997 Plan as referenced) which is available at: https://www.airquality.org/ProgramCoordination/Documents/Sac%20Regional%202008%20NAAQS%20Attainment%20and%20RFP%20Plan.pdf An updated list of SMAQMD's most recent plans can be found at: https://www.airquality.org/Air-Quality-Health/Air-Quality-Plans. 6-7

The most recent PM10 Plan was the second PM10 Maintenance Plan was approved by EPA on March 14, 2024 and can be found at https://www.airquality.org/ProgramCoordination/Documents/PM10%20Second%20MP%20Final%20Draft%202021-07-23.pdf Please see: https://www.airquality.org/Air-Quality-Health/Air-Quality-Plans for list of most recent plans.

6-7 cont.

For CO the most recent plan from SMAQMD is stated from 2004. Please add a footnote to clarify that Sacramento is in Attainment for Carbon Monoxide and that the 20-year maintenance period is over. see https://ww2.arb.ca.gov/resources/documents/2023-carbon-monoxide-sip-revision

6-8

Sacramento Area Council of Governments

Page 6-20, the second to the last sentence should clarify that SACOG Is responsible for transportation (and not general) conformity.

6-9

Sacramento County General Plan

Page 6-21 has a reference date of 2011 for the goals and policies from the Sacramento County General Plan. Please make sure that the air quality goals and policies are consistent with the latest version of the General Plan Air Quality Element which was last amended on October 25, 2022 and can be found at: https://planning.saccounty.gov/PlansandProjectsIn-Progress/Documents/General%20Plan%20Amendments/5.%20Air%20Quality%20Element%20-%20Amended%2010-25-2022.pdf

6-10

Impact AQ-1: Conflict with or Obstruct Implementation of an Applicable Air Quality Plan

This section references the 2008 8-Hour Ozone Attainment and RFP Plan which is accurate but is inconsistent with Local, Sacramento AQMD section (see previous comment) which references an earlier SIP.

6-11

Sincerely,

Rich Muzzy

Rich Muzzy
Air Quality Planner/Analyst
CEQA and Land Use

cc: Paul Philley, AICP, Program Supervisor

Sacramento Area Flood Control Agency

Letter 7

October 8, 2024

Sacramento County
Department of Community Development, Planning and Environmental Review Division
Attention: Environmental Coordinator
827 7th Street, Room 225
Sacramento, CA 95814

RE: Upper Westside Specific Plan
State Clearinghouse No. 2020100069
County Control Number PLNP2018-00284
Draft Environmental Impact Report

Dear Environmental Coordinator:

The Sacramento Area Flood Control Agency (SAFCA) has received the Notice of Availability for the subject Draft Environmental Impact Report (DEIR) and offers the following comments.

1. GENERAL

As you may be aware, SAFCA is responsible for providing flood protection for the Natomas Basin where the subject project is located. SAFCA has undertaken a number of actions over the last several years to improve the level of flood protection provided to the Natomas Basin.

The Natomas Levee Evaluation Study Final Report, dated July 14, 2006 (Final Report), identified improvements to levees required to provide the Natomas Basin with 200-year flood protection. In response to the Final Report, SAFCA embarked on a long-term, multi-phased project to provide the Natomas Basin with 200-year flood protection, referred to as the Natomas Levee Improvement Project (NLIP), which has been implemented in Phases 1, 2, 3, 4a and 4b. The completion of all phases of the NLIP is necessary to provide adequate flood protection for the Natomas Basin.

In 2008, in response to the United States Army Corps of Engineers' (USACE's) notification that the levees protecting the Natomas Basin were inadequate to prevent severe flooding, the Federal Emergency Management Agency (FEMA) changed the Flood Insurance Rate Map (FIRM) Panels (i.e. floodplain zoning maps) for the Natomas Basin for Sutter County (December 2, 2008) and the City and County of Sacramento (December 8, 2008) and designated the Natomas Basin as Special Flood Hazard Zone AE (2008 Designation). The 2008 Designation required local land use regulatory agencies to limit development of new structures in the Natomas Basin such that the lowest occupied floor would be constructed at least ten feet above grade, effectively preventing development of new structures in the

Office 916-874-7606
Fax 916-874-8289
1325 J Street, Suite 1700
Sacramento, CA 95814

Natomas Basin. The NLIP has been designed to provide flood protection for the residents, businesses and other improvements within the Natomas Basin.

On June 16, 2015, in response to the construction of flood control improvements in the initial phases of the NLIP between 2007 and 2013, FEMA revised the FIRM Panels to designate the Natomas Basin as Zone A99 (2015 Designation). The local floodplain management agencies, including the County of Sutter, the County of Sacramento and the City of Sacramento, then adopted that designation, thereby lifting or modifying their building limitations in response to the 2015 Designation. A Zone A99 designation requires homeowners and businesses with federally backed loans to carry flood insurance but does not require the elevation of structures above the 100-year water surface elevation. FEMA issued the 2015 Designation because SAFCA had completed the flood control improvements in Phases 1-3 and a portion of Phase 4a of the NLIP and it reasonably anticipated that the Project Partners would complete the later phases of the NLIP to improve the levee system that encircles the Natomas Basin.

In June 2014, Congress authorized the Water Resources Reform and Development Act, including the American River Watershed Project, Natomas Basin improvements, under which the USACE will continue the work initiated by SAFCA in the earlier phases of the NLIP.

On August 16, 2016, the Central Valley Flood Protection Board and SAFCA entered into the Local Project Partnership Agreement for the American River Watershed Project, Natomas Basin improvements. On August 18, 2016, the U.S. Department of the Army, the State, and SAFCA entered into the Project Partnership Agreement for the American River Watershed Project, Natomas Basin improvements.

To continue implementing the Project, the USACE, in cooperation with the State of California Central Valley Flood Protection Board (CVFPB) and SAFCA, plans to build flood control improvements along the Sacramento River East Levee, the Natomas Cross Canal south levee, the Pleasant Grove Creek Canal (PGCC) West Levee, the Natomas East Main Drainage Canal (NEMDC) West Levee, and the American River north levee in the Natomas Basin area of the City and County of Sacramento and County of Sutter.

As discussed in Chapter 13 - Hydrology and Water Quality of the DEIR, in 2007 the California Water Code and Government Code were amended to require local land use agencies such as the County of Sacramento to make one of four findings regarding the provision of an Urban Level of Flood Protection (ULOP) before approving new development agreements, discretionary entitlements, permits allowing building one or more new homes, or tentative maps or parcel maps. in specified floodplains. As listed in the DEIR, the County General Plan policies related to ULOP include SA-5, SA-22, SA-22a, and SA-22b.

2. COMMENTS

The comments presented below are related to the Specific Plan and various chapters of the DEIR.

A. Road 9

The new Road 9 roadway connection to the Garden Highway, which sits atop the Sacramento River east levee, will not be allowed at the location shown on the Upper West Side Roadway Master Plan. If the County wishes to have a connection to garden Highway in this area, it should utilize the ramp that has been constructed at Farm Road. See the attached markup of the Roadway Master Plan. 7-1

B. Continuation of Legal Access to TNBC Cummings Tract and SAFCA Johnson Ranch

The legal access to The Natomas Basin Conservancy's (TNBC) Cummings Tract (Sacramento County Assessor's Parcel Numbers [APNs] 225-0110-061 and 225-0110-060) and SAFCA's Johnson Ranch property (APNs 225-0010-019 and 225-0110-020) is through the private road reservation shown along the east side of Lots 8, 9, 10, 11 and 12 and the west side of Lot 7 of Natomas Riverside Subdivision No. 3, filed for recording on August 6, 1918 in Book 15 of Maps, Page 43, Records of Sacramento County, California. 7-2

The proposed development along the west side of APN 225-0110-025 should be modified to include an OS-AG corridor to preserve the existing private road reservation. See the attached markup of the Roadway Master Plan.

C. Conversion of Radio Road and Farm Road to Public Use

The Radio Road roadway connection to the Garden Highway is currently within a private road and canal reservation shown along the south side of Lot 8 of the Map of Natomas Riverside Subdivision No. 3. The Farm Road roadway connection to the Garden Highway is currently within a private road reservation shown along the south side of Lot 9 and the north side of Lot 23 of the Map of Natomas Riverside Subdivision No. 2, filed for recording on February 26, 1918 in Book 15 of Maps, Page 41, Records of Sacramento County, California. 7-3

Converting these private road rights to a public road right of way will require the property owner to grant a public road easement for this use. SAFCA expects to be compensated for these conveyances on SAFCA-owned property.

D. TNBC's Alleghany Tract

DEIR Plate PD-4 shows all of TNBC's Alleghany Tract (APN 225-0190-011) as being owned by SAFCA. This is also discussed in Footnote 1 at the bottom of DEIR Page 2-27. SAFCA only purchased a portion of this parcel from TNBC. SAFCA's parcel is now known as APN 225-0190-023. TNBC's remainder parcel is now known as APN 225-0190-024. 7-4

E. Chapter 13 - Pages 13-3, 13-9, and 13-25

The discussion of the levees surrounding the Natomas Basin in the second paragraph of the section entitled "Flood Protection" on Page 13-3 of the DEIR should add the Pleasant Grove Creek Canal in the list of flood sources. 7-5

"ULOP" is an acronym commonly used for "Urban Level of Flood Protection." The word "Flood" should be inserted into the phrase "Urban Level of Protection" on page 12 and in two places on page 13-9.

As noted on page 13-25, completion of American River Common Features Natomas Basin Project is expected to lead to achievement of ULOP. The County should consider the necessity of making ULOP findings at the time of each development approval based on the status of the Project, the specifics of the requested approval, and any changes in or new information regarding flood hazards, facility conditions, and other considerations as described in more detail in the Department of Water Resources ULOP Criteria from November 2013.

7-5 cont.

F. Chapter 20 - Page 20-12

The discussion of the existing Stormwater Drainage on Page 20-12 and 20-13 does not accurately describe the stormwater drainage system in the Specific Plan area. The San Juan Pump Station and the Riverside Pump Station discussed in the text serve the urbanized development in the adjacent City of Sacramento areas and do not serve the Specific Plan area. RD 1000 should be contacted to obtain a correct description of the stormwater drainage system.

7-6

If you have any questions on the above comments, please contact Mr. John Bassett of my office at (916) 704-8731 or bassettj@saccounty.gov.

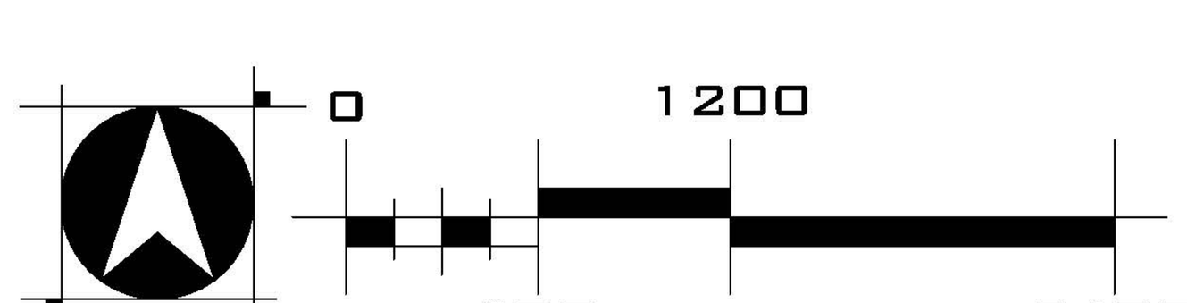
Sincerely,

Jason D. Campbell
Deputy Executive Director

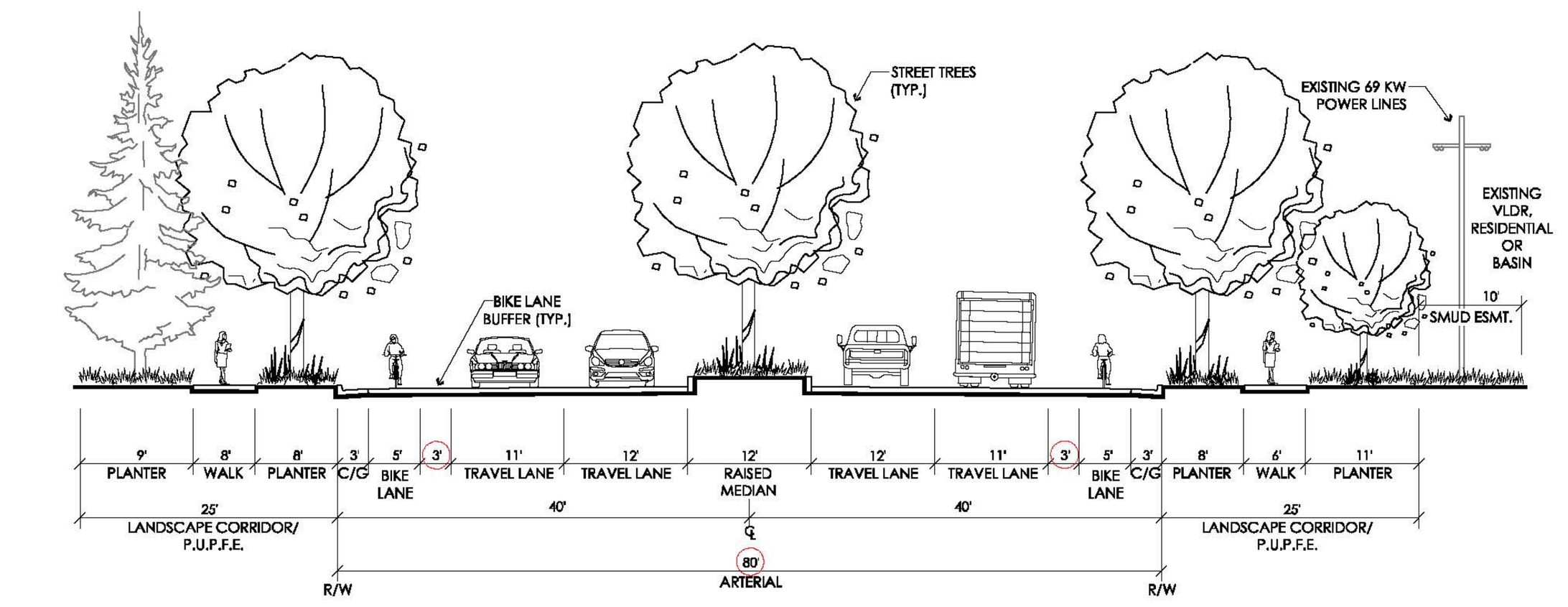
John A. Bassett
Director of Engineering
Design Construction Maintenance

cc: Kevin King - RD 1000
John Roberts - TNBC

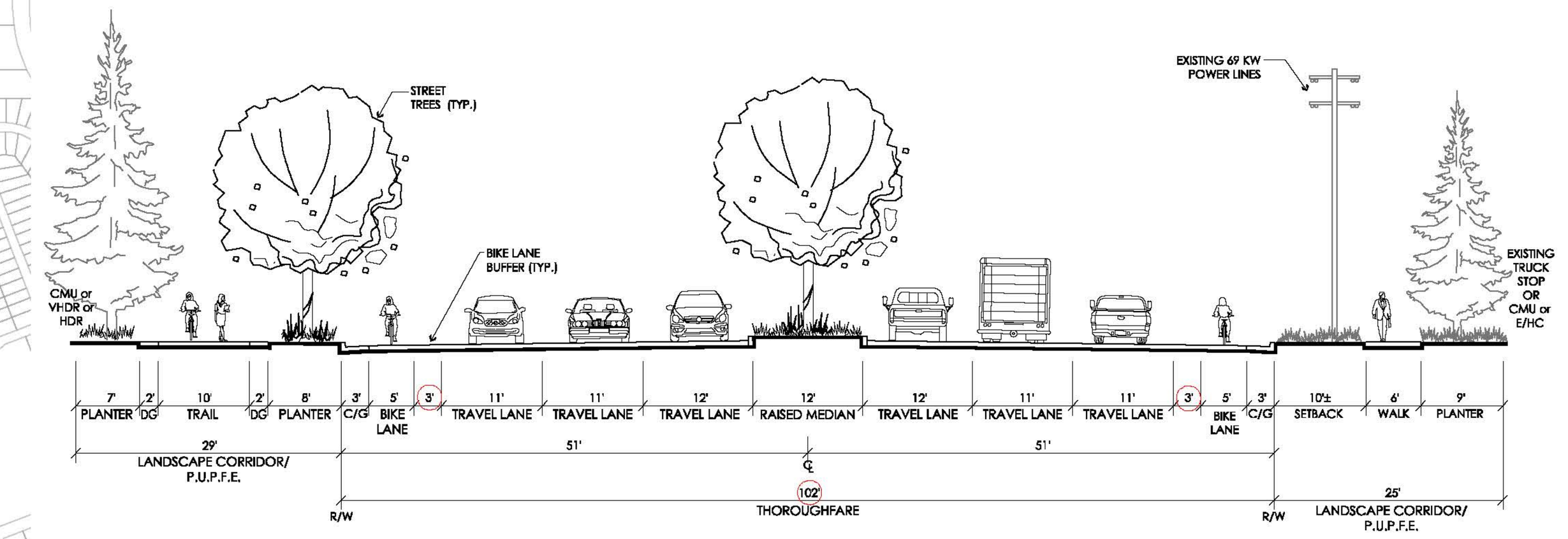
ROADWAY MASTER PLAN
UPPER WESTSIDE
COUNTY OF SACRAMENTO, CALIFORNIA
JANUARY 15, 2024



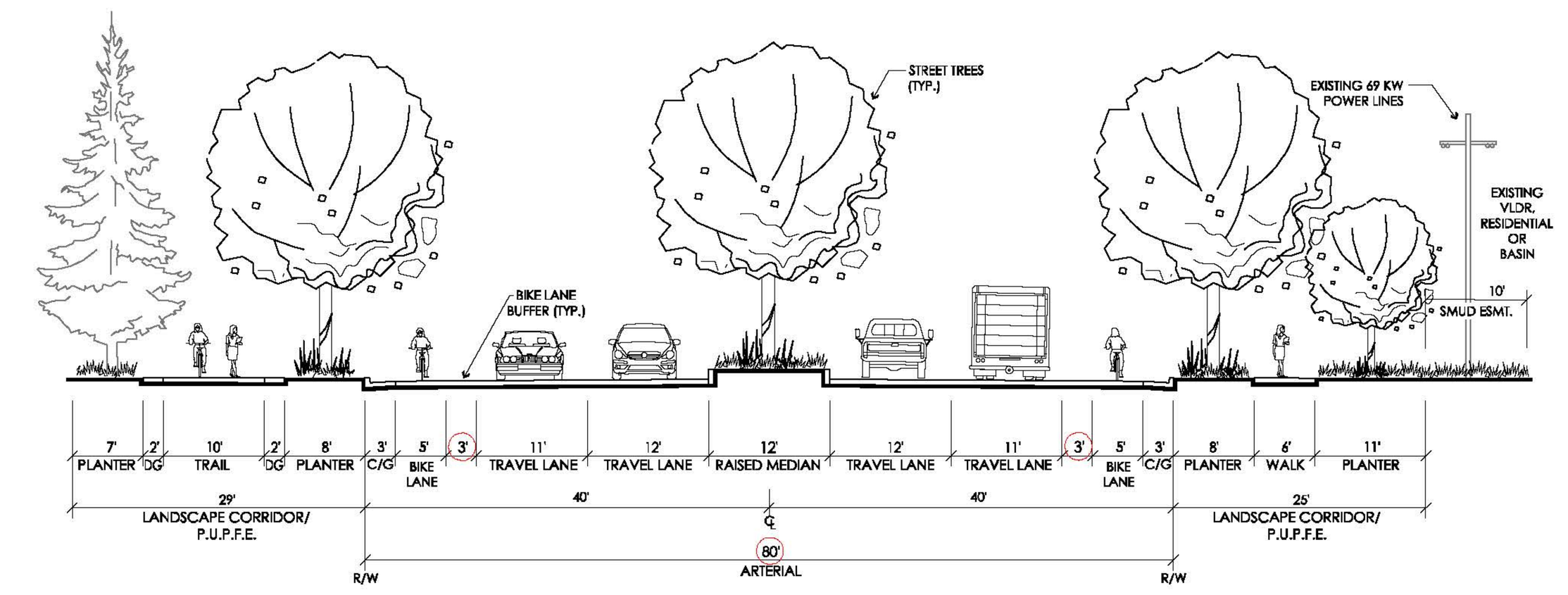
NOTE: DIMENSIONS CIRCLED IN RED VARY FROM APPLICABLE STREET SECTION STANDARDS FOUND IN THE SACRAMENTO COUNTY 2018 IMPROVEMENT STANDARDS, SECTION 4: STREET DESIGN



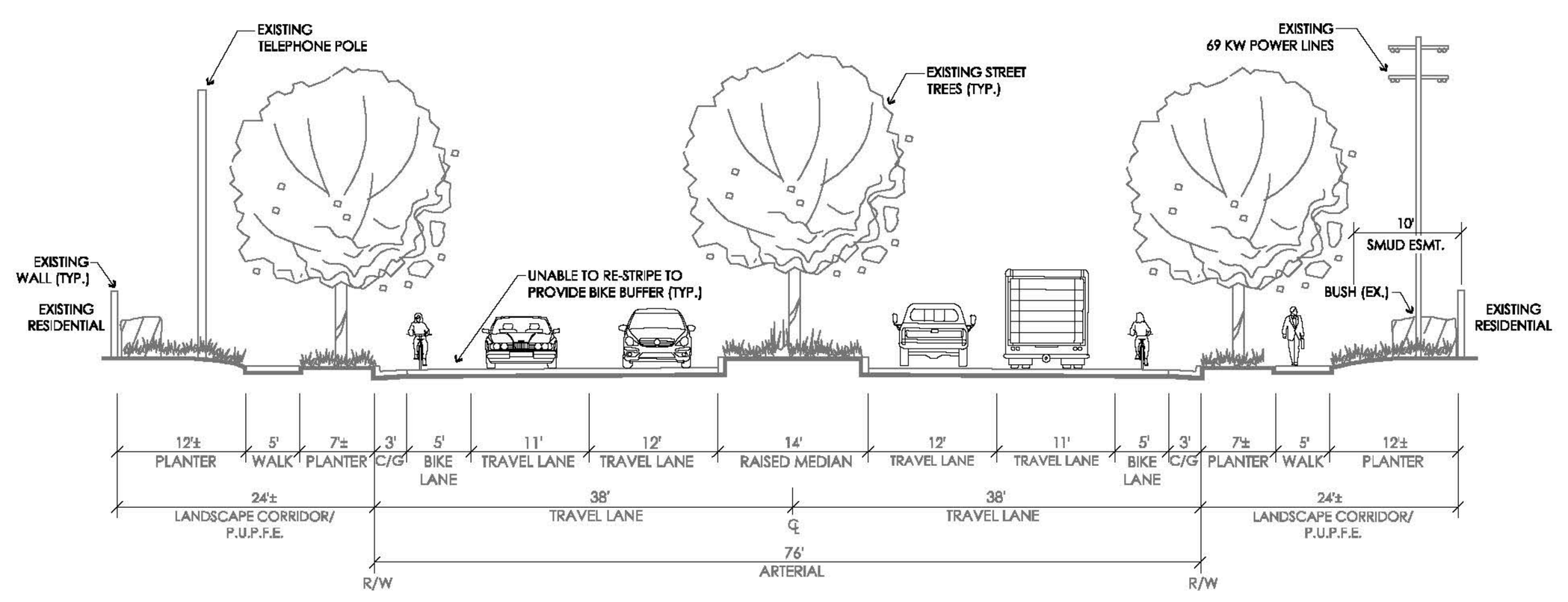
B6 ARTERIAL (El Centro Road - adjacent to North Lake Basin)
80' STREET SECTION
SCALE: 1"=15'
74' STREET SECTION IN COUNTY STANDARDS



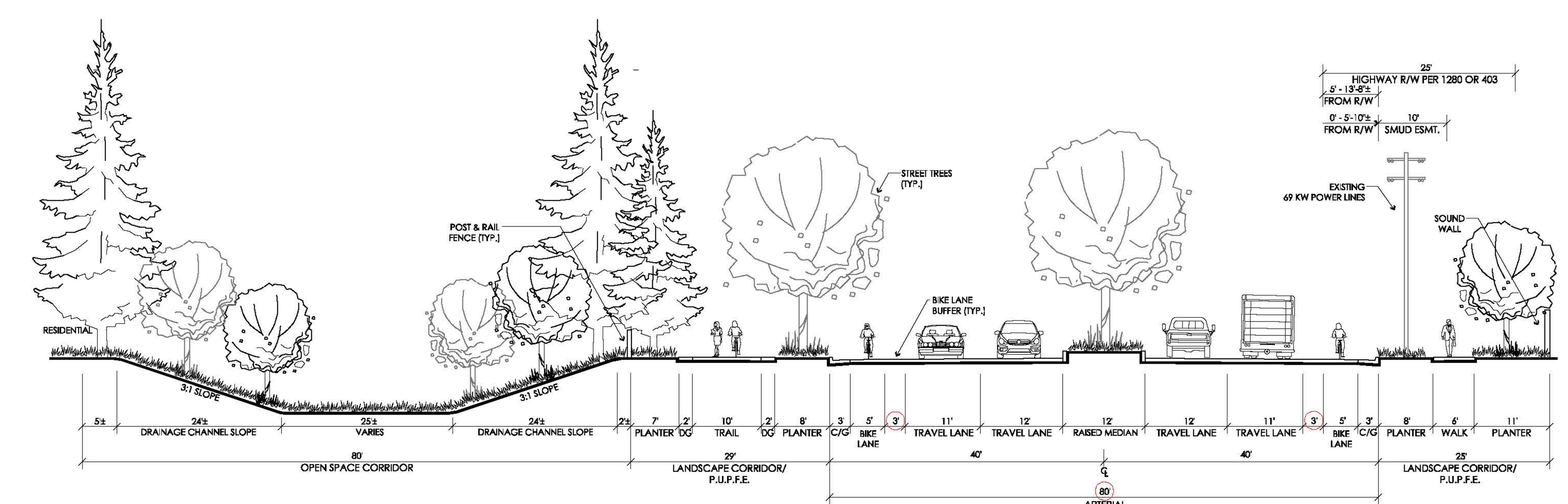
A THOROUGHFARE (El Centro Road at Truck Stop)
102' STREET SECTION
SCALE: 1"=15'
96' STREET SECTION IN COUNTY STANDARDS



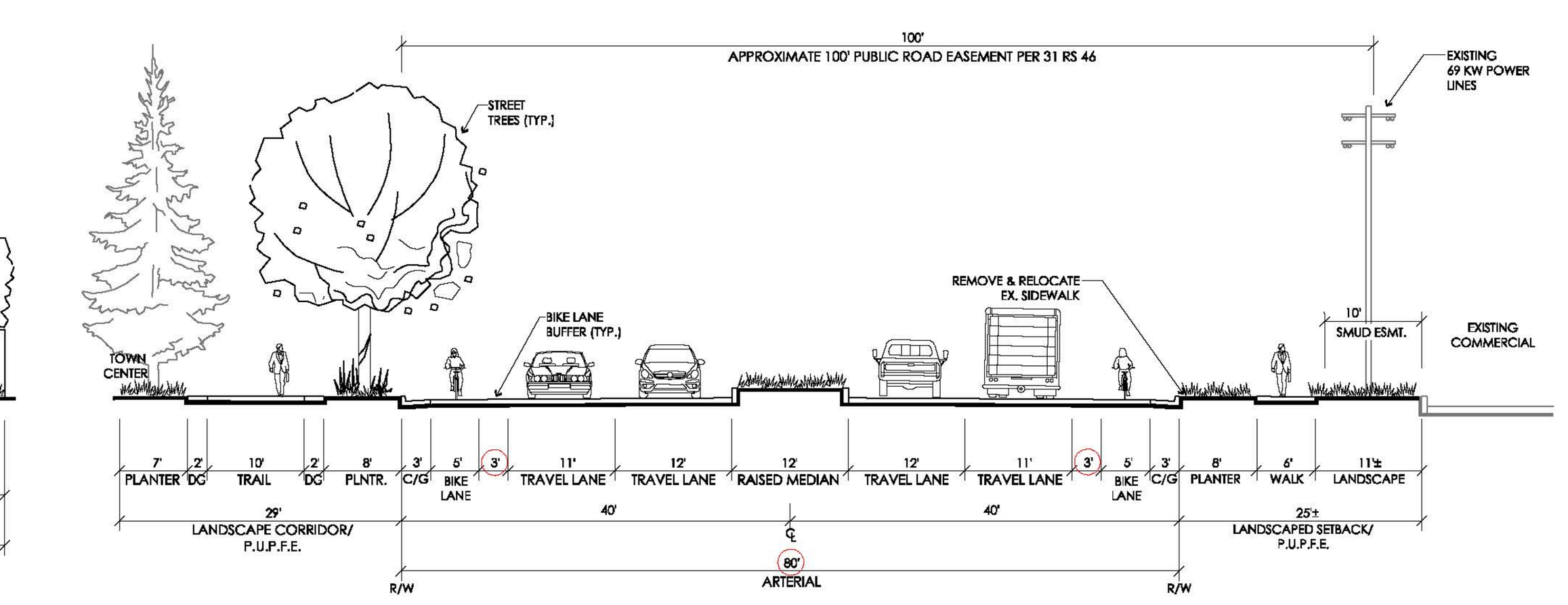
B1 ARTERIAL (El Centro Road - North of Existing Subdivision)
80' STREET SECTION
SCALE: 1"=15'
74' STREET SECTION IN COUNTY STANDARDS



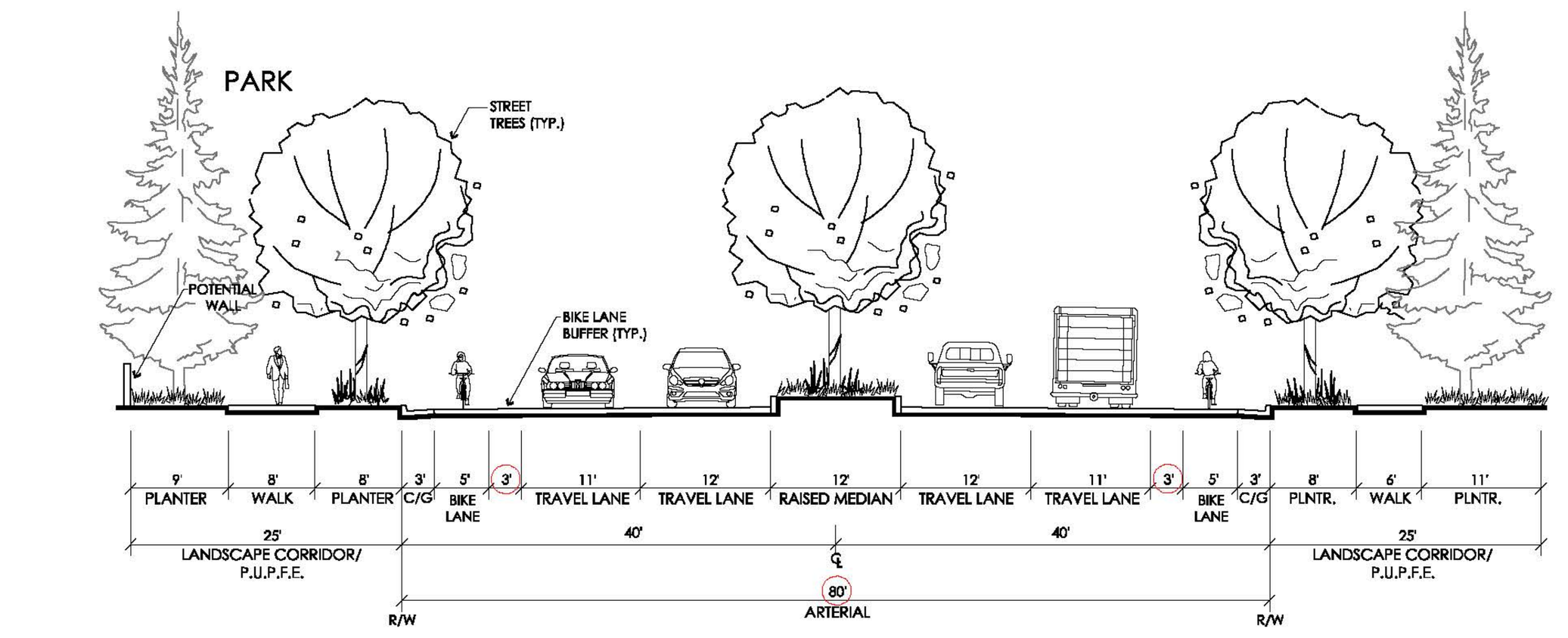
B2 EL CENTRO ROAD (At Existing Subdivision)
76' STREET SECTION
SCALE: 1"=15'
74' STREET SECTION IN COUNTY STANDARDS



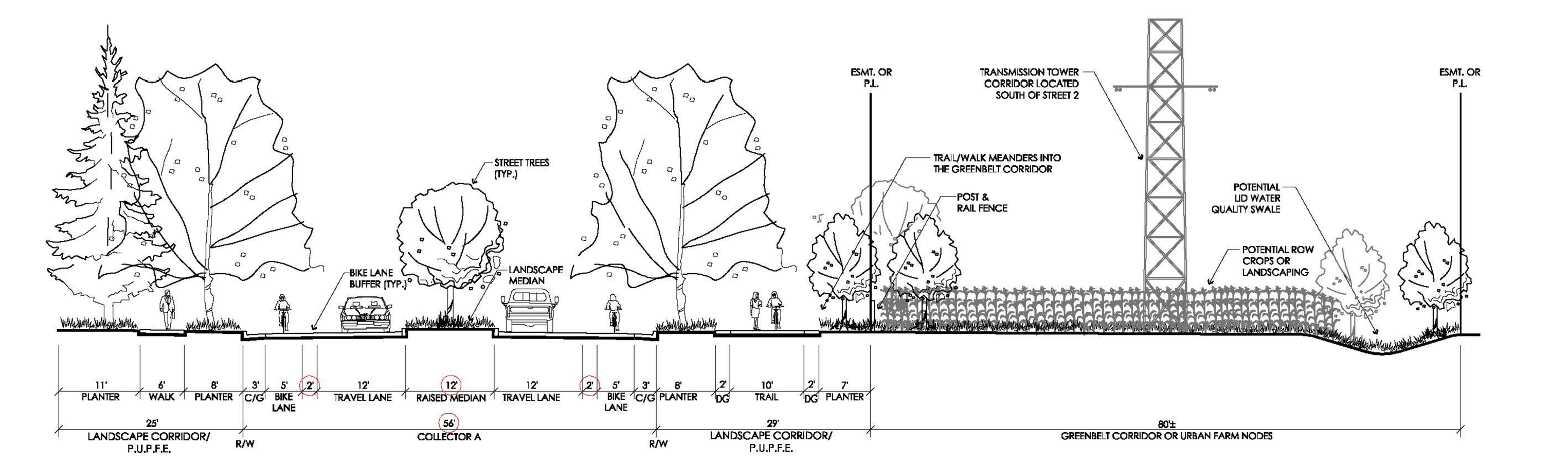
B3 EL CENTRO ROAD (Between Farm Road & San Juan Road)
80' STREET SECTION
SCALE: 1"=15'
74' STREET SECTION IN COUNTY STANDARDS



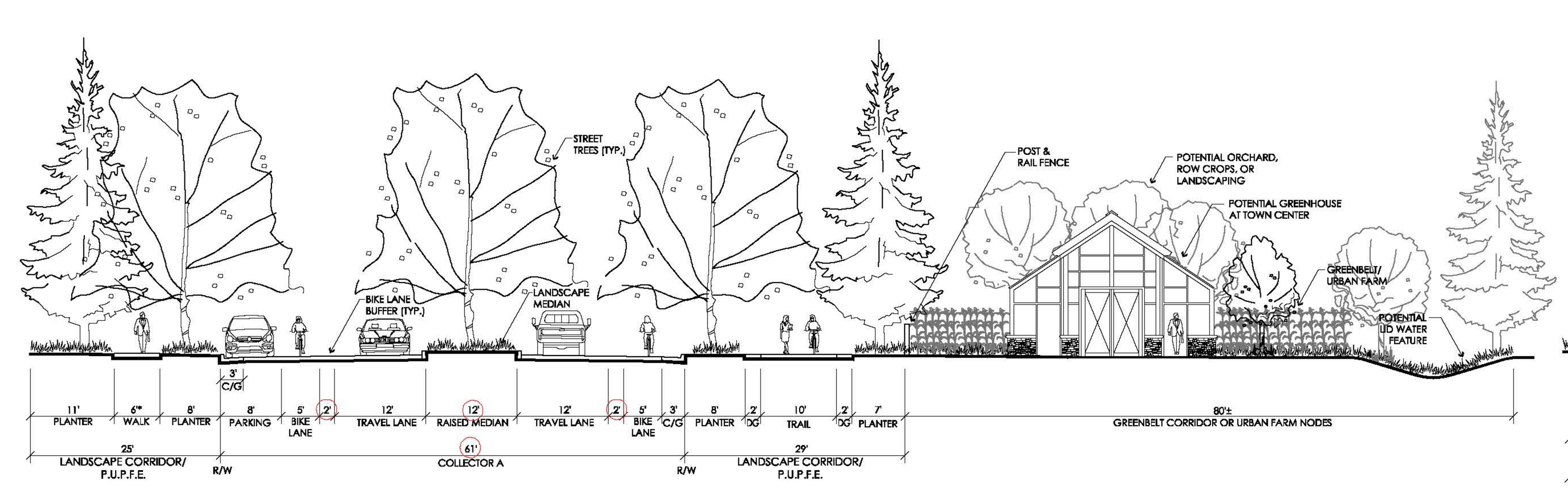
B4 EL CENTRO ROAD (South of West El Camino Avenue)
80' STREET SECTION
SCALE: 1"=15'
74' STREET SECTION IN COUNTY STANDARDS



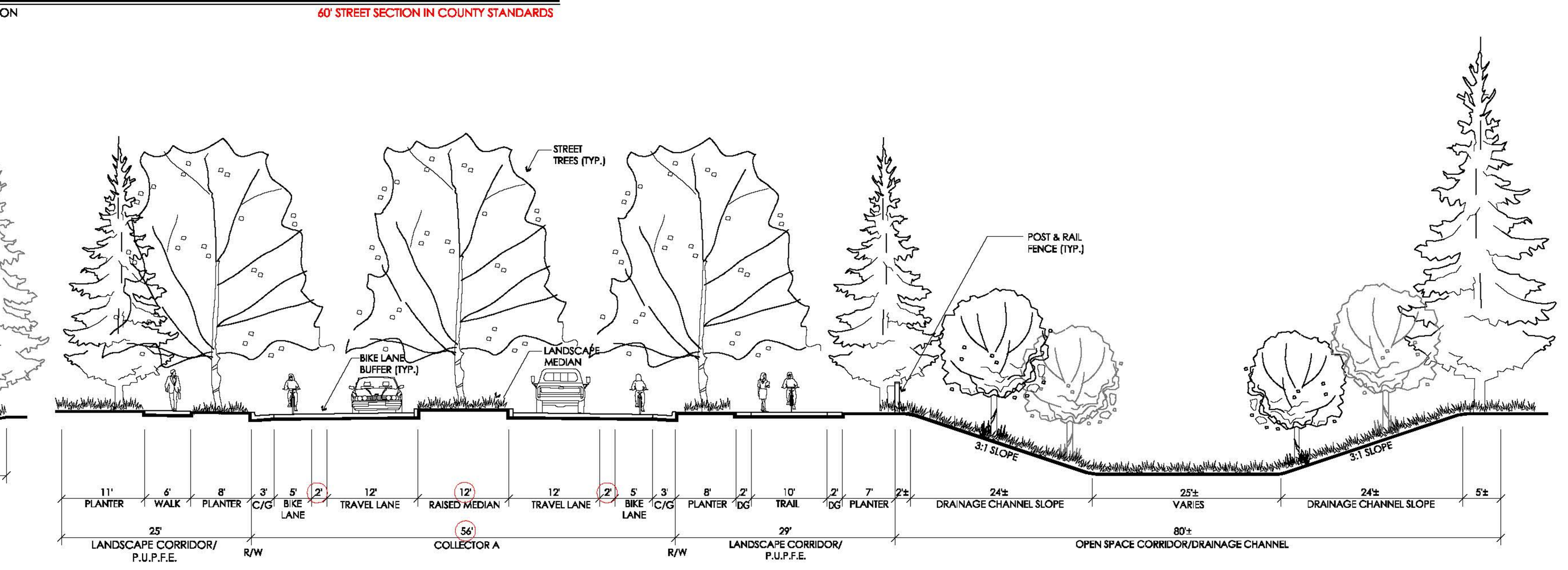
B5 ARTERIAL (Farm Road east of El Centro Road)
80' STREET SECTION
SCALE: 1"=15'
74' STREET SECTION IN COUNTY STANDARDS



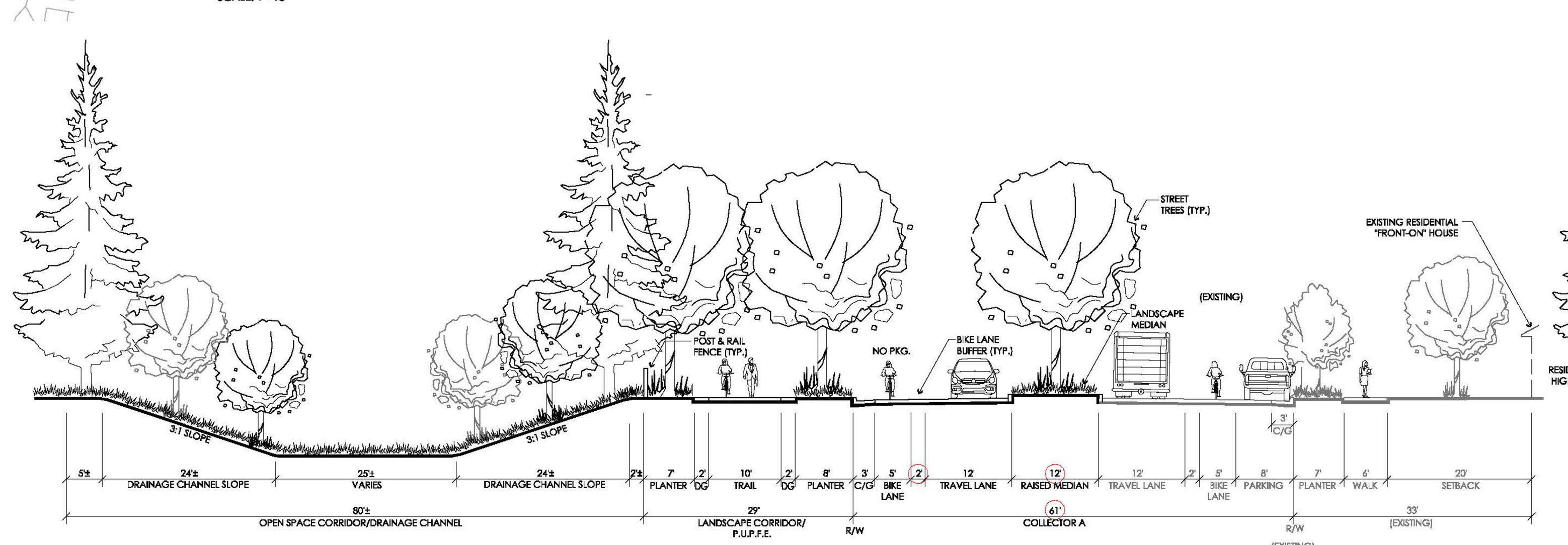
C1 BRYTE BEND ROAD - South of Street 2 (Collector A Street)
56' STREET SECTION
SCALE: 1"=15'
60' STREET SECTION IN COUNTY STANDARDS



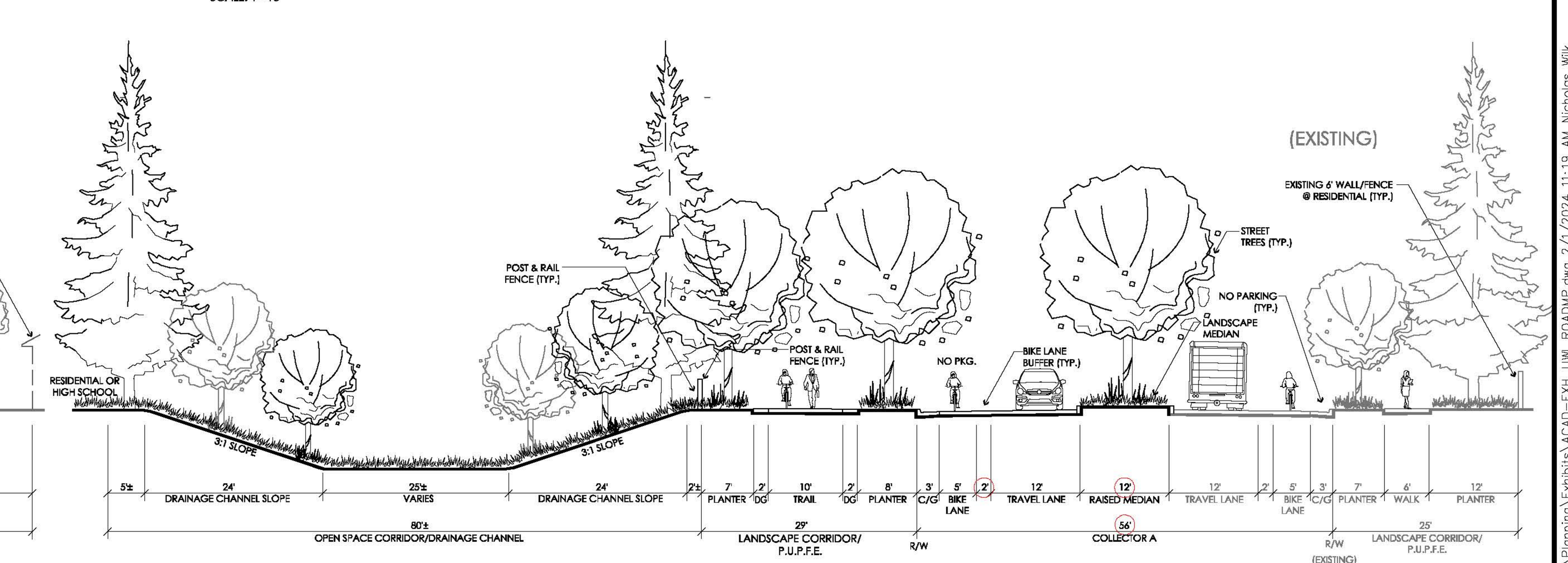
C2 BRYTE BEND ROAD - Between Street 2 and Farm Road & North of San Juan Road (Collector A Street)
61' STREET SECTION
SCALE: 1"=15'
60' STREET SECTION IN COUNTY STANDARDS



C3 BRYTE BEND ROAD - North of Farm Road (Collector A Street)
56' STREET SECTION
SCALE: 1"=15'
60' STREET SECTION IN COUNTY STANDARDS



C4 SAN JUAN ROAD - Between El Centro Road and Bryte Bend Road at Existing Front-On Lots (Collector Street)
61' STREET SECTION
SCALE: 1"=15'
60' STREET SECTION IN COUNTY STANDARDS



C5 SAN JUAN ROAD - East of El Centro Road & RADIO ROAD - East of Bryte Bend Road (Collector Street)
56' STREET SECTION
SCALE: 1"=15'
60' STREET SECTION IN COUNTY STANDARDS

WOOD RODGERS
BUILDING RELATIONSHIPS ONE PROJECT AT A TIME
3301 C St, Bldg. 100-B
Sacramento, CA 95816
Tel 916.341.7760
Fax 916.341.7767

Department of Environmental Management
Jennea Monasterio
Director

Divisions
Administration
Environmental Compliance
Environmental Health

County of Sacramento

October 8, 2024

TO: CEQA@saccounty.gov

FROM: Leana Nguyen (nguyenl@saccounty.gov)

SUBJECT: PLNP2018-00284 Upper Westside Specific Plan

LOCATION: *The Project encompasses approximately 2,066 acres in the unincorporated Natomas community of Sacramento County, approximately 3.5 miles from downtown Sacramento. The Project area is bounded by Interstate 80 to the south, the West Drainage Canal to the east, Fisherman's Lake Slough to the north, and Garden Highway to the west. The Project is located outside of the County's Urban Policy Area (UPA) and Urban Services Boundary (USB), and is bounded on three sides by the City of Sacramento, bordering the communities of North and South Natomas.*

EMD PROJECT COMMENTS:

1. **CONDITION:** Prior to final occupancy, each lot that is newly developed as part of the Legado Specific Plan must connect to public water. 8-1

2. **CONDITION:** Prior to final occupancy, each lot that is newly developed as part of the Legado Specific Plan must connect to public sewer. 8-2

3. **CONDITION:** The applicant must contact the Environmental Health Plan Check Department prior to beginning construction of any food facility. Environmental Health may be contacted at (916) 874-6010. 8-3

4. **ADVISORY:** Prior to recordation of the final map, if an abandoned well is found on the property, it must be issued an inactivation permit (subject to review and approval from EMD), repaired and brought back into service, or it must be destroyed at the parcel owner's cost. All well-related activities must be performed in compliance with EMD's well permitting and inspection program requirements. Contact wells@saccounty.gov with any questions. 8-4

5. **ADVISORY:** Prior to recordation of the final map, if an abandoned septic system tank is discovered on the property, it must be destroyed in compliance with EMD's liquid waste permitting and inspection program requirements. When these septic systems are no longer in use, the septic tanks must be abandoned under a permit issued by EMD. Contact septicinfo@saccounty.gov with any questions. 8-5

6. **ADVISORY:** Any facility in Sacramento County that handles and/or stores a hazardous material equal to or greater than the minimum reportable quantities (55 gallons for liquids, 500 pounds for solids and 200 cubic feet (at standard temperature and pressure) for compressed gases) must obtain a permit and submit a Hazardous Materials Business Plan (HMBP) to EMD. The purpose of the HMBP Program is to protect public health and the environment and groundwater from risks or adverse effects associated with the storage of hazardous materials. Contact Thomas Vohoska at vohoskat@saccounty.gov with any questions. 8-6

7. **ADVISORY:** Any facility in Sacramento County that generates hazardous waste must obtain a permit from EMD. The purpose of the program is to ensure compliance with the Hazardous Waste Control Act, verify Hazardous Waste accumulation, labeling, container and tank management standards, and waste generator status, respond to complaints of illegal disposal of hazardous waste, and issue permits and inspects businesses that treat hazardous waste pursuant to permit by rule, conditional authorization, or conditional exemption laws and regulations. Contact Thomas Vohoska at vohoskat@saccounty.gov with any questions. 8-7

8. **ADVISORY:** Any facility in Sacramento County that stores petroleum products in above ground tanks in quantities 1,320 gallons or greater must obtain a permit from EMD per the Above Ground Petroleum Storage Act (APSA). You must also develop and implement the Spill Prevention Control and Countermeasures (SPCC) Plan requirements per Code of Federal Regulations, Title 40, Part 112. Contact Thomas Vohoska at vohoskat@saccounty.gov with any questions. 8-8

W:\Land Use\COMMENT LETTERS\2024\PLNP2018-00284 Upper Westside Specific Plan.pdf

SACRAMENTO LOCAL AGENCY FORMATION COMMISSION
1112 I Street, Suite 100 • Sacramento, CA 95814 • (916) 874-6458
www.saclafco.org

October 28, 2024

SENT VIA EMAIL

Sacramento County
Department of Community Development, Planning and Environmental Review Division
Attention: Environmental Coordinator
827 7th Street, Room 225
Sacramento, CA 95814

SUBJECT: Upper Westside Specific Plan (State Clearinghouse No 2020100069, County Control Number PLNP2018-00284)

Mrs. Newton,

Thank you for contacting Sacramento Local Agency Formation Commission (LAFCo) regarding the Upper Westside specific Plan Draft Environmental Impact Report (DEIR). The proposed project is a Specific Plan for a multi-use development located in the northwest portion of unincorporated Sacramento County outside of the County's Urban Policy Area (UPA) and Urban Services Boundary (USB). Also, we thank you for allowing us to submit additional comments a little after the deadline.

Upper Westside is bounded on three sides by the City of Sacramento, adjacent to the existing City of Sacramento communities of North and South Natomas. According to the City's comment on the June 2021 Notice of Preparation, the proposed project site is located outside of the City's Sphere of Influence boundaries.

The Draft EIR prepared by Sacramento County to evaluate the proposed project has been prepared as a Project EIR to meet the requirements of the State CEQA Guidelines. The EIR notes that Sacramento LAFCo may be a responsible agency that would review and approve revised boundaries for urban service providers. Sacramento LAFCo's responsibilities and processes as a responsible agency are set forth in Section 15096 of the State CEQA Guidelines.

LAFCo has reviewed the Notice of Preparation, our June 2021 Response to the NOP, the Draft EIR, and the Appendices to the Draft EIR in order to understand how the County has responded in the DEIR to LAFCo's previous requests to evaluate environmental

issues required of LAFCo by the Cortese-Knox-Hertzberg Act. Our comments on the DEIR follow the order of our 2021 NOP comments.

1. **Revise the DEIR to properly describe the type and timing of the LAFCo entitlements necessary to provide services to the USWP project area.**

   LAFCo's NOP response notes that much of the project site is unserved by urban utilities, and that Sphere of Influence Amendments (SOIAs), annexations, or formations of new service providers would be necessary to serve the proposed UWSP.

9-1

2. **Request for an exclusive Executive Summary to set forth LAFCo procedures and necessary actions.**

   Because the project site has previously been used primarily for agriculture, the project is outside of the service boundaries of many of the providers; for several of the providers, the project area is outside of the providers sphere of influence. For these providers, consistent with LAFCo policies, it would be necessary for the Commission to amend their Spheres of Influence prior to considering an annexation of the project area into the utility service area.

   The DEIR inconsistently describes the types of LAFCo entitlements that would be necessary to extend existing urban services to the project site or to create a new service provider to serve the project area. For example, the project description indicates that a proposed annexation to Sacramento County Water Agency to provide water services to the subject area. SCWA is not a service district under the jurisdiction of LAFCo, and therefore should be removed from the project description. Should SCWA need to extend infrastructure to the subject area, but it will not be accomplished through LAFCo's annexation process. Additionally, the subject area is not included in the SOI for SacSewer. As such the project description would need to be updated to include a SOI amendment to SacSewer with a subsequent Annexation to the service district.

9-2

3. **Request To Meet with Lead Agency**

   LAFCo adopted policy is to retain CEQA lead agency status for those projects that require a Sphere of Influence Amendment, as may be necessary for extending urban services to the USWP project area. As noted in our June 2021 NOP comments, in cases where the Sphere amendment(s) is/are part(s) of a larger project, such as the USWP project, LAFCo may consider entering into a Memorandum of Understanding to establish LAFCo as a co-lead agency in concert with the land use agency. Although this request was made previously in our NOP comments, Sacramento County has not responded to our query. We request to have a meeting with County staff pursuant to Section 15104 of the California Environmental Quality Act, which states that the Lead

9-3

Agency shall convene a meeting with responsible agency representatives to discuss the scope and content of the environmental information as soon as possible but no later than 30 days after receiving a request for the meeting.

9-3 cont.

4. **Request for an exclusive Executive Summary to set forth LAFCo procedures and necessary actions.**

   Given the authority of LAFCo in the project consideration and our NOP comment requesting a discussion in the EIR of LAFCo's role in the entitlement process, including the Commission's procedures, and necessary actions. Our review of the DEIR indicates that no such discussion is offered in the DEIR. Please amend the EIR to include this information.

9-4

5. **Evaluation of public services should describe and assess LAFCo standards and requirements**

   The evaluation of public services should explicitly meet LAFCo requirements. The DEIR appears to properly evaluate the environmental effects of physical facilities that would need to be constructed to serve the project, including those outside of the project site, whose construction potentially could have environmental effects.

   Additionally, the evaluation should assess whether service providers have (1) the service capability and capacity to serve the project area, and (2) whether they can provide services to the project area without adversely affecting existing service levels elsewhere in their service areas.

   The analysis may benefit from consideration of the required service provider Plans for Services regarding the financing and timely provision of services with no adverse impact to existing ratepayers, including sustainable water supplies/treatment/distribution and wastewater collection and treatment, as well as other public services and utilities.

   The evaluation should assess whether new service providers would perform any services that are now being provided by another service provider in the project area, and whether substitution of the new provider for the existing provider would have any adverse effects on the existing provider's ability to maintain services elsewhere in its service area.

   Although LAFCo responsibilities regarding public services and utilities are set forth in DEIR Chapter 20, Utilities they are not mentioned, completed or utilized in the environmental assessment within the Chapter. We request that the DEIR's evaluation of utilities be revised to include our requested information.

9-5

6. Evaluation of potential impacts to Prime Farmlands to meet LAFCo statutory requirements

LAFCo's required definition of prime farmland is set forth in the Cortese-Knox-Hertzberg Act. The regulatory setting contained in Chapter 5 of the DEIR properly sets forth the standards of Government Code Section 56064 in defining prime farmlands, but these criteria are not used in the evaluation of the project's effects on important farmlands elsewhere in the chapter. We request that the DEIR be amended to either include a revision of Impact AG-1 to include a parallel calculation of prime farmland lost using LAFCo's definition of such farmland, or that a standalone impact statement be drafted to evaluate the loss of such farmland. 9-6

The EIR should also assess the interface between planned urban uses and existing and ongoing agricultural uses. Specifically, the analysis should determine the types of crops typically grown in interface areas and the types of pesticides/biocides and other chemicals used on identified crops. For each identified chemical, the EIR should determine any setback required by the State and the Sacramento County Agricultural Commissioner between the application site and sensitive uses such as residences and schools. Any low sensitivity land use buffers necessary to permit continued farming operations should be identified.

7. Evaluation of potential impacts to Prime Farmlands assessed using LAFCo Policies, Standards, and Procedures

The DEIR contains an evaluation of the consistency of the proposed UWSP with Standard E of the LAFCo Policies, Standards, and Procedures. The consideration of the consistency of the proposed project assessed in the EIR is the sole responsibility of the Commission, and not the preparers of the DEIR. Please delete the discussion Sacramento County LAFCo Criteria Factors 1 through Factor 5. 9-7

8. Evaluation of potential impacts to Open Space to meet LAFCo statutory requirements

LAFCo is required by its enabling legislation to evaluate a project's impact on open space. Based on our review, we note that the loss of open space with implementation of the project is not explicitly evaluated in the DEIR (e.g., there is no impact that assesses the loss of open space with implementation of the project). Additionally, there is no discussion of the County-wide loss of open space as requested in LAFCo's June 2021 NOP comment letter. Non-agricultural open space is discussed in DEIR Chapter 4, Aesthetics. Impacts AE-1 and AE-2 evaluate the project induced loss of open space as a change in visual quality. No mitigation measures are offered for either impact, and both are determined to be significant and unavoidable. Agriculture as open space is evaluated in Chapter 5, Agricultural Resources. 9-8

LAFCo requests that the EIR be modified to include an evaluation of the project's effect on open space, both at a project level and at a countywide level. 9-8 cont.

9. **Evaluation of an alternative project that includes expansion of the City's Sphere of Influence and annexation of the project area**

   LAFCo's NOP comment requested that the range of alternatives assessed in the EIR should include an alternative that would amend the Sphere of Influence of the City of Sacramento and annex the project site to the City.

   LAFCo requested that this alternative be evaluated to provide information to the Commission to permit them to evaluate the project's consistency with LAFCo policy to favor the most efficient and comprehensive service provider to the proposed project. As set forth in the DEIR, the project anticipates that the City may furnish a water supply to the project as well as potentially treating and distributing potable water. Additionally, according to the NOP, the City currently provides fire protection services to the site. 9-9

   This alternative was not included in the DEIR, and no rationale for its absence was provided either in response to our NOP comment or in the DEIR. We request that the DEIR be amended to include an evaluation of this alternative.

Advisories:

10. **Sphere of Influence Amendment for County Service Ara No.10 (CSA-10):**

    CSA-10 provides transportation and related services for new development to comply with air quality control measures. The project description includes an annexation to CSA-10 or the creation of a new CSA. Please be advised that forming a new service district has a different process than Annexation. Regardless of the route, LAFCo will need to assess the Sphere of Influence for the service area. 9-10

If you have any questions regarding the comments above, please do not hesitate to reach out to our office. Thank you again for including LAFCo in this process.

Regards,

Desirae N. Fox

Desirae N. Fox
Policy Analyst

Letter 10

SUTTER COUNTY
DEVELOPMENT SERVICES DEPARTMENT

Building Inspection | Code Enforcement | Planning | Admin & Finance
Environmental Health/CUPA | Engineering/Water Resources | Road Maintenance

October 28, 2024

Sacramento County
Department of Community Development
Planning and Environmental Review Division
Attention: Emma Patten, Senior Planner
827 7th Street, Room 225
Sacramento, CA 95814

Re: Draft Environmental Impact Report for the Upper Westside Specific Plan (State Clearinghouse No. 2020100069, County Control Number PLNP2018-00284)

Dear Emma Patten:

Sutter County has reviewed the Draft Environmental Impact Report (DEIR) for the Upper Westside Specific Plan (UWSP) project (PLNP2018-00284) and provides the following comments:

1. As a signatory to the Natomas Basin Habitat Conservation Plan (NBHCP), Sutter County has serious concerns regarding this project and its potential to jeopardize the validity of the NBHCP. Under the NBHCP and Incidental Take Permit (ITP), Sutter County and the City of Sacramento were permitted a designated amount of development within the Natomas Basin in exchange for compliance with the NBHCP and ITP to allow for preservation of habitat lands for threatened and endangered species. The Severability section of the NBHCP states that if one of the plan's participants has its permits revoked for failure to comply with the NBHCP, the essential effect to the implementation of the NBHCP is that less Authorized Development is covered by the plan. 10-1

2. The DEIR identifies the consistency of the UWSP mitigation measures with the provisions of the NBHCP and Metro Air Park Habitat Conservation Plan (MAPHCP), but does not fully evaluate nor consider the various conflicts the development itself and implementation of these mitigation measures would have with the related ITPs and Implementation Agreements (IA) for both HCPs, which is a significant and avoidable oversight that should be fully evaluated prior to approval of any environmental documents and mitigation measure for this proposal. 10-2

3. The approval of the development of this property within the Natomas Basin would constitute a significant departure from the NBHCP's Operating Conservation Plan and could trigger a re-evaluation of the NBHCP. As a signatory to the NBHCP, this is unacceptable to Sutter County, since approval of this project places the integrity of the NBHCP in jeopardy and could impact Sutter County's ability to develop within its own permitted development area. 10-3

4. As discussed in the document, the project applicants only control 292 acres or 14 percent of the UWSP area but are proposing a significant shift of 1,532 acres from agriculture/farmland to 9,356 units and 3.1 million square feet of commercial, retail, and office uses. How does Sacramento County intend to hold the larger non-participating property owners of the 10-4

remaining 1,774 acres accountable and tied to biological resources and mitigation contained in this document that has also not been reviewed and approved by CDFW or USFWS? 10-4 cont.

5. **BR-12: Loss of Wildlife Movement and Nursery Sites.** The permanent loss of giant garter snake dispersal habitat within the Natomas Basin, proposed with this development, will not adequately be mitigated by providing mitigation outside of the Natomas Basin. The permanent loss within the Natomas Basin will be a further detriment to available dispersal habitat, is contrary to the NBHCP and MAPHCP, and will remain a significant impact. 10-5

6. **BR-13: Conflict with Any Local Policies or Ordinances Protecting Biological Resources.** Although Sacramento County has adopted a Swainson's Hawk Ordinance and Impact Mitigation Program, this would still not sufficiently mitigate for the loss of 40 acres of Swainson's Hawk foraging habitat that this development would eliminate in the Natomas Basin, which is also contrary to the policies of the NBHCP and MAPHCP. Therefore, this would also still remain a significant impact. 10-6

7. **BR-14: Conflict with Natomas Basin HCP and Metro Air Park HCP.** The NBHCP and MAPHCP are adopted conservation plans with respective plan areas that cover all of the Natomas Basin, not portions of the Natomas Basin. Although the applicant is proposing to implement some similar mitigation measures included in both plans to help to minimize impacts to covered species in the NBHCP and MAPHCP, the approval and development of the UWSP area could permanently disturb/harm over 975 acres of habitat/foraging area for these protected species, which is directly contrary to both the NBHCP and the MAPHCP documents and policies. Approval and construction of this development as proposed would potentially pose significant impacts to the long-term implementation and success of both HCPs, with or without the proposed mitigation measures. 10-7

8. It is premature to propose such significant land use changes, potential changes in habitat for protected species, and mitigation without fully evaluating the proposal's impacts to the existing NBHCP and MAPHCP (which have both already been reviewed and approved by USFWS and CDFW) without first obtaining each agencies' requirements and approvals through each of their existing permitting processes. 10-8

9. As we believe this proposal may have significant and potentially avoidable conflicts with the approved NBHCP and MAPHCP, and this EIR is intended to be used for the permitting processes for USFWS, CDFW, and other applicable agencies, Sutter County should be involved in any discussion and/or permitting review process within the Natomas Basin that may affect our implementation and validity of the existing NBHCP, ITP, and IA. 10-9

In summary, the topics discussed above are of great concern to Sutter County. This project lies outside of the boundaries designated in the NBHCP for development. Sacramento County land use designation, boundaries, and policies should not be modified to accommodate growth which is neither contemplated nor permitted by the NBHCP. Sutter County cannot support a proposal that may undermine the adopted NBHCP, or potentially threaten Sutter County's ability to develop within its already permitted development area. Accordingly, Sutter County strongly encourages Sacramento County to <u>fully</u> evaluate the impacts of this development proposal on all affected parties before reviewing and/or approving such a significant change. 10-10

Please provide Sutter County and my office with all future notices regarding this project.

Sincerely,

Arwen Wacht Digitally signed by Arwen Wacht
Date: 2024.10.28 15:51:25 -07'00'

Arwen Wacht
Principal Planner

Ec: Steven Smith, County Administrator
Neal Hay, Development Services Director
William Vanasek, County Counsel
Sutter County Board of Supervisors

Cheryle Hodge, Principal Planner/New Growth Manager, City of Sacramento

John Roberts, Executive Director, The Natomas Basin Conservancy

From: King Tunson
To: Newton. Julie
Subject: RE: Notice of Availability of Draft EIR for the Upper Westside Specific Plan
Date: Tuesday, September 10, 2024 2:51:04 PM

Hi Julie,

I reviewed the above-referenced document and don't have any additional comments. Thanks

11-1

King Tunson
Program Specialist
Fire Planning/Administration
Sacramento Fire Department
5770 Freeport Blvd, Ste 200
Sacramento, CA 95822
Office (916) 808-1358
ktunson@sfd.cityofsacramento.org

From: Newton. Julie <newtonj@saccounty.gov>
Sent: Friday, August 30, 2024 3:18 PM
To: PER-CEQA <CEQA@saccounty.gov>
Subject: Notice of Availability of Draft EIR for the Upper Westside Specific Plan

To all interested parties,

NOTICE is hereby given that a Draft Environmental Impact Report (DEIR) has been prepared by the County of Sacramento, State of California, and is available for public review pursuant to State of California, California Environmental Quality Act (CEQA) Guidelines for the project listed below.

Proposed Project: Upper Westside Specific Plan (State Clearinghouse No 2020100069, County Control Number PLNP2018-00284)

Review and Comment Period: August 29, 2024 to October 14, 2024

Project Location: The Project encompasses approximately 2,066 acres in the unincorporated Natomas community of Sacramento County, approximately 3.5 miles from downtown Sacramento. The Project area is bounded by Interstate 80 to the south, the West Drainage Canal to the east, Fisherman's Lake Slough to the north, and Garden Highway to the west. The Project is located outside of the County's Urban Policy Area (UPA) and Urban Services Boundary (USB), and is bounded on three sides by the City of Sacramento, bordering the communities of North and South Natomas.

Project Description: The Specific Plan would encompass a 1,532± acre Development Area and a 534± acre Ag Buffer Area that is located west of the Development Area,

providing a transition to the Garden Highway. Within the Development Area, the project proposes an urban, commercial mixed-use town center district near the intersection of El Centro Road and West El Camino Avenue surrounded by neighborhoods. The Development Area includes 9,356± dwelling units and 3,096,245± square feet of commercial uses, with three K-8 school sites, one high school site, and several parks. Other amenities include trail networks, a greenbelt and urban farm corridor, and a canal system that will all encourage pedestrian and bicycle use by providing connections between neighborhoods.
In addition to the adoption of the Specific Plan, the Project will require amendments to the Sacramento County UPA and USB boundaries. The Project also requires amendments to the General Plan to include the proposed policy amendments and land uses, streets and bikeways on the General Plan's Land Use Diagram, Transportation Plan, and Active Transportation Plan. The Project will also require adoption of a Water Supply Master Plan amendment, and a Water Supply Assessment pursuant to California Water Code.

Significant Environmental Effects: The DEIR identified that the project would result in significant and unavoidable impacts related to aesthetics, agricultural resources, air quality, cultural resources (historical resources), noise, population and housing, transportation, and tribal cultural resources. The project would result in impacts that are less than significant or less than significant with mitigation with respect to airport compatibility; biological resources; climate change; cultural resources; energy; geology, soils, and mineral resources; hazards and hazardous materials; hydrology, drainage, and water quality; land use; public services; public utilities; and water supply.

WHERE DRAFT EIR MAY BE REVIEWED: The Draft EIR is available for review during normal business hours at the Sacramento County Planning and Environmental Review Division in Sacramento (827 7th Street, Room 225, Sacramento, CA 95814).
The DEIR as well as other project documents and details may be reviewed at the internet and/or physical address below:
https://planning.saccounty.gov/PlansandProjectsIn-Progress/Pages/UpperWestsideSpecificPlan.aspx

SEND COMMENTS TO:
Sacramento County,
Department of Community Development, Planning and Environmental Review Division
Attention: Environmental Coordinator
827 7th Street, Room 225
Sacramento, CA 95814;
Comments can also be emailed to CEQA@saccounty.gov no later than 5:00 p.m. on October 14, 2024. Failure to comment will not preclude your right to testify at a future public hearing for the proposed project.

PUBLIC HEARINGS: The County Planning Commission will hold a public meeting to accept public comments on the project and close the public comment period on Monday, October 21, 2024.

An additional public hearing for the project will be held at the Planning Commission and Board of Supervisors after preparation of a Final EIR. The date, time, and place of the Planning Commission hearing are presently unknown. An additional notice providing the date, time, and place of the Planning Commission hearing will be provided once a date has

been finalized.
Agendas and materials for Sacramento County public meetings can be found at:
https://www.saccounty.gov/Government/Pages/PublicMeetings.aspx

City of SACRAMENTO
Community Development

October 28, 2024

Letter submitted via e-mail at: CEQA@saccounty.gov.

Sacramento County,
Department of Community Development, Planning and Environmental Review Division
Attention: Environmental Coordinator
827 7th Street, Room 225
Sacramento, CA 95814

Subject: COMMENTS ON THE DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE UPPER WESTSIDE SPECIFIC PLAN (PLNP2018-00284).

Dear Environmental Coordinator,

On August 30, 2024, Sacramento County released the Draft Environmental Impact Report (DEIR) for the Upper Westside Specific Plan (UWSP). The proposed UWSP would include development of approximately 1,532± acres within a 2,066 acres project area located north and west of Interstate 80 and north and east of Garden Highway. The proposal includes the addition of 9,356 dwelling units (25,460 population) and 3,106,700± square feet of commercial uses into the unincorporated Natomas area bounded by the City of Sacramento. The project plan includes development consisting of residential, neighborhood mixed-use, neighborhood commercial, community mixed-use, office mixed-use and health & hospitality mixed-use. The plan includes three K-8 school sites, one high school site, several parks, and a 10.0± acre urban farm site on property owned by the Los Rios Community College District that is envisioned to be part of a 16.0± acre vocational training campus.

The proposed UWSP borders the City of Sacramento on three sides. This area is located within the City's American River Place of Use (POU) for water rights and the Natomas Basin Habitat Conservation Plan (NBHCP). The Sacramento unincorporated area of Natomas Basin is designated as an Area of Concern and a Study Area per the City's 2040 General Plan. The UWSP is located in an area that is also known as the "Boot" per the Natomas Joint Vision Plan that was a joint planning effort undertaken years ago with a group of landowners, Sacramento County and the City of Sacramento.

The magnitude of the project is significant in that the proposal consists of the development of 1,532 acres of the 2,066 acres of rural agricultural lands. This area along with other open space lands located in Natomas Basin has been mostly undeveloped primarily because the City of Sacramento has been committed to the implementation of the Natomas Basin Habitat Conservation Plan (NBHCP) for over 25 years while prioritizing infill development.

The DEIR comments presented in this letter address multiple topical areas. The following provides a brief listing of significant comment topic points that are later detailed further in this letter along with additional comments:

- **Prior NOP Comments Not Addressed** – City staff submitted comments in response to the Notice of Preparation (NOP) for the UWSP. These comments provided input on the scope of the EIR as requested by the County. However, the UWSP DEIR analysis does not properly address the issues raised in our NOP comment letter dated November 20, 2020. This letter documents the areas that are deficient in the DEIR. 12-1

- **NBHCP Conflict & Viability** – The UWSP is in direct conflict with the conservation strategy of the adopted NBHCP and Incidental Take Permits (ITPs) issued by the U.S. Fish and Wildlife Service (FWS) and California Department of Fish and Wildlife (CDFW) to the City of Sacramento. Specifically, the ITPs limit urban development in the "Basin" to 17,500 acres which is the total combined authorized development of the City of Sacramento, Sutter County and Metro Air Park. The limitation of 17,500 acres pertains to the "Basin" for the approved conservation strategy to be successfully completed. If Sacramento County approves any urbanization beyond the 17,500 acres authorized by the wildlife resources agencies doing so would be in direct violation of the existing ITPs that the wildlife resource agencies enforce. Sacramento County may recall being asked on to join the City of Sacramento and Sutter County to participate in the NBHCP (see Attachment A letter dated 11/28/2000). If Sacramento County is considering allowing further urbanization of the Basin that was not contemplated by the NBHCP how will the County provide assurances to the NBHCP signatory parties that the conservation strategy can still be successfully completed especially without the County's HCP participation? 12-2

  The following provides a partial listing of the issues that City staff has determined conflict with the NBHCP: 12-3
  - Proposed UWSP directly impacts the protected one-mile Swainson's Hawk buffer zone approved by the wildlife resource agencies.
  - Proposed UWSP would allow development of 1,532 acres of land that currently is rural agricultural lands beneficial to the NHBCP and that could potentially be acquired in the future for habitat lands. 12-4

- Proposed UWSP would decrease the remaining open space lands in Natomas Basin which directly impacts the viability of the NBHCP by jeopardizing the successful completion of the NBHCP and placing urbanization near protected areas such as Fisherman's Lake and existing Conservancy owned HCP mitigation lands. 12-5
- Future development of 1,532 acres of UWSP would place a greater burden on the existing planned growth authorized by the NBHCP which in turn will most likely cause HCP fee payers increased HCP fee rates and the inability to secure mitigation lands that meet all of the rigorous HCP mitigation land criteria. 12-6
- An Amendment to the NBHCP and obligations of the issued ITPs would be needed for any development to occur within the one-mile SWHZ and an in-depth effects analysis in relation to the existing adopted NBHCP conservation strategy including future viability to meet all requirements of the NBHCP considering the loss of 1,532 acres due to UWSP and cumulative impacts associated with the proposed Grandpark Specific Plan (approximately 5,400 acres) in process with the County. The County is essentially considering allowing roughly 7,000 acres of land located in the unincorporated Sacramento County portion of the Natomas Basin to be removed from benefiting and contribution to the completion of the NBHCP conservation strategy. 12-7
- Biological – the Draft EIR concludes that with mitigation the UWSP biological impacts can be mitigated to a less than significant level. City staff disagrees with this conclusion. 12-8

- **NBHCP Participation** – If the County intends to allow urbanization beyond its Urban Services Boundary (USB) and Urban Policy Boundary (UPB) why would the County not join the NBHCP as the City of Sacramento and Sutter County have done? Sacramento County may recall being asked to participate in the NBHCP (see Attachment A letter dated 11/28/2000). If Sacramento County is considering allowing further urbanization of the Basin that was not contemplated by the NBHCP how will the County provide assurances to the NBHCP signatory parties that the conservation strategy can still be successfully completed especially without the County's HCP participation? This has been an issue and concern expressed for over 25 years and to date has not been resolved. 12-9

- **Water** – During the County's preparation of the Draft EIR, the City in compliance with State law provided a water supply assessment as requested by the County. The water supply assessment is not an agreement nor commitment by the City to provide water for the future development of UWSP. The City has not entered into any agreement to provide water for the UWSP development. The Draft EIR incorrectly assumes and seems to have pre-determined that the City would provide water to UWSP per an agreement to do so with Sacramento County 12-10

Water Agency (SCWA). Page 2-24 of Section 2 Project Description of the UWSP Draft EIR states the following:

> *"WATER*
> *The City of Sacramento through an agreement with the SCWA would provide water service to land uses allowed under the proposed UWSP. The City of Sacramento obtains most of its water supply from surface water in the American and Sacramento rivers, while groundwater obtained from the North American and South American subbasins of the Sacramento Valley Groundwater Basin provides the remainder.*
>
> *As discussed above, the proposed UWSP would require SCWA annexation. Water supply would be delivered to the UWSP area through the City's water treatment and distribution system, which consists of two water treatment plants, eight pump stations, many storage reservoirs, 28 municipal wells, thousands of hydrants, and nearly 1,800 miles of pipeline."*

The DEIR conflicts with the City's 2040 General Plan policy that pertains to provisions of City services to new development in unincorporated areas. The specific policy is presented below: 12-10 cont.

> *"LUP-1.4 City Services Prior to Annexation. Prior to the provisions of City services to new development in unincorporated areas, the City shall require that the unincorporated properties be annexed into the City. Alternatively, the City may provide utility service to properties in advance of annexation only if the annexation process has been initiated and the landowner and City have executed a conditional agreement for services that stipulates minimum standards for the development of roads and urban infrastructure and criteria and conditions for annexation into the City."*

The Draft EIR page 14-29 lists future Service District Annexation requests to the Sacramento Local Agency Formation Commission (LAFCo). City staff opposes any filing of Service District Annexation requests including for example the listed annexation to Sacramento County Water Agency (SCWA) until to the satisfaction of the City of Sacramento pending concerns and issues are resolved such as water supply/service, Natomas Basin Habitat Conservation Plan conflicts, and provision of public services such as police and fire protection.

- **Transportation** – The UWSP has significant implications to the transportation network and facilities located with the City of Sacramento in addition to the nearby freeways and Garden Highway. These concerns are documented in further detail in this letter. 12-11

- **Public Services** – The Draft EIR does not adequately address the impacts of the UWSP on existing public services (police, fire, parks) nor details how these services would be provided considering the lack of current County services in the area due to the existing rural nature and that the UWSP is geographically removed from proximity to nearby County services.

12-12

ADDITIONAL DETAILED COMMENTS:

The City's comments below respond specifically to the information presented and analysis provided in the DEIR. The Planning Division of the Community Development Department presents the comments below as a single letter representing multiple City departments.

Memorandum of Understanding between City & County

On December 10, 2002, the City & County entered into a Memorandum of Understanding (MOU) (City Resolution 2002-830 and County Resolution 2002-1566) regarding Principles of Land Use and Revenue Sharing for the Natomas Area. The MOU (Attachment B) specifically calls for any future urbanization efforts in the Natomas Joint Vision Area (NJVA) to be processed through the City, with the County remaining a steward of agricultural lands and open spaces.

The DEIR inadequately addresses the implications of this MOU, particularly the agreement that future urbanization efforts in the NJVA would be processed through the City, with the County remaining a steward of agricultural lands and open spaces. Furthermore, the EIR does not acknowledge or analyze the City's intent to designate the Natomas Basin Study Area, which includes the project area, as an Area of Concern. The City's General Plan policy LUP-A.1 explicitly states the City's near-term goal (2024-2029) to work with LAFCo on this designation, which would give the City "greater influence on land use decisions and other governmental actions" in the area.

12-13

City staff does not support the proposed County General Plan Amendment for text amendments to align County policies in various General Plan Elements regarding development in the Natomas Joint Vision Area. There has been no coordination with City staff regarding proposed text amendments to the County's General Plan that are relative to potential future development in the Natomas Joint Vision Area. Since this specifically pertains to potential development in Natomas Basin which the City has designated as an Area of Concern per the City's 2040 General Plan and located within our designated Natomas Basin Study Area it would seem that the County would provide some coordination with the City prior to moving forward with changes that pertain to a subject that has been of interest to the City for more than 25 years.

12-14

Economic Impacts

Our concerns about the concentration of commercial development along the westerly extension of El Camino Avenue remain unaddressed. The DEIR does not sufficiently analyze the potential regional nature of this retail development and its implications for traffic patterns and associated environmental impacts. It fails to address the potential secondary physical and economic impacts within the City that may result from locating retail, hospitality, and other commercial uses adjacent to the City boundary. 12-15

The 2002 City/County MOU recognized mutual economic interests in the future of NJVA and outlined a revenue sharing framework. The DEIR does not address how the UWSP aligns with or impacts this framework. There is insufficient discussion of how the County plans to address these economic issues, especially considering the entitlements being sought by project proponents. 12-16

Growth Inducement

While the DEIR addresses some concerns raised in our NOP comment, particularly regarding the extension of urban infrastructure and potential growth-inducing effects, certain aspects of our request for analysis have not been adequately addressed, especially as they pertain to impacts on the City of Sacramento.

The DEIR acknowledges that the project would eliminate obstacles to growth by extending the Urban Services Boundary and Urban Policy Area. However, it does not sufficiently analyze the project's consistency with long-range plans, particularly its inclusion or absence from the Region's Sustainable Communities Strategy. This omission is significant, as it relates directly to the broader regional planning context and potential cumulative impacts on the City of Sacramento. 12-17

Furthermore, the DEIR lacks a comprehensive analysis of the project's growth-inducing effects on the City of Sacramento. While it mentions consistency with Sacramento County General Plan Policy LU-120, it fails to provide a detailed, quantitative examination of how the project's infrastructure extensions might stimulate additional development within our City limits. This analysis should include estimates of the scale, type, and timing of potential new development, as well as a thorough assessment of the resulting environmental impacts. The DEIR's current list of general impact categories is insufficient without a location-specific analysis of how these effects would manifest within Sacramento.

We request that these areas of analysis be expanded to fully address the growth-inducing impacts of the proposed project on the City of Sacramento, as originally outlined and requested in our NOP comment.

Habitat Conservation Plan

Hydrological connectivity

Our NOP comment requested an analysis of hydrological connectivity to existing preserves in Natomas Basin. The DEIR states that the UWSP "is not expected to significantly affect the connectivity of aquatic habitat for giant garter snake" and "would not affect the delivery of water to existing reserves." However, this brief statement lacks the detailed analysis we sought. We request a more thorough examination of potential impacts on existing preserves, particularly the adjacent Cummings Reserve. 12-18

Effects on land inventory and mitigation prices

We specifically asked for an analysis of the effects of reducing land available for mitigation while increasing demand, potentially driving up mitigation prices for existing permit holders. The DEIR does not directly address this issue. While it states that mitigation lands "would not unnecessarily directly compete with TNBC for habitat mitigation opportunities," this assertion lacks supporting evidence. We request a detailed analysis of how the UWSP might affect land availability and mitigation costs for existing NBHCP and Metro Air Park (MAP) HCP parties. 12-19

Land availability for HCP parties

We asked how and where HCP parties with authorized development would find land for mitigation given the cumulative impacts of proposed developments in the Natomas Basin Area. The DEIR's treatment of this issue is insufficient, stating only that mitigation measures BR-3 & BR-7b are "not expected to interfere with the ability of TNBC to satisfy its mitigation responsibilities." We request a more comprehensive analysis of cumulative impacts on mitigation land availability. Based on our direct experience implementing the NBHCP for over 25 years, we question if there is enough suitable land that would remain available to The Natomas Basin Conservancy to mitigate the already approved authorized development of 17,500 acres granted to the City, Sutter County and Metro Air Park if Sacramento County allows the UWSP and Grandpark Specific Plan projects to be approved. We request that Sacramento County evaluate the HCP mitigation land criteria requirements, total mitigation including size of habitat reserves that are required for completion of the HCP conservation strategy. The UWSP DEIR focuses on the impacts and mitigation of the UWSP project itself but does not address the existing HCP acreage requirements that must be completed in the Basin. 12-20

Prior to conducting any public hearings for potential action on the UWSP by the County Planning Commission and Board of Supervisors, we request Sacramento County provide the NBHCP signatory parties (City of Sacramento, Sutter County, FWS and CDFW) a

detailed accounting and graphics demonstrating of how HCP total acreage requirements could be accomplished with the potential approval and implementation of the UWSP and Grandpark Specific Plan projects. This information and data should also be included as part of the proposed Final EIR when it becomes available.

12-20 cont.

Consistency with NBHCP Conservation Strategies

We request further clarification on the adequacy of the proposed 250-foot open space buffer between planned development and the Cummings Reserve, compared to the NBHCP's 800-foot setback requirement. The DEIR notes that exceptions to the 800-foot setback have been made in the past. While this explanation is helpful, we request further analysis on whether this 250-foot buffer is sufficient to protect the Cummings Reserve from potential edge effects of urban development.

12-21

We urge the County to provide a more robust analysis of these issues in the Final EIR to ensure the UWSP does not compromise the NBHCP's conservation goals or the ability of existing HCP parties to meet their mitigation obligations.

One-Mile Buffer Swainson's Hawk Zone

The City of Sacramento must express its opposition to the proposed Upper Westside Specific Plan (UWSP) due to its direct conflict with the Natomas Basin Habitat Conservation Plan (NBHCP).

The City of Sacramento, as a signatory to the NBHCP, has a legal obligation to ensure the continued integrity of this regional conservation strategy. Our analysis of the UWSP reveals that significant portions of the proposed development would encroach into the Swainson's Hawk Zone - a critical one-mile-wide buffer adjacent to the Sacramento River that was explicitly established in the NBHCP to protect essential Swainson's Hawk habitat and foraging areas. The NBHCP categorically prohibits development within this zone, with only a strictly limited exception of 252 acres granted to the City of Sacramento.

12-22

While Sacramento County is not a direct signatory to the NBHCP, both the U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW) are bound to the NBHCP as "Permitters" with mandatory obligations to enforce its provisions. These wildlife agencies would be required to issue permits for the UWSP, yet doing so would fundamentally conflict with their legal obligations under the NBHCP, which states that any additional urban development within the Swainson's Hawk Zone "would constitute a significant departure from the Plan's Operating Conservation Program."

The project's inadequate agricultural buffer of 534 acres, ranging from merely 700 to 2,700 feet in width, is insufficient compared to the one mile (5,280 feet) protective

buffer mandated by the NBHCP. This reduction in buffer width would severely compromise a core conservation measure that both wildlife agencies have previously determined to be essential for the protection of Swainson's Hawk habitat.

The NBHCP is explicit: development beyond the permitted activities necessitates a comprehensive reevaluation of the Plan, a new effects analysis, potential amendments to the Plan and/or permits, and a separate conservation strategy. For the wildlife agencies to issue permits for this project as currently designed would require the completion of all these actions - none of which have been undertaken.

We are particularly alarmed that approval of development within the Swainson's Hawk Zone would directly threaten the biological effectiveness of the NBHCP's conservation strategy, which both the City of Sacramento and Sutter County depend upon for our incidental take permits. The one-mile buffer zone was established through rigorous biological analysis and stands as an indispensable component of the plan's mitigation strategy for impacts to Swainson's Hawk.

The County must either:

12-22 cont.

- Substantially redesign the project to eliminate all development within the one-mile Swainson's Hawk Zone buffer; or

- Undertake the mandatory comprehensive reevaluation of the NBHCP required when proposing development within this zone, including preparation of a new effects analysis and development of a separate conservation strategy that definitively ensures no net loss of the effectiveness of this critical conservation measure. This reevaluation must be conducted under the strict oversight of USFWS and CDFW to ensure absolute compliance with their obligations as Permitters under the NBHCP.

- For any County approval of development that directly disturbs the one-mile Swainson's Hawk Zone (SWZ), we request that the County first initiate an amendment to the NBHCP with the wildlife resource agencies to modify the requirements and obligations placed on the City of Sacramento and Sutter County that pertain to the one-mile SWZ. Any action by Sacramento County to approve and allow development within the SWZ is in direct conflict with the adopted NBHCP and enforceable requirements by the wildlife resource agencies including for example, the Incidental Take Permits issued by U.S. Fish and Wildlife Services (FWS) and the California Department of Fish and Wildlife (CDFW) to the City of Sacramento and Sutter County.

Agriculture

The Draft EIR falls short in addressing crucial concerns regarding the project's impact on agricultural resources and the Natomas Basin Habitat Conservation Plan (NBHCP). While the EIR quantifies the conversion of approximately 1,372 acres of farmland within the project area, it fails to provide a comprehensive analysis of how this loss might affect the NBHCP's requirement to maintain 4,375 acres in rice cultivation for Giant Garter Snake habitat. The EIR should evaluate not only the direct loss of farmland but also the potential indirect effect of increased development pressure on remaining agricultural lands in the Natomas Basin, which could make it more challenging to maintain the required acreage of rice cultivation. 12-23

Transportation

Roadway Widening and City Responsibility

The DEIR continues to rely on fair share contributions toward roadway widening projects within City limits without adequately addressing our concerns about implementation responsibility. For instance, Mitigation Measure TR-3b still assumes City involvement in implementing improvements at I-5 on-ramps, despite our previous statement that the City should not be assumed to have matching funds. The DEIR does not propose alternative mitigation approaches that avoid placing implementation responsibility on the City, nor does it explain how these projects would be fully funded and executed given the City's financial constraints. 12-24

TR-3a and TR-3b Impacts & Mitigations on Page ES-119 & ES-120: The City of Sacramento looks forward to working collaboratively with the County on the required I-80 West El Camino Avenue interchange improvements being triggered by the project's development. As specified in the Upper Westside Specific Plan Public Facilities Financing Plan on page 23, the traffic analysis estimated that approximately 90 percent of trips caused by new development in the County using this interchange would be caused by development in the UWSP. The City looks forward to seeing the UWSP project fulfills the required improvements and phasing to ensure the ultimate improvements are constructed when triggered by the UWSP project. 12-25

Conflict with City Transportation Policies

Our NOP comments highlighted the City's current focus on reducing lanes on City roadways to align with our Climate Change goals. However, the DEIR does not acknowledge or analyze how the proposed roadway widenings, such as those in Mitigation Measure TR-3a, align with or conflict with this policy direction. We request that the Final EIR include an analysis of how the proposed transportation improvements align with the City's current transportation policies and goals. 12-26

Regional Growth and VMT Impacts

The DEIR's VMT analysis remains narrowly focused on project-level impacts and does not address our request to examine how the UWSP may redistribute growth away from the City or impact the City's VMT relative to the regional average. We continue to be concerned about potential impacts on the City's growth patterns and overall regional VMT efficiency. We request that the Final EIR include modeling scenarios that evaluate these broader impacts as originally suggested in our NOP comments. 12-27

Ongoing Technical Coordination

While the DEIR mentions some collaboration with the City, it does not outline a specific process for ongoing coordination throughout project development and implementation as we had requested. Given the project's potential impacts on City infrastructure and services, we believe a more detailed plan for continued technical coordination is necessary. 12-28

Water

In our NOP comments, we identified three potential alternatives for providing domestic water to serve the proposed UWSP area. While the DEIR focuses on Alternative 3 - utilizing City of Sacramento water rights and infrastructure - it does not provide a comprehensive analysis or clear dismissal of Alternatives 1 and 2 involving Natomas Central Mutual Water Company (NCMWC) water rights. We request that the Final EIR include a thorough evaluation of all three alternatives to ensure a complete understanding of the project's water supply and water retailer options. 12-29

Furthermore, our NOP comments requested specific details regarding the water delivery system engineering, including the size of mains, distribution, volume, future capacity, system pressurization, storage capacity, and measures to protect the water supply and prevent contamination of the City's existing system. While the DEIR provides some information about the proposed water delivery system, including a water storage tank and transmission mains, it lacks the level of detail we requested. We urge the County to include more comprehensive information on these aspects in the Final EIR to fully assess the potential environmental impacts and ensure the adequacy of the proposed water infrastructure. 12-30

Sewer System

The City of Sacramento notes the EIR's discussion of new wastewater infrastructure needed to serve the Upper Westside Specific Plan area, including the proposed sewer pump station and force main. However, we note that our previous comment requesting 12-31

analysis of impacts to the Sacramento Regional County Sewer Interceptor has not been adequately addressed. Specifically, the EIR lacks a comprehensive evaluation of the interceptor system's capacity downstream of the New Natomas Pump Station to accommodate additional flows from this project in combination with buildout of the existing Natomas area and other proposed development in the Natomas Joint Vision area. We remain concerned about the potential cumulative impacts on this critical piece of regional infrastructure and whether it has sufficient capacity to serve all these areas without requiring significant upgrades. The City requests that the EIR be revised to include a thorough analysis of existing and projected flows in the interceptor system, an assessment of its available capacity at key points along its alignment, and an evaluation of whether system upgrades may be necessary to handle the increased wastewater volumes. If upgrades to the interceptor are required, the potential environmental impacts of such improvements should also be discussed.

12-31 cont.

Fire Protection

The City of Sacramento notes the acknowledgment in the DEIR that the City's Fire Department currently provides and will continue to provide fire protection and emergency medical services to the Upper Westside Specific Plan (UWSP) area under contract with the Natomas Fire Protection District. We also note the inclusion of a site for a new fire station within the proposed plan. However, we find that the DEIR does not adequately address several key concerns raised in our NOP comments.

The DEIR lacks a comprehensive analysis of fire protection services and facilities as requested. While it provides a basic assessment of increased demand and the need for a new station, it falls short of the in-depth analysis needed for a project of this scale. We request a more detailed evaluation of current service levels, response times, equipment needs, and long-term planning for fire protection services. Furthermore, the DEIR does not sufficiently address how the project proponent will mitigate service demand impacts and maintain current levels of service throughout the project's implementation. We request more specific information on phasing, funding mechanisms, and interim measures to ensure consistent service levels during development.

Given the City's extensive experience in providing municipal services, including over 100 years of fire protection services, we reiterate our position that the City is best equipped to provide a full range of municipal services to the UWSP area. We request that the EIR include a more robust discussion of the City's role in long-term service provision and planning for the area.

12-32

Law Enforcement

The DEIR fails to adequately address the concerns raised in our NOP comment regarding potential impacts to City of Sacramento police protection services. The DEIR focuses

12-33

exclusively on Sacramento County Sheriff's Office services without acknowledging or evaluating potential impacts to the City of Sacramento Police Department (SPD). This oversight is particularly concerning given the project's unique geographical context - adjacent to the City but isolated from developed County areas - which could potentially strain City services.

Furthermore, the DEIR does not provide the requested evaluation of how and when law enforcement services and facilities will be provided to ensure no impacts to the City of Sacramento. While plans for a new County sheriff's substation are discussed, this does not address the potential cross-jurisdictional impacts or need for coordinated services with the City.

The California Highway Patrol's role is only briefly mentioned, without fully addressing its responsibilities for state highways, state-owned buildings, and state property within the City, as noted in our NOP comment.

Given the project's location and potential to affect multiple jurisdictions, we reiterate our request for a more comprehensive analysis that considers impacts to both County and City services, as well as inter-agency coordination strategies. This analysis should evaluate how the proposed development's law enforcement needs will be met without adversely impacting existing City services or response times.

12-33 cont.

Schools

We appreciate that the DEIR identifies the existing schools that would serve different portions of the UWSP area, including Witter Ranch Elementary School, Two Rivers Elementary School, Natomas Middle School, Inderkum High School, and Natomas High School. This information adequately addresses which schools would serve residents both inside and outside the specific development plan areas within the UWSP.

However, the DEIR does not fully address our question regarding which schools would serve the area while the proposed schools are being built. While Table PS-2 provides helpful enrollment and capacity data for existing schools, the DEIR lacks a clear explanation of how school services will be provided during the interim period before new schools are operational. We request that the Final EIR include a phasing plan showing when the proposed schools would be constructed relative to residential development, an explicit discussion of which existing schools would absorb students during the construction phases, and an analysis of whether those existing schools have sufficient capacity to handle temporary increases in enrollment. This information is crucial for understanding the full impacts of the project on school services throughout its implementation.

12-34

Parks & Recreation Facilities

The Draft EIR for the UWSP analyzed the project's impact on the existing setting for Parks and Recreation Facilities by considering whether an increase in use of public parks and recreation facilities resulting from the UWSP would cause the substantial physical deterioration of those facilities (e.g., damage to vegetation, accelerated wear on sports facilities and fields, or erosion along trails) or in the need for new or expanded facilities, the construction or operation of which would result in substantial adverse physical effects. This analysis further considers whether implementation of the proposed UWSP would diminish or otherwise adversely affect recreational opportunities and existing facilities within the UWSP area based on facility capacity.

Within a 1-mile radius of the UWSP area, there are approximately 20 parks, most of which are within the City of Sacramento and comprising a total of 160 acres of parklands. The closest parks to the UWSP area include River Otter Park, located directly adjacent to the southeastern edge of the UWSP area across Interstate 80, Peregrine Park, located directly adjacent to the eastern edge of the area, and San Juan Reservoir Park, located directly adjacent to the northwestern edge of the area. The North Natomas Regional Park, at 212 acres, located 1.6 miles northwest of the UWSP serves the entire region.

12-35

As stated in the DEIR, the proposed UWSP would facilitate development of up to 9,356 housing units and yield 25,460 residents. The Sacramento County 2030 General Plan, Policy PF-123 requires 5.0 acres of parkland per 1,000 residents. As a result, approximately 127.9 acres of parkland is required to serve the needs of the proposed UWSP. As there are no parks currently located directly within the UWSP area, the 160 acres of nearby parks previously described could be adversely affected by the increase of residents generated by the proposed UWSP. The areas surrounding the UWSP area, in which the existing parks are located, are developed, and contain existing residents that utilize these facilities. Therefore, there is a need for new parks to serve the UWSP area and to alleviate pressure which would occur to nearby parks from increased residential uses in this area.

To accommodate the increase in residents resulting from the proposed UWSP, the plan includes a "parks program," which outlines the proposed parks and recreational facilities to be implemented in the UWSP area. The proposed UWSP parks program proposes a diverse mix of recreational amenities and public gathering spaces which are sized and distributed to serve the anticipated needs of the residents within the UWSP. A total of 146.6 acres of parks and amenities would be provided in the UWSP area, which accounts for 11 percent of the Development Area. Parks and amenities would include 76.5 of active parks and the 2.6-acre Town Center median park as well as the 15-acre Westside Canal, 34.1 acres of greenbelt space, a 10-acre urban farm, a 12.1-acre West Edge Buffer, and a 14.7-acre Basin Edge Parkways trail.

The UWSP concludes that these facilities would be sufficient to accommodate the 25,460 proposed residents and would meet the requirements for parkland under the Sacramento County 2030 General Plan. Therefore, no additional means would need to be utilized to meet any demands in the UWSP area for parks and recreation services. Objectives for parks and recreation in the UWSP area would be met under the proposed plan, and the impact would be less than significant.

The proposed project's "parks program" includes 76.5 – 79 acres of parkland which meets the minimum guidelines of 3 acres per 1,000 residents. The 76.5 acres of parkland are considered neighborhood/community serving parks, which will be programmed with active recreation uses. However, the DEIR analyzes the project at the minimum dedication requirement under the Quimby Act of 3 acres per 1,000 residents, less than the County's (and City's) policy requirement of 5 acres per 1,000. If the project were to dedicate neighborhood/community parkland at the County standard of 5 acres per 1,000 resident, the proposed project's parkland dedication requirement would total approximately 128 acres of neighborhood/community serving parks.

The proposed project's "parks program" supplements the 79 acres of parkland with an additional 86 acres of parkland. The 86 acres of parks and recreation facilities are identified has having permanent drainage facilities, a greenbelt without recreation amenities, urban farms that will likely be leased and operated by community based or non-profit organizations, agricultural buffers, and a median with a trail. These types of facilities do not take the pressure off adjacent neighborhood and community parks that do contain active recreation, which is in high demand in the City of Sacramento.

12-35 cont.

The proposed UWSP is located adjacent to communities of the City of Sacramento; South Natomas and North Natomas. Each community was established and planned to be well-served by neighborhood and community parks that are located within a 10-minute walk of almost all the residential areas. The proposed project's gap of 51.5 acres that are not identified as neighborhood/community parkland will likely result in an adverse physical effect on the nearby parks within the two adjacent communities. Additionally, the proposed 79 acres of parkland will likely be diminished or adversely affected at a quicker rate than industry standards. This would be a significant impact.

The City of Sacramento Youth, Parks, & Community Enrichment Department (YPCE) recommends the project reduce the impacts to existing City parks by adding, or converting, 51.5 acres of neighborhood/community serving parkland in order to meet the 5 acres per 1,000 resident standard. The proposed project should incorporate the City's standards and guidelines for neighborhood and community parks, as adopted by the Parks Plan 2040, a subsequent project of the 2040 General Plan Master EIR. The existing parks within the adjacent communities are well-used, and it can be expected that the UWSP parks will be as well. Additional recommendations for the UWSP's park program are to consider community input from residents within the adjacent communities. They want to see regular enhancements and to the parks, such as lighting,

restrooms, outdoor exercise equipment, an all-weather field, and an integrated bicycle network. Residents are also advocating for accessible parks for all ages, drought-tolerant landscaping, and the preservation of wildlife habitat.

The UWSP's investment of over $143 million into the acquisition and development of parks, trails, and open space converts to approximately $1 million per acre with an annual estimated cost of $3.5 million to maintain each park facility. These costs exceed the City of Sacramento's Park development impact fee credit limits set for turnkey parks, and the estimated annual maintenance costs currently funded by Community Facilities Districts and Landscape and Lighting Districts within North Natomas. The full development of the UWSP park program will likely result in amenities that are attractive to use, and likely a financial impact on Parks annual workplans to repair and replace in 20 years from development. The proposed project's Public Facilities Finance Plan includes a fee for the provision of repair and replacement of facilities (e.g. parks, pump stations) as well as infrastructure after their useful life. The County may consider funding the long-term repair and replacement costs through a combination of the proposed infrastructure CFDs and through the new services CFD that will fund the share of urban services not paid for by property taxes. The City encourages the County to include an infrastructure CFD to fund long term repair and replacement costs of park facilities. Additionally, the utilities costs to maintain the 146.6 acres of parkland should also be included in the infrastructure CFD.

12-35 cont.

The conversion of 51.5 acres to neighborhood/community parkland, incorporation of the parks Plan 2040 standards and guidelines for park and facility development, incorporation of the 2040 General Plan park access policies for South and North Natomas, and funding for long term repair and replacement of facilities will reduce impacts to the existing parks within the adjacent communities and proposed parks within the UWSP.

Land Use Planning (City's 2040 General Plan)

On February 27, 2024, the City of Sacramento adopted the new 2040 General Plan. The new General Plan identifies five Special Study Areas that are adjacent to existing City limits and are of interest to the City of Sacramento. Planning for the future of these unincorporated areas requires collaboration between the City and the County.

12-36

The proposed Upper Westside Specific Plan (UW SP) is located within the Natomas Basin Special Study Area which bears relation to the planning of the City of Sacramento. The City of Sacramento is projected to see significant growth by 2040 (69,000 new homes, and 76,000 new jobs), and with careful land use planning, new development can help make Sacramento a model of sustainable, equitable growth and community development.

Updating the 2040 General Plan was a major undertaking and a multi-year process in effort to develop a land use framework and policies which provide for strategic growth and change that seek to concentrate new growth within the existing City limits.

The City is concerned about how the UW SP could induce sprawl and redistribute growth away from the City especially if the proposed development does not comport with the City's new land use standards and innovative policies.

The intent of the City's General Plan land use vision is to promote greater integration of uses along the corridors and in centers to broaden the range of housing types in the City, support the vitality of local businesses, lay the foundation for high-frequency transit, and make it easier to provide electric vehicle charging infrastructure and also to get around without a car.

The building intensity standards are intended to provide more flexibility and innovation in building design. Minimum density standards apply in all areas where residential development is permitted and a primarily FAR-based system could incentivize the design and construction of smaller units, potentially resulting in units that are more affordable by design.

12-36 cont.

For your reference below is a link to the City of Sacramento's new 2040 General Plan. Building intensity standards are shown on **Maps LUP-6**, **LUP-7**, **LUP-8,** and **Figure LUP-5**.
https://www.Cityofsacramento.gov/content/dam/portal/cdd/Planning/General-Plan/2040-General-Plan/Adopted%202040%20General%20Plan_20240227.pdf

Additionally, below two key innovative policies that support our emission reduction and sustainability goals in the 2040 General Plan. Policy LUP-4.13 requires new or expanded gas stations provide EV charging infrastructure. Policy LUP-4.14 eliminates vehicle parking minimums Citywide.

- **LUP-4.13 Future-Ready Gas Stations.**
  The City shall prohibit the establishment of new gas stations or the expansion of new fossil fuel infrastructure at existing gas stations unless the project proponent provides 50kW or greater Direct Current Fast Charger (DCFC) electric vehicle charging stations on site at a ratio of at least 1 new charging station per 1 new gas fuel nozzle.

- **LUP-4.14 Elimination of Vehicle Parking Minimums.**
  The City shall not require new or existing development to provide off-street vehicle parking spaces.

Conclusion

As this project progresses through planning, environmental review, and engineering, we request the County's continued coordination and that we receive all project public notifications including those for any future public meetings and hearings. If you have follow-up questions or seek clarifications on any of the above issues, please contact Cheryle Hodge at chodge@Cityofsacramento.org or 808-5971.

Sincerely,

Cheryle L. Hodge

Cheryle Hodge
New Growth Manager, Community Development Department

cc: Michael Jasso, Assistant City Manager, City of Sacramento
Tom Pace, Director, Community Development Dept., City of Sacramento
Greg Sandlund, Planning Director, Community Development Dept.
Matt Eierman, Director, Department of Public Works
Lucinda Willcox, Assistant Director, Dept. of Public Works,
Jennifer Donlon Wyant, Transportation Planning Manager, Dept. of Public Works
Pravani Vandeyar, Director, Department of Utilities
Brett Ewart, Supervising Engineer, Department of Utilities
Pelle Clarke, Senior Engineer, Department of Public Works
Jackie Beecham, Director, Youth, Parks & Community Enrichment Dept.
Shannon Brown, Assistant Director, Youth, Parks & Community Enrichment Dept.
Chris Costamagna, Fire Chief, Sacramento Fire Department
King Tunson, Program Specialist, Sacramento Fire Department
Kathy Lester, Police Chief, Sacramento Police Department
Eddie Macaulay, Lieutenant, Sacramento Police Department
Tom Bufford, Principal Planner, Environmental Planning Services
Scott Johnson, Senior Planner, Environmental Planning Services
Remi Mendoza, Senior Planner, Long Range Planning

ATTACHMENT A

OFFICE OF THE
CITY MANAGER

CITY OF SACRAMENTO
CALIFORNIA

CITY HALL
ROOM 101
SACRAMENTO, CA
95814-2684

PH 916-264-5704
FAX 916-264-7618

November 28, 2000

Terry Schutten, County Executive
Sacramento County
700 H Street, Suite 7650
Sacramento, CA 95814

Dear Terry:

Subject: Natomas Basin Habitat Conservation Plan–Revisions to Plan and Preparation of Plan EIS/EIR.

The purpose of this letter is again to invite Sacramento County to partner with Sutter County, Reclamation District 1000, Natomas Central Mutual Water Company and the City of Sacramento in revising the Natomas Basin Habitat Conservation Plan (NBHCP) and preparing new NEPA and CEQA documents for the Plan.

As you are aware, United States District Judge David F. Levi has issued a Memorandum of Opinion and Order in the case National Wildlife Federation v. Bruce Babbit. In his Order, Judge Levi noted that while the NBHCP was designed to be a basin-wide plan, only the City of Sacramento of the five agencies, was participating as a permittee. Throughout his Order, Judge Levi questioned the viability of the NBHCP if only the City participated. The Court also found that the Fish and Wildlife Service should have prepared and EIS for the Plan and it's Incidental Take Permit(ITP).

The final drafting of the NBHCP was a cooperative effort by the three land use agencies coordinated by SAFCA and their consultant Thomas Reid Associates. Mr. Patrick Groff was the County's representative. As the final draft neared completion, and the SAFCA Board relinquished the document to the three land use agencies for ITP application, it became obvious that the agency applications were governed by different time lines. The City's need was immediate, while the two Counties preferred to proceed more cautiously. To this end the City applied for and received a ITP. It was always assumed the Counties would participate as their needs demanded. Likewise, RD1000 and NCMWC were proceeding independently to complete HCP's governing their maintenance practices. If not for the lawsuit and Court Order, this approach would have continued.

We now have an opportunity to once again partner to ensure the success of the NBHCP. Sutter County and the City have agreed to be the lead agencies for the revision of the NBHCP, and preparation of the new CEQA documentation. While FWS will be the lead agency for NEPA, both the EIR and EIS will be prepared by CH2MHill, under contract with the City. The CH2MHill contract costs will be borne by the City, Sutter County, RD1000 and NCMWC. Upon completion of the NBHCP revision and environmental process, all four agencies will apply for ITPs. We would like to invite Sacramento County to participate with Sutter County and the City as lead agencies, and to join us in applying for ITPs.

We realize the Board of Supervisors will need to take action on the proposed County participation. In the mean time, we would encourage assignment of senior County staff, to attend the team meetings and to speak to the issues of importance to the County.

Please contact me or Tom Lee if you have further questions regarding our proposal. Ms. Carol Shearly, Natomas Manager, of my staff, will be coordinating all team activities. She may be reached at 264-5893.

Sincerely,

Robert P. Thomas
City Manager

Attachment B

CERTIFIED AS TRUE COPY OF Resolution 2002-830 DATE CERTIFIED January 13, 2003 CITY CLERK, CITY OF SACRAMENTO

RESOLUTION NO. 2002-830

ADOPTED BY THE SACRAMENTO CITY COUNCIL

ON THE DATE OF DEC 10 2002

A RESOLUTION AUTHORIZING THE CITY MANAGER TO EXECUTE A MEMORANDUM OF UNDERSTANDING BETWEEN THE CITY AND COUNTY OF SACRAMENTO REGARDING PRINCIPLES OF LAND USE AND REVENUE SHARING FOR THE NATOMAS AREA (JOINT VISION). (M02-014)

BE IT RESOLVED BY THE COUNCIL OF THE CITY OF SACRAMENTO THAT:

WHEREAS, the County and the City have mutual policy and economic interests in the long term development and permanent preservation of open space within that area of the County known as Natomas, which area is generally depicted on Exhibit A of the Memorandum of Understanding (MOU); and

WHEREAS, cooperation between the County and the City is an opportunity to develop a vision for Natomas which reflects areas of collective interest. This Shared Policy Vision is contained in Exhibit B to this memo; and

WHEREAS, the County and City desire to establish principles to form the parameters of a future agreement or agreements encompassing the manner in which the County and City share revenue and land use decisions within the Natomas area.

NOW THEREFORE, be it resolved by the City Council of the City of Sacramento, as follows:

The City Manager is authorized to execute on behalf of the City the Memorandum of Understanding between the City and County of Sacramento regarding principles of land use and revenue sharing for the Natomas area (Joint Vision) on file with the City Clerk.

HEATHER FARGO
MAYOR

ATTEST:

VALERIE BURROWES
CITY CLERK

FOR CITY CLERK USE ONLY

RESOLUTION NO.: 2002-830
DATE ADOPTED: DEC 10 2002

RESOLUTION NO. 2002-1566

WHEREAS, the County and the City have mutual policy and economic interests in the long term development and permanent preservation of open space within that area of the County known as Natomas, which area is generally depicted on Exhibit A of the Memorandum of Understanding (MOU); and

WHEREAS, cooperation between the County and the City is an opportunity to develop a vision for Natomas which reflects areas of collective interest. This Shared Policy Vision is contained in Exhibit B to this memo; and

WHEREAS, the County and City desire to establish principles to form the parameters of a future agreement or agreements encompassing the manner in which the County and City share revenue and land use decisions within the Natomas area.

NOW, THEREFORE, BE IT RESOLVED that the Board of Supervisors

Authorizes the County Executive to execute on behalf of the County the Memorandum of Understanding between the City and County of Sacramento regarding principles of land use and revenue sharing for the Natomas area (Joint Vision) on file with the City Clerk.

On a motion by Supervisor Dickinson, Seconded by Supervisor Collin, the foregoing resolution was passed and adopted by the Board of Supervisors of the County of Sacramento, State of California, at a regular meeting thereof this 10th day of December, 2002 by the following vote, to wit:

AYES:	Supervisors:	Collin, Dickinson, Johnson, Niello, Nottoli
NOES:	Supervisors:	None
ABSENT:	Supervisors:	None
ABSTAIN:	Supervisors:	None

Don Nottoli
Chair, Board of Supervisors

In accordance with Section 25103 of the Government Code of the State of California a copy of the document has been delivered to the Chairman of the Board of Supervisors, County of Sacramento on

By Kay F. Johnson
Deputy Clerk, Board of Supervisors

I hereby certify that the foregoing is a correct copy of a resolution adopted by the Board of Supervisors, Sacramento County, California on 12-10-2002

Dated 12-17-2002

Clerk of said Board of Supervisors

By Kay F. Johnson Deputy

FILED

DEC 10 2002

BOARD OF SUPERVISORS
CLERK OF THE BOARD

ATTEST: Sandra Leahy
Deputy Clerk, Board Of Supervisors

MEMORANDUM OF UNDERSTANDING BETWEEN THE COUNTY OF SACRAMENTO AND THE CITY OF SACRAMENTO REGARDING PRINCIPLES OF LAND USE AND REVENUE SHARING FOR NATOMAS AREA

This Memorandum of Understanding (MOU) is entered into this 10th day of December 2002, by and between the County of Sacramento, a political subdivision of the State of California (hereinafter referred to as "County") and the City of Sacramento, a chartered, California municipal corporation (hereinafter referred to as "City");

WHEREAS, the intent of the MOU and Joint City and County Natomas Vision is to reach a formal conceptual agreement for broad collaboration between the City and County regarding principles for growth, revenue sharing, and permanent open space preservation in the unincorporated portion of the Natomas Basin within Sacramento County.

WHEREAS, the County and the City have mutual policy and economic interests in accommodating long term development while securing permanent preservation of open space within that area of the County known as Natomas, which area is generally depicted on Exhibit A to this MOU; and

WHEREAS, cooperation between the County and the City is an opportunity to develop a vision for Natomas which reflects areas of collective interest. Protecting and maximizing existing, and future, airport operations, open space preservation, and fair distribution of revenue are shared core values. There is a common stake in pro-actively influencing the emerging urban form, by guiding inevitable growth to provide for residential and employment opportunities close to the region's urban core. This promotes improved air quality through trip reductions, and distance traveled, and maximizes the return on existing and future public infrastructure investment in Natomas, this Shared Policy Vision is contained in Exhibit B to this memo; and

WHEREAS, together, the City and County can forge a leadership role on a regional scale for growth management. Such a cooperative effort can address land use, economic development, and environmental opportunities and challenges in Natomas. The result can be quality development balanced with permanent open space preservation systems; and

WHEREAS, Cities and counties are dependent upon tax revenues generated by continued commercial and industrial growth. The tax system creates intense competition between jurisdictions and can lead to economic development at the expense of good land use planning. Such competition between the City and County can be reduced or eliminated by establishing a revenue sharing agreement. In this way, each jurisdiction can benefit from economic development through cooperation rather than competition; and

WHEREAS, the County and City desire to establish principles to form the parameters of a future agreement or agreements encompassing the manner in which the County and City share revenue and land use decisions within the Natomas area; and

CITY
AGREEMENT NO. 2002-224

WHEREAS, the County and the City desire to pursue jointly proposed common principles to define the parameters of a future agreement or agreements encompassing the manner in which the County and City share revenue and land use decisions within the Natomas area; and

WHEREAS, should the County and the City wish to adopt and implement the proposed common principles set forth in the MOU, each will be required to undertake a series of discretionary legislative actions, including but not limited to amendments of their respective general plans and agreements concerning revenue sharing, all of which will require the exercise of legislative discretion, and all of which will require compliance with CEQA, notice and public hearings, and satisfaction of all other applicable requirements of federal, state and local law.

WHEREAS, the County and the City recognize that, pursuant to the California Environmental Quality Act (CEQA) and other state and federal statutes, additional environmental analysis will be required for any development beyond that contemplated by the current land use plans of the jurisdictions, including the current North Natomas Community Plan (NNCP) of the City of Sacramento; and

WHEREAS, the County and City recognize that, should the governmental entities interested in, or involved with, any further development of the North Natomas Basin wish to pursue such development, they will necessarily have to propose and consider a new, separate or enhanced Habitat Conservation Plan (HCP) to address development impacts to protected species under federal and state endangered species laws; and

WHEREAS, the County and City recognize that, the proposed HCP currently under consideration by the City, Sutter county and the relevant federal (U.S. Fish & Wildlife Service) and state (Department of Fish and Game) agencies deals solely with the mitigation requirements for development under the current land use plans for those jurisdictions, including the current NNCP of the City, and that any further Natomas Basin development plans for these jurisdictions and the County, including future development pursuant to the proposed principles set forth in this MOU, will require additional or alternative mitigation, and additional environmental analysis.

WHEREAS, the County and the City acknowledge that approval of this MOU changes no existing land uses approved by either the County or the City nor commits the County or the City to specific land uses or to agreement on any specific annexations to the City. Approvals necessary for such commitments have not been considered by either the County, the City or any other appropriate authority.

NOW, THEREFORE, the County and City agree as follows:

Purpose of MOU: The purpose of this MOU is to define a mutually acceptable set of proposed principles that the City and the County are prepared to consider when considering the future land use planning and revenue sharing in the Natomas area. This MOU reflects the parties' definition of a proposed set of principles to govern future development in the Natomas areas that they are interested in studying and analyzing for possible future adoption and implementation upon completion of all necessary studies and work, including but not limited to the completion of all necessary environmental analyses under CEQA and other federal and state statutes.

I. Land use and revenue sharing within the Natomas areas should be guided as follows:

A. Open Space.

(1) Open space planning will rely on, and coordinate with, existing open space programs, and will address linkage issues. Some specific areas will be designated for preservation as permanent open space to provide assurance that community separators are implemented. Other areas may not require active preservation.

(2) Open space mitigation may be in conjunction with or distinct from any applicable criteria of the Natomas Basin Habitat Conservation Plan (HCP) and may, depending upon circumstances, exceed that of the HCP. Any new development beyond that analyzed in the Natomas Basin HCP shall be required, subject to state and federal laws and regulations, adequate habitat and buffer areas sufficient to protect impacted endangered species. A joint funding mechanism will provide funding for land and easement acquisitions.

(3) Land to be preserved as farmland must not be restricted by nearby development and needs to have a secure supply of affordable water. Buffer areas will be derived from developing lands.

(4) An airport protection plan will protect the airport by preserving open space around it and keeping noise-sensitive development and waterfowl attractors in relatively distant areas. An emphasis on open space will also lend permanence to any buffers that are established. Such a plan may be achieved through a multi-jurisdictional agreement as to land uses designed to maximize airport protection.

B. Future Growth.

(1) Consideration of new growth should be done in partnership with the preservation of open space. The urban form should include a well integrated mixture of residential, employment, commercial, and civic uses, interdependent on quality transit service with connections linking activity centers with streets, transit routes, and linear parkways with ped/bike trails.

(2) The City, rather than the County, is the appropriate agent for planning new growth in Natomas and can better provide a full range of municipal services. The County is the appropriate agent for preserving open space, agricultural and rural land uses.

(3) The County will preserve its interest in the planning and development of Sacramento International Airport and Metro AirPark.

(4) New growth will be supportive of the City's Infill Strategy. It will contribute to the sustainability of established neighborhoods/ commercial corridors/business districts.

(5) Development in Natomas will build on the vision of the currently planned growth in North Natomas, including the application of the City Council adopted (Resolution No. 2001-805) Smart Growth Principles.

(6) Future Growth areas shall foster development patterns which achieve a whole and complete, mixed-use community.

(7) The City, as the agent of development, will apply the adopted Smart Growth Principles to any new development in Natomas. Smart Growth Principles emphasize pedestrian and

transit orientation by addressing density, efficient design, and urban open space to provide sustainable, livable communities with fewer impacts than standard development.

(8) The City and County will develop a joint planning process for major uses in Natomas that are likely to have important economic impacts to existing commercial facilities in the city or county. Among the goals of that process will be to avoid competition for tax revenues, in favor of balanced regional planning.

C. Economic Development.

(1) The area subject to revenue sharing between the County and the City shall include all that area depicted on Exhibit A except for those areas designated as Metro Air Park and the grounds of Sacramento International Airport, excepting those Airport properties currently used as buffer lands for Airport operations. If retail or commercial development other than Airport-related operations is permitted on such buffer lands, revenues derived from such development shall be subject to this MOU. For purposes of this section, airport-related operations are defined as airport support services such as terminal expansion, aviation fuel sales, aircraft maintenance and support; and hotel motel uses, to the extent such uses are existing or are relocated from existing premises.

(2) The one percent, general ad valorem tax levy on all property within defined area, which is annexed to the City, shall be distributed, from the effective date of annexation, equally between the County and the City prior to accounting for the impact of distribution of such taxes to the Education Revenue Augmentation Fund.

(3) It is generally intended that all other revenues from the area be shared as follows subject to an agreed upon projection of need for County or City services:

(a) Upon the effective date of the annexation of undeveloped property for single-purpose/regional tax generating land use the County and City will share the 1% Bradley-Burns sales tax and City General Fund share of transient occupancy tax equally.

(b) Upon issuance of certificates of occupancy, or their equivalent, property within the unincorporated area, except as excluded in Section C (1), which is approved for single-purpose/regional tax generating land use by County, the County and City will share the 1% Bradley-Burns sales tax and County General Fund share of transient occupancy tax equally.

(c) Upon the effective date of the annexation of undeveloped property for a Multi-Purpose/Master Planned Community Area but prior to commencement of development beginning, revenues (including the general ad valorem property tax but excluding special taxes, fees or assessments) shall be shared by comparing the projected City municipal revenues to projected City municipal expenses including capital/development costs funded by the City.

In the event of a projected City surplus (revenues exceed expenses), 50% of such surplus shall be allocated to the County by adjusting the County's property tax share for the area.

(d) Upon the effective date of Annexation of any area developed for urban purposes as of the date of this MOU, the County municipal revenues transferred with the area shall be calculated against the costs of municipal services being transferred. The County's property tax share will be increased in the case of a surplus (i.e. County revenues transferred exceed County expenses transferred), and the City's share will be increased in case of a deficit (i.e. County revenues transferred are less than County expenses transferred). The County will consider a one-time contribution to the City upon annexation of any such area calculated on the basis of avoided, near-term capital maintenance costs together with a one-time contribution for the costs of necessary, significant infrastructure repairs which are identified prior to completion of annexation.

(e) In the event either the County or the City approve development in a fashion which would require payment pursuant to Government Code Section 53084, the County or the City, as the case may be, should be entitled to the greater of the revenue calculated pursuant to either that section or the ultimate provisions of a revenue sharing agreement.

(f) Should legislation be enacted which alters the manner in which local agencies are allocated revenue derived from property or sales taxes, any agreement shall be subject to good faith renegotiations.

II. The principles set forth are intended to guide further discussions and the ultimate negotiation of an agreement between the County and the City. It is recognized that certain of the terms used are subject to further definition and refined during the process of negotiation. It is the intent of the County and the City to work cooperatively to establish a review process, by agreement, to evaluate the likely impacts of large-scale commercial uses in Natomas on competing uses in the County and City. The goals of such a process will be to avoid competition for tax revenues, in favor of balanced regional planning and to assure that proposed land uses conform to the principles articulated in this MOU. It is further the intent of the County and the City that the revenue sharing principles set forth in this MOU shall govern the adoption of a Master Tax Sharing and Land Use Agreement for annexations.

Nevertheless, this Memorandum of Understanding is a good faith expression of the intent of the County and the City to cooperatively approach development and revenue within the Natomas area of our regional community.

CITY OF SACRAMENTO
A Municipal Corporation

By _____ Thomas V. Lee
Deputy City Manager
For: Robert P. Thomas, City Manager

COUNTY OF SACRAMENTO

By _____
Terry Schutten, County Executive

APPROVED AS TO FORM:

Richard Archibald 12-23-02
City Attorney

APPROVED AS TO FORM:

County Counsel

ATTEST:

City Clerk

ATTEST:

Clerk of the Board

CITY
AGREEMENT NO. 2002-224

CITY
AGREEMENT NO. 2002-224

Sacramento City-County MOU for the Natomas Area on
Principles of Land Use and Revenue Sharing

Exhibit A

Natomas Area Map

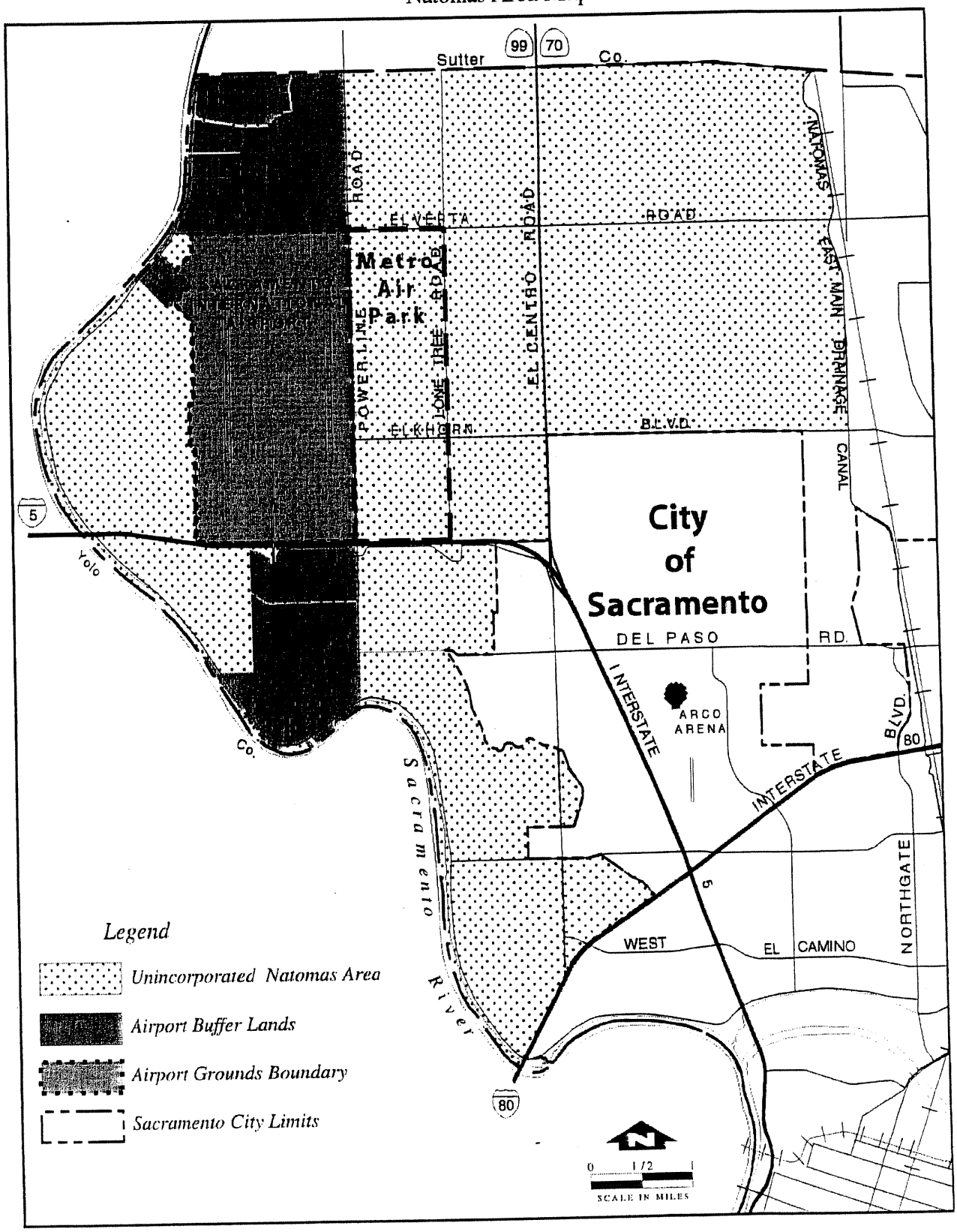


EXHIBIT B

Joint City-County Shared Policy Vision in Natomas

I. Statement of Intent

The intent of this joint City and County Planning exercise is that both the City Council and Board of Supervisors will reach a formal agreement regarding growth, economic development and permanent open space preservation in the unincorporated portion of the Natomas Basin within Sacramento County. The agreement will be adopted by Sacramento County and the City of Sacramento.

1. Introduction

A. Background

A preliminary set of planning principles for Natomas was presented to the Board of Supervisors at a public workshop in May 2001. Before that, in June 2000, the City Council held a public hearing to consider goals and policies to modify the City Sphere of Influence for several study areas, including Natomas.

Subsequent discussions among City and County management and staff have fostered a spirit of mutual gain. There is opportunity to develop a vision for Natomas, which reflects areas of collective interest. Protecting and maximizing existing, and future, airport operations, open space preservation, and fair distribution of revenue are shared core values. There is a common stake in pro-actively influencing the emerging urban form, by guiding inevitable growth to provide for residential and employment opportunities in close to the regions urban core. This promotes air quality measures through trip reductions, and distance traveled, and maximizes the return on existing and future public infrastructure investment.

Together, the City and County will forge a leadership role on a regional scale for growth management. The cooperative effort addresses land use, economic development, and environmental opportunities and challenges in Natomas. The result will be quality development balanced with permanent open space preservation systems.

B. Vision - Cooperative Land Use Planning

The best way to insure sustainable community building in Natomas is for the City and County to plan jointly. Such an effort will provide opportunity to focus more on sound long-term planning principles, and less on quick return revenue generation. Such a planning policy foundation may be without precedent, however, the highly regarded American River Parkway Plan (ARP) stands as an excellent result of City-County cooperation. That plan also provides an example of an administrative structure that involves third-party ratification of any amendments to the plan.

II. Basic Issues

There are three main areas where the City and County will come to agreement, each comprised of several sub-issues.

1. Open Space

The planning principles offer agreement regarding the size, location, and nature of open space preservation areas in the Natomas area. The location of open space areas will be based in part on the natural value of the land (e.g. habitat value, community separators), but also on constraints to development (e.g. airport protection or flood-prone areas). This agreement will ultimately designate the location of open space and provide principles for its permanent preservation. Ideally, the County will be the agent for maintaining rural and agricultural land uses, and permanent open space preservation.

Open Space systems provide multiple values/ benefits for human needs (health, public safety, cultural, recreational, economic prosperity, and civic identity), for wildlife, for productive agriculture, and for a healthy, sustainable built environment. Open Space also contributes to the provision of clean air and water for the region. Open Space systems must be of adequate size to support their intended purpose, e.g., agricultural areas must be large enough to maintain the agricultural economy; regional recreation facilities must be diverse enough to accommodate multiple passive and active uses; habitat areas must be large enough to support the requirements of native species; vistas/viewsheds should be sufficient to provide a sense of place. Open Space systems should be linked by trails, act as community separators, and accommodate habitat conservation plan requirements.

2. Economic Development

Cities and counties are dependent upon tax revenues generated by continued commercial and industrial growth. The tax system creates intense competition between jurisdictions and can lead to economic development at the expense of good land use planning. This joint agreement will lessen competition between the City and County by establishing a revenue sharing agreement. In this way, each jurisdiction stands to benefit from economic development, without becoming subject to the forces of competition.

New development will be consistent with the City's Smart Growth Principles, by supporting reinvestment in existing communities, particularly designated infill areas, as an alternative to greenfield development. New growth will not detract from the sustainability of established neighborhoods, commercial corridors, and business districts in the city and county.

Sacramento International Airport is recognized as a regional asset for economic development. The vision will incorporate effective measures for protection of airport operations and expansion, such as where residential development will not be considered.

The Natomas Mutual Water District and Rio Linda/Elverta Parks and Recreation District currently provide services to the Natomas area and are, therefore, stakeholders in the economic development of the area. The City and County will cooperate with the districts to address their unique circumstances prior to the LAFCo process. The LAFCo process required for consideration of amendments to spheres of influence and annexation proposals will determine the appropriate roles for these districts.

3. Future Growth

The vision will provide the acreage and location for future growth, and identify principles to define the nature of growth appropriate for Natomas. Constraints and opportunities inherent in the land (e.g. habitat values) or its location (e.g. proximity to existing urbanization) will help define where growth is desired. The City will be the agent for growth, by planning areas to be developed.

Conclusion. Now is the time to seize the opportunity to craft the common vision for Natomas. This is best addressed through a cooperative planning effort between Sacramento City and County. This will curb land speculation, competition between jurisdictions and establish planning principles to guide growth in concert with permanent open space preservation.

III. Planning Issues and Principles

The City and County discussions regarding Natomas identified seven primary issues areas related to possible development in Natomas. Those issues areas are listed below along with principles that address the general concerns of the City or County. These principles will constitute the basis of an agreement between the City and County for making decisions regarding land uses.

1. Open Space
    A. Open Space Preservation
    B. Farmland Preservation
    C. Airport Protection
2. Economic Development
    A. Fiscal Collaboration
3. Future Growth
    A. Jurisdictional Roles
    B. Infill Linkages

1. Open Space

A. Open Space Preservation

1. Permanent Protection of Open Space. Achieve a permanent open space by acquiring land or easements. A variety of funding sources will be used to make land and easement acquisitions. Open Space encompasses lands that essentially are unimproved and that have limited development potential due to the physical characteristics of the land, due to value as a drainage or habitat corridor, due to land being restricted to agricultural production, due to location of the land as a community separator/ buffer between developed areas, or due to the scenic value of the land and its role in maintaining a community's sense of place or heritage.

2. Community Separators. Provide community separators at the Sutter/ Sacramento County line, by using open space that defines urban shape by providing gateways, landscaped freeway corridors, defined edges and view sheds. The community separator is land designated as permanent open space, by both the City and County General Plans, in order to avoid an uninterrupted pattern of urbanization, and to retain the character f distinct communities.

3. Open Space Linkages. Coordinate and connect permanent open space in Natomas with the larger open space systems to provide linkages for trail extensions and biological connectivity.

4. Mitigation Ratio. Require development to provide permanent open space, preserved in the Natomas area, at a mitigation ratio of at least one-to-one.

Implementation. The agreement will establish a policy framework for open space planning in Natomas which will rely on, and coordinate with, existing open space programs, and will address linkage issues. Some specific areas will be designated for preservation as permanent open space to provide assurance that community separators are implemented. Other areas, such as west of Sacramento International Airport, may not require active preservation because of specific constraints related to inadequate infrastructure or public ownership.

This mitigation may be in conjunction with or distinct from any applicable criteria of the Natomas Basin Habitat Conservation Plan (HCP). A minimum one-to-one mitigation ratio within the Sacramento unincorporated area of Natomas will exceed that of the HCP by one-half acre of mitigation per acre of development. A joint funding mechanism will provide funding for land and easement acquisitions.

B. Farmland Preservation

1. Require Mitigation for Losses. Plan land use in Natomas in a manner that minimizes and mitigates loss of overall agricultural productivity.

Implementation. Identify areas of Natomas that are to be developed or remain in general agriculture. Land to be preserved as farmland must not be restricted by nearby development and needs to have a secure supply of affordable water. Buffer areas will be derived from developing lands. The City and County shall work jointly with agricultural interests to develop a comprehensive program to assist in farmland viability.

C. Airport Protection

1. Protect Future Airport Operations. Plan land use in Natomas in a manner that will protect Sacramento International Airport from complaints originating from encroaching uses that might eventually limit its operations or future expansion.

2. Coordinate long range land use planning. The various affected jurisdictions will coordinate planning efforts to ensure the continued viable operations and expansion of Sacramento International Airport

3. Maintain Airport Safety Related to Habitat. Avoid compromising airplane safety when establishing open space by keeping waterfowl habitat at safe distances from the airport.

Implementation. A multi-jurisdictional airport protection plan will protect the airport by preserving open space around it and keeping noise-sensitive development and waterfowl attractors in relatively distant areas. An emphasis on open space will also lend permanence to any buffers that are established.

2. Economic Development

A. Fiscal Collaboration

1. Revenue Agreement. Adopt a Revenue Exchange Agreement.

Implementation. The City and County will negotiate an agreement that defines, and provides for, revenue exchange for development that occurs within the agreement area.

3. Future Growth

A. Jurisdictional Roles

1. City and County Roles. The City is the appropriate agent for planning new growth in Natomas. The County is the appropriate agent for preserving open space, agricultural and rural land uses.

2. Maintain County Interests. The County will preserve its interest in the planning and development of Sacramento International Airport and Metro AirPark.

Implementation. Define the roles of each jurisdiction in the agreement.

B. Infill Linkage

1. Support City Infill Strategy. New growth will be supportive of the City's Infill Strategy. It will contribute to the sustainability of established neighborhoods/ commercial corridors/ business districts.

Implementation. Create a linkage program between new growth and the City's Infill Strategy, extension of the Downtown/Natomas/Airport transit line and implementation of the North Natomas Community Plan goals and objectives as a part of the General Plan amendment process.

4. Urban Growth Principles

1. Smart Growth. Development in Natomas will build on the vision of the currently planned growth in North Natomas, including the application of Smart Growth Principles.

2. Regionally Significant Land Uses. The City and County will develop a joint planning process for major uses in Natomas that are likely to have important economic impacts to existing commercial facilities in the city or county.

3. Balanced Communities. Undeveloped areas shall foster development patterns which achieve a whole and complete, mixed-use community.

Implementation. The City, as the agent of development, will apply Smart Growth Principles to any new development in Natomas. Smart Growth Principles emphasize pedestrian and transit orientation by addressing density, efficient design, and urban open space to provide sustainable, livable communities with fewer impacts than standard development.

Establish a review committee, by agreement, to evaluate the likely impacts of large scale commercial uses in Natomas on competing uses in the county and city. The committee's goal will be to avoid competition for tax revenues, in favor of balanced regional planning.

IV. Identify Areas for Growth and Permanent Open Space Preservation

Consideration of new growth should be done in partnership with the preservation of open space. The urban form should include a well integrated mixture of residential, employment, commercial, and civic uses, interdependent on quality transit service with connections linking activity centers with streets, transit routes, and linear parkways with ped/bike trails.

V. Plan Administration and Agreement

The agreement will be adopted by Sacramento County and the City of Sacramento. It may also be desirable to have the agreement adopted by an outside party, e.g. the State Legislature (similar to the American River Parkway Plan) to provide additional strength to the agreement, and to require inter-jurisdictional coordination on agreement implementation.

The means to implement this common vision is yet to be defined. There are various instruments available for the legislative bodies of the City and County, such as a Joint Resolution, or a Memorandum of Understanding.

The agreement will consist of:

- A map clearly delineating the areas for growth and for permanent open space and agricultural preservation.
- The Planning Principles.
- The implementation program including adoption of permanent open space and agricultural preservation strategies.

The implementation includes:

- A third party agreement
- Amendments to both General Plans to incorporate the common vision
- Adoption of a Revenue Sharing Agreement
- Define Goals, Roles and Responsibilities for the respective jurisdictions, and a mechanism for future, regional scale participation.

- Benchmarks for performance

- A funding program for permanent open space and agricultural preservation.

This cooperative planning effort is consistent with the Capitol Regional Compact, endorsed by both jurisdictions recently. Developed by Valley Vision, it promotes regional coordination, cooperation and collaboration. The compact defines four goals for future collaboration:

- Create Regional Growth and Development Patterns

- Coordinate Land Use, Infrastructure, Public Services and Transportation

- Reinforce our Community Identities and Sense of Place

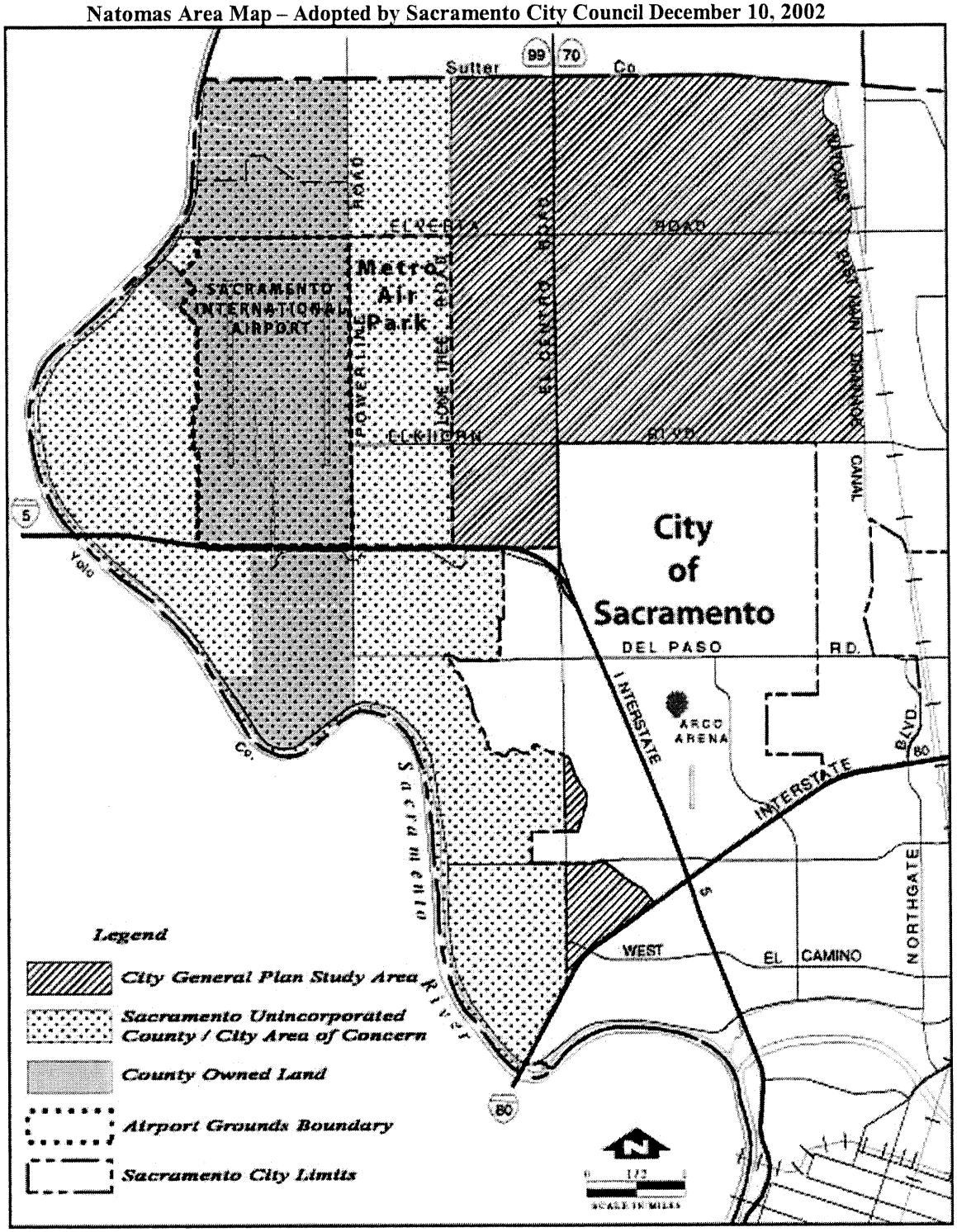
- Protect and Enhance Open Space and Recreational Opportunities.

~~Sacramento City – County MOU for the Natomas Area on~~

Principles of Land Use and Revenue Sharing

Exhibit A

Natomas Area Map – Adopted by Sacramento City Council December 10, 2002



MOU map – 3.jpg December 18, 2002

Natomas Unified School District
Connecting students to their future

Emma Patten
Senior Planner
Planning and Environmental Review
827 7th Street
Sacramento, CA. 95814

Re: Draft EIR for the Proposed Upper Westside Specific Plan

Dear Mrs. Patten,

Thank you for your previous responses to the Natomas Unified School District (NUSD) comments on the last drafts and the opportunity to provide comments on the current drafts of the Upper Westside Facilities Financing Plan (3rd draft) and Urban Services Plan (2nd draft).

NUSD is very appreciative of the efforts to provide for adequate school sites, central to proposed residential areas, with a focus on convenient and safe active transportation routes between proposed residential development and the proposed school sites. We agree with the need for four schools, and believe that the DEIR fundamentally includes them and they are required. The district respectfully requests the County require the evidence of a satisfactory plan that will ensure adequate funding of the schools before approval of the EIR. NUSD wholeheartedly supports the intent of the General Plan and General Plan policies, and we believe that the County's policy framework provides clear guidance for this Specific Plan and implementing documents, including:

13-1

> **Land Use Element, page 43 (Intent):** "…Each residential development should have access to a variety of local destinations that provide for residents' daily needs, including retail, employment, recreational amenities, schools, and municipal and social services. The resulting non-automobile street activity will promote human contact and a sense of neighborhood, as well as reduce automobile traffic and the associated impacts."
>
> **Policy PC-6. Infrastructure Master Plan and Financing Plan** (Requirements for Amending the General Plan Land Use Diagram). Required: Inclusion of an Infrastructure Master Plan and Financing Plan that include the following:
> - The Infrastructure Master Plan shall identify required public facilities and infrastructure (including roads, transit, water, sewer, storm drainage, schools, fire, park, library, and

other needed community facilities) and associated costs for the development of the proposed UPA expansion/Master Plan;
- The Financing Plan shall:
  - …Identify the phase or timing for when the facilities are needed;
  - Identify the funding mechanisms proposed to pay for the identified infrastructure and facilities…

Public Facilities Element, page 18 (Intent): "Schools are an important part of any neighborhood. In addition to their central educational role, they serve as a place for meetings, special programs, after-school play, soccer and little league games, and precinct voting. How well the school functions in these various roles depend very much on the school's location with respect to other community uses and how accessible it is… school siting and design should be a key element of a neighborhood planning effort. There remain many opportunities for design innovation and good, sensible planning to achieve neighborhoods which better integrate the school into the fabric of neighborhood life."

Policy PF-29. Schools shall be planned as a focal point of neighborhood activity and interrelated with neighborhood retail uses, churches, neighborhood and community parks, greenways and off-street paths whenever possible.

Policy PF-30. New elementary schools in the urban area should be planned whenever possible so that almost all residences will be within walking distance of the school (one mile or less) and all residences are within two miles of a school.

Policy PF-35. New schools should link with planned bikeways and pedestrian paths wherever possible.

Public Facilities Element, page 20 (Intent): …from a school facilities perspective, school enrollment and the size of the school site are basic requirements… in growing districts the problems of timely school construction and, above all, funding new school facilities requires resolution in order to achieve this objective.

13-1 cont.

NUSD greatly appreciates the County's efforts to involve us in reviewing draft versions of the Public Facilities Financing Plan and also for the opportunity to review the Draft Specific Plan and Draft Environmental Impact Report (Draft EIR). As we move from draft to final versions of these documents, NUSD believes that the County's General Plan – particularly the direction related to identifying the cost of required public facilities, identifying when public facilities are required, and providing funding for such public facilities – will be very helpful.

NUSD applauds the County's planning efforts here – particularly the greenbelt system placement relative to school sites (summarized on Draft EIR page 2-23) and the strategic planning of school sites so that "over 90 percent of the proposed residential units would be within three-quarters of a mile of a K-8 school site" (Draft EIR, page 2-53).

In the Final EIR, Final Specific Plan, and Final Public Facilities Financing Plan, it will be important to arrive at mutually agreeable language that ensures funding in adequate amounts, and with the right timing such that school sites can be constructed within the Specific Plan Area when schools are needed by Specific Plan Area residents. This is important to meet expectations expressed in the aforementioned General Plan policies, but also because the analysis presented in the Draft EIR relies on the presence of school sites. For example, on page 8-41 of the Draft EIR is a description of the features of the Draft Specific Plan that would reduce vehicular travel demand and associated greenhouse gas emissions, including a note that "the proposed UWSP would include the development of commercial mixed use and employment/highway commercial uses, as well as schools… [and that]…[b]y providing a range of residential, commercial, and school uses within the UWSP area, approximately 22.9 percent of home-based trips associated with the proposed UWSP would be internal." The rate of internal trips used in the air quality, greenhouse gas emissions, transportation, and transportation noise analysis in the Draft EIR would need to be adjusted if school construction is ultimately not feasible as presented in the Draft Specific Plan and Draft EIR. 13-1 cont.

Specific Comments and Questions

Page ES-15: Toxic Air Contaminants (and page 24-4). On page ES-15, in the Executive Summary table, the toxic air contaminants impact notes that there is a significant impact for exposure of sensitive uses to substantial pollutant concentrations. School uses are identified as being within 1,000 feet of Interstate 80. From the Land Use Plan, it does appear that there is a proposed K-8 school site within approximately 1,000 feet of Interstate 80, though we only have a PDF version of the Land Use Plan and cannot create an accurate estimate of this distance. Would Mitigation Measure AQ-4c apply to this school site – the mitigation measure that requires installation of high-efficiency filtration systems – to this school site? How would the ongoing maintenance, repair, and replacement of such a system (as described in the second bullet of this mitigation measure) apply to this school site? 13-2

Page ES-64: Greenhouse Gas Reduction Plan. The strategy for reducing GHG emissions relies on the preparation of Greenhouse Gas Reduction Plans for future project tentative maps (Mitigation Measure CC-1b). The District is interested in how this may relate to school facilities master planning as well as more detailed transportation facilities planning and improvements that ensure safe walking and bicycling routes between homes and school sites within the Specific Plan Area. 13-3

Bullet 2 of Mitigation Measure CC-1b identifies a performance standard of 1.42 metric tons of carbon dioxide equivalent per thousand square feet, measured in a future year. Does the estimate proposed in the Draft EIR include non-residential development proposed for school uses? If so, how would the strategies related to a prohibition on natural gas, on-site renewable energy, purchase of zero GHG electricity, tree planting, etc. apply to the proposed school sites? On page ES-64, there is reference to a strategy to reduce vehicular travel demand and associated GHG emissions through an "increase access to common goods and services, such as groceries, schools, and daycare." Would this increase in access be achieved through augmenting the current active transportation plan to increase connectivity and ensure a very low stress active transportation network between proposed homes and school sites? The District is highly supportive of a transportation system that would distribute 13-4

traffic and provide very low stress and convenient pedestrian and bicycle routes to the school sites, but we are unclear how an increase would be pursued beyond the estimates presented in the Draft EIR. 13-4 cont.

Additionally, since the estimates of GHG emissions rely on the presence of the four proposed school sites, what mechanism would be most effective for ensuring adequate funding for these school sites for the Specific Plan and EIR? How would the future GHG Reduction Plans prepared at the tentative map level guarantee adequate funding to provide for school sites? 13-5

Page ES-98, Subsequent Review for School Parking Lot Noise (and page 15-46). On this page of the Executive Summary is an overview of an impact related to the placement of proposed noise-sensitive uses near proposed school sites that would have parking areas. Mitigation Measure NOI-4a (page 15-48) suggests that there would be a future acoustical study to evaluate parking lot-generated noise relative to the County's exterior noise performance standards with building placement, buffering through distance, or a sound wall to shield adjacent proposed noise-sensitive uses from parking lot-generated noise. NUSD supports strategies to avoid land use-noise compatibility issues in this Specific Plan – both issues that would affect educational activities at the proposed school sites and issues that could be caused by school-generated noise. However, NUSD is interested in clarifying that, if buffering is required in the future, that this buffer would be required outside of the proposed school sites, if a sound wall is proposed, that this would be constructed by others outside of school property, and that if a sound wall is constructed, that it not interrupt casual surveillance of the area and not interrupt pedestrian and bicycle connectivity in the vicinity of school sites. In addition, it may not be feasible to place buildings in locations that would break the line of site between future parking fields and adjacent noise-sensitive uses. 13-6

Page ES-108, Subsequent Review for School Parking Lot Noise (and pages 15-46 and 15-64). NUSD has the same questions about the school parking lot noise discussion and Mitigation Measure NOI-7h on page ES-108 as we have in relation to the discussion on page ES-98 and Mitigation Measure NOI-4a. 13-7

Page ES-108 and 109, Subsequent Review for School Playground Noise (and page 15-64). The Draft EIR includes an impact related to the placement of proposed residential uses near possible future playground areas within future school sites. NUSD strongly supports the County's goal to avoid land use-noise compatibility issues that could arise but we do feel that this should be balanced with a goal of making sure that school sites are fully integrated into planned residential areas in a way that supports safe and convenient walking and bicycling to school. Mitigation Measure NOI-7i recommends a minimum 90-foot setback between the center of play areas and adjacent "residential boundaries." NUSD assumes this setback would be from the center of future playground activity areas and outdoor gathering spaces associated with future residential developments, rather than 90 feet from the edge of adjacent residential property boundaries, but this clarification could be helpful. In addition, the proposed mitigation seems to suggest that the recommended buffer would be provided by future school site planning. While such a buffer may be feasible, NUSD must consider a broad range of criteria in site planning, and it may not be possible in all cases to ensure such a buffer on the school property. It may be necessary to relax the referenced exterior and interior 13-8

standards for residential dwellings adjacent to school sites or to consider building orientation and the location of outdoor gathering spaces for future residential development in areas adjacent to school sites. 13-8 cont.

Page ES-109, Subsequent Review for School Stadium and Sports Fields Noise (pages 15-64 and 15-65). On this page of the Executive Summary is an overview of an impact related to the placement of proposed noise-sensitive uses near proposed school sites that would have a stadium and sports fields. Mitigation Measure NOI-7j requires an acoustical study demonstrating compliance with County exterior noise performance standards prior to issuance of a building permit for proposed school uses. NUSD has a somewhat different process for school site planning and permitting that does not involve issuance of a building permit from the County. We are also interested in understanding who would prepare this acoustical study, and whether strategies to reduce noise exposure (distance, intervening structures, etc.) would be the responsibility of adjacent proposed residential tentative maps or other form of residential applications. NUSD absolutely supports the goal of avoiding adverse noise impacts associated with special events and use of sports fields. However, we do not believe that future residential sensitive outdoor areas near the proposed school sites have been identified, and NUSD has not done any programming or site planning for the school sites, either. Therefore, unless the site planning for proposed residential adjacent residential areas occurs in tandem with school site planning and there is flexibility on the placement and methods of noise attenuation, it may be necessary to relax the exterior noise standards for special events and school use of outdoor sports fields. In addition to "operational limits on amplified sound equipment," it may be possible to reduce noise exposure through design of public address systems, such as through the sizing and placement of loudspeakers, but this option involves additional expense, and NUSD is not in a position at this time to determine definitively whether such additional expense would be feasible for future school sites within the Upper Westside Specific Plan Area. 13-9

Page ES-113, School Impacts (and page 17-17). In this portion of the Executive Summary, the Draft EIR explains that "the NUSD has existing capacity for the elementary and middle school students generated by the proposed UWSP, it does not have existing capacity for the high school students generated by the proposed project." The Draft EIR goes on to explain that school facilities "impacts are included as part of the analysis of physical impacts to the environment." This is true so long as the school sites that are proposed are developed with school facilities as identified in the Draft Specific Plan and Draft EIR. The Draft EIR assumes the presence of these schools, and impact analysis related to criteria air pollutant emissions, greenhouse gas emissions, transportation noise, and other topics assumes that the proposed school sites are operational for K-8 and high schools. Since the analysis assumes the presence of the planned schools, and since NUSD has provided information on the current cost of school facilities and the need for additional funding to ensure that schools can be provided as identified in the Specific Plan and Draft EIR, it will be important to include language in the County's documents that ensures adequate funding and requires that adequate funding is available for construction of planned schools once they are needed to serve proposed residential development in the Specific Plan Area. 13-10

Also, in this part of the Executive Summary, the Draft EIR notes that, "compliance with mitigation measures… would reduce construction-related effects to the extent feasible." NUSD would typically 13-11

conduct environmental review for proposed school sites, and in the past, NUSD has coordinated this review with Sacramento County as a responsible agency. Assuming NUSD conducts environmental review of the planned school sites within the Specific Plan Area, this environmental review would require feasible mitigation for potentially significant impacts, including construction-related impacts. It may be helpful to understand which mitigation measures specifically are being referenced here for future school sites in the Draft EIR. 13-11 cont.

Page 2-59, Phasing. The text on page 2-59 suggests that, "non-residential development anticipated under Phase 1 includes 1.3 million square feet of office development, an elementary school, and a 33.5-acre community park." Certainly, the first phase of development will require school facilities, and the analysis in the Draft EIR relies on the presence of school facilities, but it appears that Plate PD-22 shows the southern half only of a proposed K through 8 site rather than a complete school site. Clarification here could be helpful regarding the details of the phasing (and funding) approach for school sites to serve proposed residential development. 13-12

Page 4-18, Lighting Impacts. The Draft EIR discusses the planned high school site and associated outdoor lighting impacts. The Draft EIR identifies that such lighting would be required to comply with "Countywide Design Guidelines and Commercial Lot and Commercial and Institutional Project Development Standards in Chapter 5 of the Zoning Code." NUSD would typically conduct environmental review for proposed school sites, and would include feasible mitigation to address potentially significant impacts. If the future high school site includes outdoor sports lighting standards, and if there could be a potentially significant impact associated with this component of a future high school project, NUSD may indeed require that sports lighting include certain design components to avoid light spillage and glare. However, it would be helpful to have more clarity about any mechanism that would require school sites to comply with the County's Zoning Code. 13-13

Page 5-12, Pesticides. The Draft EIR includes a reference to a requirement for agricultural operators to notify schools if their agricultural operation is within a quarter mile from the school boundary and identify all pesticides to be used during the school year. What pesticides are currently applied during the school year in areas near planned school sites? Please provide documentation that sites designated AG-Cropland near the planned school sites will not use pesticides during the school year once these schools are operational. 13-14

Page 8-40, Greenhouse Gas Reduction Actions in the 2022 Scoping Plan Update. Appendix D of the 2022 Scoping Plan identifies local actions that can be taken to reduce greenhouse gas emissions, including off-site mitigation (California Air Resources Board 2022 Scoping Plan, Appendix ED, page 30). Among off-site mitigation options is: 13-15

> "Off-site EV chargers can increase access to EV charging throughout a community. Some examples could include EV chargers in multi-unit dwellings in disadvantaged or low-income areas, public locations (schools, libraries, city centers), workplaces, key destinations (e.g., parks, recreation areas, sports arenas)."

It may be worth considering identifying the funding of EV chargers within the proposed school sites as an additional greenhouse gas emissions mitigation strategy. 13-15 cont.

Page 15-49, Sound Generation Area of the Pavilion. There is discussion here of a plan for amplified music events at "the pavilion," but NUSD is unable to find a discussion of this element in the Draft Specific Plan. It may be helpful to understand the location of this planned facility vis-à-vis planned school sites. On page 24-6 of the Draft EIR, there is a discussion of an outdoor pavilion in a proposed 25.8-acre park in the west-central portion of the Specific Plan Area, but NUSD is unable to find any park site of this land area on the Land Use Plan. 13-16

Page 17-8, School Downsizing. The Draft EIR includes a statement here that NUSD would like to have clarified: "[t]hrough careful planning, a reduced Plan Area school site could follow the recent trend of school downsizing and meet the Department's criteria." 13-17

Page 22-63, Construction of K-8 and High Schools. Here, the Draft EIR includes a statement that "[t]he proposed UWSP would construct K-8 schools and a high school to serve the needs of students generated in the UWSP area." It is our understanding that NUSD would be responsible for construction and operation of the proposed school sites, though it is important to clarify the funding mechanisms for the construction of school sites and to include language requiring that such funding is available in amounts and with the right timing to ensure NUSD schools can serve students in the Specific Plan Area once dwelling units are occupied. 13-18

Again, NUSD is very appreciative of the County's collaborative approach on the Public Facilities Financing Plan. We appreciate the opportunity to review the Draft Specific Plan and Draft Environmental Impact Report (Draft EIR). NUSD looks forward to continued collaboration with the County to find mutually agreeable language related to school funding for this ambitious and important development Plan.

Sincerely,

Lalanya Rothenberger

Lalanya Rothenberger
Executive Director, Facilities and Strategic Planning
Natomas Unified School District

From:	PER-CEQA
To:	Newton. Julie; Messerschmitt. Kevin; Little. Alison; Nagao. Michelle; Shippey. Anastasia
Subject:	FW: Upper Westside Specific Plan Comment Letter
Date:	Thursday, October 10, 2024 8:32:22 AM
Attachments:	image001.png Upper Westside Specific Plan Opposition 2024.pdf

Andrea Guerra, Senior Office Assistant
Planning and Environmental Review
827 7th Street, Room 225, Sacramento, CA 95814 | (916) 874-2862 (direct)
www.planning.saccounty.gov

Planning and Environmental Review has several customer service options available and appointments can be made for most services. Please see our website at planning.saccounty.gov for the most current information on how to obtain services including office and public counter hours.

Please consider the environment before printing this email

From: Executive Director <executivedirector@sacfarmbureau.org>
Sent: Wednesday, October 9, 2024 4:02 PM
To: PER-CEQA <CEQA@saccounty.gov>
Cc: Pat Hume <PatHume@saccounty.gov>
Subject: Upper Westside Specific Plan Comment Letter

Hello,
Please see the attached comment letter from Sacramento County Farm Bureau in regard to the Upper Westside Specific Plan (State Clearinghouse No 2020100069, County Control Number PLNP2018-00284). Please keep the SCFB informed of any updates and future notices.
Thank you.

Amber McDowell | Executive Director
Sacramento County Farm Bureau
8970 Elk Grove Blvd.
Elk Grove, CA 95624
O: (916) 685-6958 | C: (916) 513-1619

SCFB

SACRAMENTO COUNTY FARM BUREAU

SACRAMENTO COUNTY FARM BUREAU

PUTTING THE FOOD ON YOUR FORK SINCE 1917

October 9, 2024

Sacramento County,
Department of Community Development, Planning & Environmental Review Division
Attn: Environmental Coordinator
827 7th St, Rm 225
Sacramento, CA 95814
CEQA@saccounty.gov

RE: Upper Westside Specific Plan (State Clearinghouse No 2020100069, County Control Number PLNP2018-00284)

Dear Environmental Coordinator,

The Sacramento County Farm Bureau is a non-governmental, non-profit, grassroots membership organization. Our purpose is to preserve and protect our agricultural economy and rural lifestyle since 1917. Four thousand acres of vital farmland are lost each year to urbanization. There is great concern among farmers and ranchers that not only is the practice of farming and ranching decreasing, but their rural way of life is being threatened. Area growers work hard to supply consumers with high quality products while battling obstacles such as increased production costs and water availability. As the earth's original conservationists, farmers and ranchers have a keen interest in preserving our precious land for future generations. Farmers are concerned with natural resources, animal health, water, and air quality, among other imperative issues. Farm Bureau's voluntary elected leaders and professional staff work hard for all Californians to ensure the rural economy's growth, to protect the family farm, and to maintain the treasured natural resources that are important to this state's vitality and lifestyle.

The Sacramento County Farm Bureau has several concerns with the Specific Plan that will develop over 1,532 acres and detrimentally impact the remaining 534 acres left of the 2,066 acres in the project area. The Draft EIR further supports the issues that we address with the proposed project. The Draft EIR identifies multiple significant and unavoidable impacts to agricultural land with the proposed project. All this area needs to be preserved as agricultural lands for flood control, health benefits derived from agricultural lands, wildlife habitat, and a sustainable local food supply. 14-1

The proposed narrow strip of remaining agricultural land, some as narrow as 700 feet, will be detrimentally impacted by the urban zone. The placement of the elementary school is a poor choice due to the state regulatory requirements placed on agriculture operations. The neighboring school will disrupt production for most of that parcel and will lead to pest and disease outbreaks, food quality and health issues, and crop losses because operational practices 14-2

including pest management will be blocked due to the school's location. In addition, the 30-50 foot buffer gravel access trail and farm fence is not a conducive buffer to protect the agricultural land against food safety hazards, pest infestations, or maintain quality production while also maintaining public safety. The minimum buffer to protect agricultural production needs to be a quarter mile. 14-2 cont.

This project area is already the needed flood buffer between the river and the urban city. The County needs to preserve this appropriately sized flood buffer which also consists of mostly prime agricultural land. These lands are classified by the State and County as important for a reason and need to remain intact as such. The county needs to protect the actual agricultural lands already here without trying to mitigate with other land that most likely is already protected or classified as important. Agricultural land cannot be created; what land is here is all that is left. Trying to substitute other land is not an acceptable or equable mitigation. The county must be cognizant about these classifications to ensure priority is maintained in preserving these limited land resources that cannot be created. Agricultural lands provide numerous benefits to the community including cooler temperatures, cleaner air, a diverse and reliable food supply that often is healthier and cheaper the less distance it must travel, carbon sequestration, producing oxygen essential for humans and wildlife, flood and fire control buffer, groundwater basin sustainability with recharge, and a habitat for wildlife. The technological advances and efficiencies applied to farming practices also assist in improving the environment and food quality. 14-3

These agricultural lands are full of wildlife. Wildlife and agricultural lands have a symbiotic relationship that benefits wildlife survival because of the agricultural practices on those lands. Agricultural lands provide food sources, a living habitat, protection from predators, functional water resources, and spacing needs for both individuals and specie population. The wildlife utilizes this particular area because of the resources the agricultural land provides and allows them to thrive. Moving them to other areas only impacts those other areas that already contain populations of various diverse species. The phasing buildout of this Specific Plan is backwards and will cause major issues for wildlife to be able to migrate from the area and will trap many species in the phasing buildout. Buildout needs to start next to the current existing developed edge and work out from that location to direct wildlife towards the future remaining agricultural land and river. Ultimately, this project causes an overall loss of land; therefore, leaving a substantial small area for all wildlife to concentrate on for the sake of surviving and thriving. Agricultural lands also provide a buffer to limit wildlife impacts within the residential and urban areas. 14-4

The DEIR mentions that the City of Sacramento is to provide the water to this new development. Where will the water to supply this new development come from? There will be less groundwater to pull from as around 1,500 acres will now be permanently covered, preventing water to infiltrate down into the groundwater basin. This project reduces the 14-5

amount of water that can recharge this basin and increases the amount of flooding for this and neighboring areas. This land has been in agriculture not only because of its prime soil quality to grow food but also to be a flood buffer for the urban zone. The annual crops grown in this area are grown because the ground is too wet in the winter. It is designated by FEMA as a high-risk flood zone. Developing this low-lying area puts more people at risk and causes more economic damage when flooding occurs. The narrow strip of agricultural land left to be a flood buffer is not large enough. The DEIR points out under PH-1, the contradictory plans of the General Plan and SACOG which will create a huge unplanned population growth of about 25,460 residents in 9,356 housing units of whom will need water, food, and other vital resources that must be obtained and maintained. In addition, the impact of traffic, noise, carbon emissions that previously were very minimal for the area will be greatly elevated and disruptive to the current rural residents' lifestyle. Their way of life will be destroyed. Even the remaining agricultural zone and wildlife will be heavily disrupted and degraded with the bombardment of trash, traffic congestion, trespassing, and other damaging impacts. The people on these agricultural lands and rural residences value the land and the livelihood with it.

14-5 cont.

Our organization has concerns with the perception the county has of how to protect our local food system. The Project Description states under the Sustainable Community section of incorporating measures that would preserve sensitive habitat and conserve agricultural lands. How can this Specific Plan state that when they will remove 1,324 acres (over 70%) of the agricultural land and the wildlife associated with it? It is contradicting. While small urban farms are important to the diversity of produce, they cannot sustain the region or a large city like the neighboring City of Sacramento. It requires large acreage of good land to grow the quantity and variety of food required to provide a balanced diet and plentiful supply to sustain grocery stores, restaurants, and farmers markets for all residents and guests within the entire region. Relying on other areas for a food supply and sending our dollars to those areas is not a sustainable decision. Quality agricultural land is a finite and priceless resource. The cities that preserve these types of lands now will benefit the best later as food, which is essential for life, becomes a very limited resource in most areas. Preserving agricultural land in our county reduces transportation of those foods allowing for a lower carbon footprint, less pollution, fresher and healthier products, and maintains local control with jobs and economic dollars staying in the area.

14-6

The County needs to understand this agricultural land currently assists with lowering the carbon footprint with carbon sequestration, provide resources for the wildlife on them, and as a buffer for flooding and wildfires. The County is doing a disservice to its current residents and businesses by eliminating agricultural lands from this area. In addition, human health and safety will be threatened. Agricultural lands and managed conservation areas are the key for carbon sequestration. This project will add to the carbon the county emits. The County needs to preserve this project area in its current state to provide aid in balancing its carbon footprint.

14-7

8970 Elk Grove Boulevard, Elk Grove, California 95624
Phone 916-685-6958 ● www.sacfarmbureau.org ● staff@sacfarmbureau.org

The County needs to determine the value of all aspects of this project area and not focus on one component that will ruin everything else for the one. In addition, a quick profit for one component but then leaves an entire community in dire straits with potential issues with water availability and quality, food shortages, poor air quality, increased flooding, and climate change is not a valid strategy the County should support. This project area has a lot of State designated Prime Farmland. Most other counties do not have any Prime Farmland. Our county is privileged to have so much abundant prime and statewide important farmland. This makes Sacramento County very valuable as other areas continue to develop more urban centers.

14-8

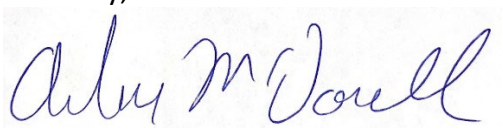
The County needs to support Alternative 2: No project/Existing Zoning as the best option for this area. It has the ideal proper placement, proper growth, proper preservation of resources including land, food, wildlife, water and air quality, and carbon sequestration. As more areas remove agricultural land, the need for food and land to produce food will increase. Preservation of agricultural land for long term options is best in this drastically developing region. Once covered over, the land able to produce food will be gone forever and leaves our county dependent on other areas for the resources vital for human survival. It is a priceless resource we cannot get back.

14-9

Absolute consideration of preserving agricultural lands in Sacramento County is imperative to sustain the county with an abundant food supply, carbon sequestration, wildlife habitat, and the local economy. The Draft EIR acknowledges these issues and that this specific plan will lead to an overall loss of farmland. This is deemed unacceptable. Therefore, the project should not move forward. Please keep the Sacramento County Farm Bureau informed with any updates and future notices.

14-10

Sincerely,



Amber McDowell
Executive Director

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Phone 916-685-6958 ● www.sacfarmbureau.org ● staff@sacfarmbureau.org

ECOS
ENVIRONMENTAL
COUNCIL
OF SACRAMENTO

Post Office Box 1526 | Sacramento, CA 95812-1526

October 28, 2024

Julie Newton, Environmental Coordinator
Department of Community Development
Division of Planning and Environmental Review
827 7th Street, Room 225, Sacramento, CA 95814
Sent via email: CEQA@saccounty.net

Emma Patten, Senior Planner
Sacramento County Planning and Environmental Review
700 H St, Sacramento, CA 95814
Sent via email:
pattene@saccounty.gov (Letter and Attachments via Dropbox – due to size of Attachments)
CEQA@saccounty.gov (Letter only)

SUBJECT: Review/Comment on Upper Westside Specific Plan Draft Environmental Impact Report

Dear Ms. Newton and Ms. Patten:

Please accept these comments from the Environmental Council of Sacramento (ECOS) on the Upper Westside Project draft Environmental Impact Report (DEIR).

The Upper Westside Project Applicant has produced attractive materials promoting the project since at least 2019. The buzz words are there, but the foundations beneath the project are weak.

- The EIR must be an informational document, not a sales brochure. The Applicant owns just 1.54 percent of the property, 31 of the 2,066 acres proposed for the project. It is difficult to discern the level of involvement of the balance of land owners. It is also difficult to see how owning only 1.54 percent of the property can expect to drive the re-zoning and annexation of such a large area. The DEIR does not say that an agreement with the other landowners has been developed. This project appears to be simple developer-driven speculation. 15-1

- Housing is a hot button issue in the City and the County. However, it is important to put the need for housing in context. The DEIR does not disclose that the County's General Plan includes already approved and zoned housing units on greenfield sites that will not be fully built out until after the year 2100. It does not disclose that the land use scenario in SACOG's draft 2025 Blueprint does not include the Upper Westside project area. 15-2

- The EIR must disclose the environmental impacts of the entire proposed Upper Westside project, as well as the cumulative impacts of it with the other proposed developments in the Natomas Basin – Grand Park (5,000 acres) and Airport South Industrial (475 acres). Instead, the DEIR picks and chooses what it 15-3

discloses. Individually and together, the projects would require changes to a number of foundational agreements and policies – the County's General Plan, the County's location of the Urban Service Boundary and Urban Policy Area, and the Natomas Basin Habitat Conservation Plan. These agreements are the result of painstaking compromise between the County, City, California Fish & Wildlife, and U.S. Fish & Wildlife, to guide and control development in the Natomas Basin.

The Upper Westside would make the work of the Natomas Basin Conservancy infinitely more difficult due to the loss of agricultural land in close proximity to Fisherman's Lake. The three projects together would spell the failure of the Natomas Basin Habitat Conservation Plan.

15-3 cont.

- The DEIR says the Westside project would have to rely on the City of Sacramento for water and sewer services and infrastructure. However, it does not disclose that the City has an agreement with State and federal wildlife agencies to not develop outside of its Permit area. Questions remain over how emergency services, police, fire, medical as well as park maintenance and recreation programs will be provided, as build-out proceeds over many years. How would infrastructure be built out if property owners are not part of the project and will services be available to non-participating land owners? Would the project area be annexed by the City to facilitate the extension of utilities?

15-4

- We do not understand why this project is allowed to proceed. Why has the County not stopped it as it teeters on multiple foundational weaknesses? Why is the County entertaining the idea of building a community the size of Galt or El Cerrito, (25,000 people), next to the Sacramento River, with only four exit roads in case of an evacuation?

15-5

- This project is not Smart Growth, it is rampant speculation. It is not needed given the excess existing housing entitlements in the Sacramento region, and in Sacramento County. The project does not provide extraordinary benefits and should not merit a change to the County's Urban Services Boundary.

15-6

- Please see our comments in the pages below and note that our attorney, Patrick Soluri, will submit comments on our behalf separately.

15-7

Sincerely,

Susan Herre AIA AICP
President of the Board of Directors

Contents

1) Key Information missing in the DEIR

The DEIR omits considerations that should be key to the County in its decision-making:

a) Impacts on provisions of the Natomas Basin Habitat Conservation Plan, and on Natomas Basin and other mitigation properties, are not identified nor analyzed; 15-8

b) The requirement that the project obtain incidental take permits to reduce impacts to less than significant is not included; 15-9

c) Location and policy significance of the County of Sacramento Urban Services Boundary, and associated land use policies, are ignored; also, there is no discussion of the implications for the Urban Services Boundary and Urban Policy Area, and future development in the Natomas Basin, if the project is approved; 15-10

d) Analysis of impacts on water quality from storm water drainage from the project area, and cumulative impact from development upstream from the project, is not provided; 15-11

e) National Annual Particulate Matter (PM) 2.5 standard has changed but this is not acknowledged. 15-12

2) Sacramento County Urban Services Boundary

The Upper Westside project would be located outside of Sacramento County's Urban Services Boundary (USB), yet the DEIR does not address the fact that it encroaches beyond the boundary of the USB. If the Upper Westside project is approved, apart from the direct impacts to farmland and habitat, it would set a precedent for other development projects in Natomas to encroach beyond the USB.

The DEIR does not address:

a) the importance of the USB as a land use planning act of regional significance;

b) the USB as the "ultimate boundary of the urban area" in the unincorporated County, based upon jurisdictional, natural and environmental constraints to urban growth;

c) the precedent-setting impact of the Upper Westside project encroachment on the USB for other development projects, both in Natomas and east Sacramento County;

d) the requirements of County General Plan Policy LU-127 for changing the USB;

e) the two other proposed projects that are outside the USB

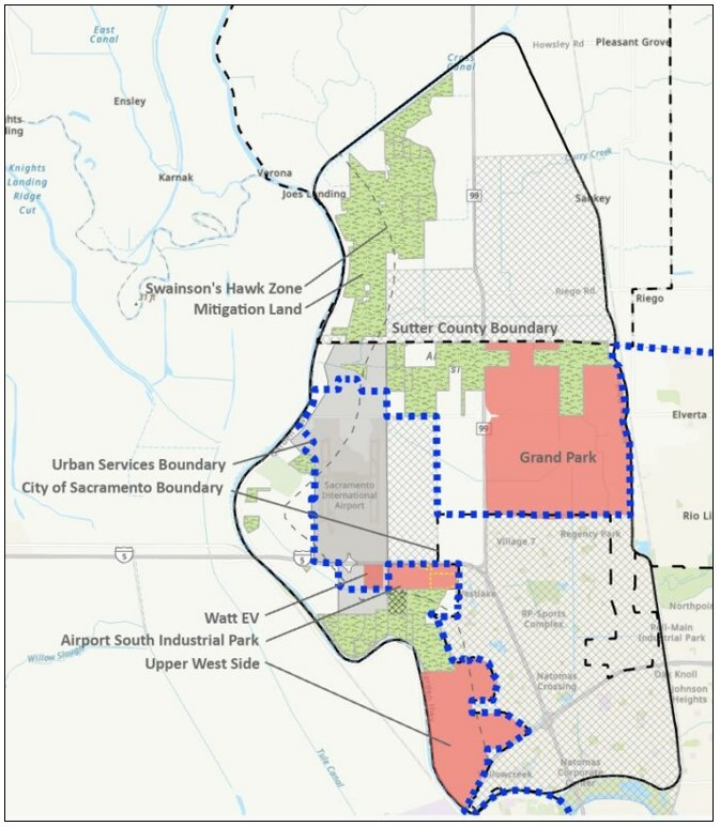


FIGURE 1: Map showing Upper Westside and the two other proposed projects outside USB
Source: ECOS

15-13

Refer to the map at right, FIGURE 1 to see the USB as a blue dotted line, and the other proposed projects that are outside the USB, the Airport South Industrial (475 acres for warehouse space) and Grand Park (5,000 acres for residential/commercial).

The County General Plan includes an Urban Services Boundary, agricultural protection policies and other commitments to maintain the project area in agriculture. These policies in turn underpin regional planning for climate change, air quality, transportation, land use and other urban infrastructure. Permitting urbanization in an area designated by the County General Plan and regional plans as agriculture has profound impacts on the entire region.

The map at right, FIGURE 2, shows the area included within the USB – about 449 square mile area. This area is about ten times the size of Paris and Washington D.C, and four times the size of the City of Sacramento.

The exact boundary line of the USB was shaped by river watersheds, creeks, the Delta, and FEMA-designated flood areas; by the history of fires and future fire risk; and by the need to preserve important farmland and to protect habitat for threatened plant and animal species. It was also shaped by the edges of existing urbanized areas and cities, and Sacramento International Airport.

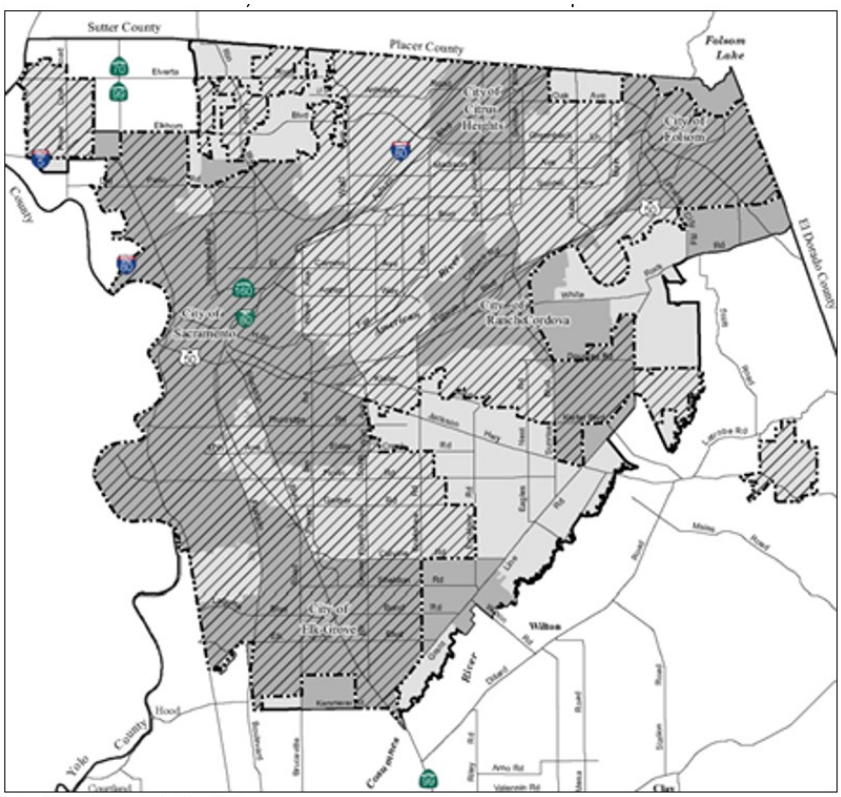


FIGURE 2: Area within the USB
Source: Sac County General Plan Land Use Element, Figure 1, USB and UPA Boundaries
https://planning.saccounty.gov/Documents/B12.%20Land%20Use%20Element%20Amended%2012-13-22.pdf

Consider what it means to break through the Urban Services Boundary (USB):

This boundary, established in 1993, is defined in the Sacramento County General Plan as the "ultimate boundary of the urban area" in the unincorporated County, based upon jurisdictional, natural and environmental constraints to urban growth; intended to be a permanent growth boundary not subject to modification except under extraordinary circumstances."

All three of the projects would break through the USB. Changes to the USB are to be made only for "extraordinary projects" and yet there is nothing extraordinary about Upper Westside except that it is close to the City of Sacramento. What is extraordinary about the area is the deep, prime agricultural soil from many years of overflow from the Sacramento River.

15-14

Consider the County's General Plan Policy LU-127 strictures for projects proposing to expand the USB in FIGURE 3 below.

Given the impacts of this project on the region and the Natomas community, the Upper Westside project does not meet the listed requirements, nor does it merit a finding of extraordinary benefits and opportunities by 4/5ths of the Board of Supervisors.

LU-127. The County shall not expand the Urban Service Boundary unless:

- There is inadequate vacant land within the USB to accommodate the projected 25 year demand for urban uses; and
- The proposal calling for such expansion can satisfy the requirements of a master water plan as contained in the Conservation Element; and
- The proposal calling for such expansion can satisfy the requirements of the Sacramento County Air Quality Attainment Plan; and
- The area of expansion does not incorporate open space areas for which previously secured open space easements would need to be relinquished; and
- The area of expansion does not include the development of important natural resource areas, aquifer recharge lands or prime agricultural lands;
- The area of expansion does not preclude implementation of a Sacramento County-adopted Habitat Conservation Plan;

OR

- The Board approves such expansion by a 4/5ths vote based upon on finding that the expansion would provide extraordinary environmental, social or economic benefits and opportunities to the County.

FIGURE 3: General Plan Policy LU-127
Source: Sac County General Plan Land Use Element, page 144
https://planning.saccounty.gov/Documents/B12.%20Land%20Use%20Element%20Amended%2012-13-22.pdf

15-15

3) Conflicts with the Natomas Basin Habitat Conservation Plan (NBHCP)

The proposed Upper Westside project conflicts with the NBHCP. Biological resources are inadequately assessed with faulty mitigation measures that do not reduce impacts to less than significant.

a) The DEIR falsely claims that the project does not conflict with the NBHCP. The DEIR claims that any conflicts with the 2003 NBHCP and the Metro Air Park Habitat Conservation Plan (MAPHCP) which adopted the NBHCP are less than significant impacts. (ES-55)

DEIR MM "BR-14: Conflict With Natomas Basin HCP and Metro Air Park HCP. The Natomas Basin HCP and Metro Air Park HCP are adopted conservation plans with respective plan areas that cover portions of the Natomas Basin. Implementation of Mitigation Measures BR-1 through BR-9 would avoid and minimize impacts to covered species in the Natomas Basin HCP and Metro Air Park HCP and have been designed to avoid conflicts with the strategies and provisions of the respective HCPs. Given these considerations, the proposed UWSP and required offsite improvements would not conflict with the provisions of existing adopted HCPs, and the overall impact would be less than significant."

15-16

As explained more fully below, the EIR's analysis fails as an informational document with respect to this impact by conspicuously omitting critical information required to understand the project's individual and cumulative impacts. Further, the EIR's finding of less than significant impact is not supported by substantial evidence. The impacts on the HCPs are significant, and evaluation and mitigation for these impacts require compliance with the terms of the NBHCP regarding development in the Basin.

i) <u>The Natomas Basin Habitat Conservation Plan was created as a basinwide HCP</u> in response to the federal Army Corp of Engineers flood control permit which permitted construction of flood control infrastructure that enabled 17,500 acres of new urban development within designated NBHCP Permit Areas (City, Sutter County, MetroAirPark) in the Basin with basinwide impacts on habitat and endangered species. The basinwide plan was required as a condition of those permits by the US Fish and Wildlife Service. The Corps permit #199200719, pg 4, undated, (**ATTACHMENT 1**) [1] states:

"l. The permit applicant shall not begin construction on the pumping station along the East Main Drain or otherwise complete the proposed project by providing 100-year flood protection for the lower American Basin until the Service first issues an incidental take permit and associated implementing agreement pursuant to Section 10(a) (1) (b) of the Act to the City and County of Sacramento, Sutter County and any other parties necessary to guarantee the successful implementation of a habitat conservation plan for the giant garter snake resident in the American Basin. This plan shall be compatible with and a component of the multispecies habitat management plan otherwise required by the Department of the Army as a condition of permit authorization. The Biological Opinion from the U.S. Fish and Wildlife Service to the U.S. Army Corps of Engineers dated March 11, 1994 is expressly incorporated as a condition of this permit."

15-17

That 1994 USFWS Biological Opinion, March 11, 1994, pg. 5 (**ATTACHMENT 2**)[2], expressly conditions the USFWS approval of the flood control project on a "multispecies habitat management plan for

[1] Attachment 1: 1994 Permit Number 199200719 U.S. ARMY ENGINEER DISTRICT.SACRAMENTO CORPS OF ENGINEERS 1325 J STREET SACRAMENTO, CALIFORNIA 95814-2922

[2] Attachment 2: March 11, 1994, US Fish and Wildlife Service, Endangered Species Act Consultation on the Revised Natomas Area Flood Control Improvement Project (PN 199200719) in Sacramento and Sutter Counties, California

the 55,000 acre lower American Basin" (i.e. Natomas Basin in Sacramento and Sutter counties) and issuance of Incidental Take Permit from USFWS and 2081 Permit from CDFW.

While the County of Sacramento did not participate in the HCP process and was not included in the Incidental Take Permit, approval of the Upper Westside project would interfere with these permits. The CDFW's NOP comment letter, pg. 13, made this point with clarity, explaining that the Project "marks an apparent departure by the County" from the Joint Vision MOU that "has been critical to the integrity of the NBHCP." The County must now come into compliance to avoid violation of the terms of the Army Corps of Engineers permits for flood control in the Natomas Basin. A previous private development in the unincorporated area of the County, Metro AirPark, agreed to comply with the NBHCP, and therefore the Metro AirPark HCP was approved by the wildlife agencies and included within the 17,500-acre Permit Areas.

15-17 cont.

ii) The NBHCP includes clear guidance as to how development outside the NBHCP and MAPHCP permit areas, totaling 17,500 acres, must be assessed and permitted by the Federal and State wildlife agencies, which agencies can deny permits.

The Implementing Agreement ("IA") (**ATTACHMENT 3**)[3] for the 2003 NBHCP requires that:
"in the event that future urban development should occur, prior to approval of any related rezoning or prezoning, such future urban development shall trigger a reevaluation of the Plan and Permits, a new effects analysis, potential amendments and/or revisions to the Plan and Permits, a separate conservation strategy and issuance of Incidental Take Permits to the permittee for that additional development and/or possible suspension or revocation of [Permit] in the event that the City or Sutter violates such limitations. " (IA 3.1 (a))."

15-18

The DEIR fails to disclose this document and does not identify the impact of the Upper Westside project on the future implementation and viability of this agreement. Nor does it include acknowledgement of the need for mitigation that will be required to come into compliance with this process for consideration. The DEIR fails to require as mitigation the CDFW take authorization required.

iii) The California Department of Fish and Wildlife NOP Comment letter, November 6, 2020, at page 11, states:
"A robust analysis of whether, in what way, and to what extent the Project may affect future implementation and the continued viability of the NBHCP and MAPHCP in the Natomas Basin is essential to the County's informed review of the Project."

"CDFW appreciates the Project proponent and the County's previous commitment to prepare a related effects analysis as part of the County's review of the Project. The analysis will provide critical information essential to a meaningful understanding of the Project's regional setting. That, in turn, will also help ensure the EIR's environmental analysis is robust and includes all the potentially significant effects on fish and wildlife that may be caused by the Project."

15-19

In fact, there is no effects analysis in the DEIR as described by CDFW's letter. Also in CDFW's November 6, 2020 letter, page 12, CDFW recommends that the EIR address, specific to the effects analysis, the following:

[3] Attachment 3: 2003 IMPLEMENTATION AGREEMENT FOR THE NATOMAS BASIN HABITAT CONSERVATION PLAN

"· Persistence of NBHCP and MAP HCP Covered Species in the Natomas Basin
· Impacts to established reserve land managed by the Natomas Basin Conservancy (TNBC)
· Reduction of available reserve land in the Natomas Basin under the NBHCP and MAPHCP (with appropriate buffers and setbacks as detailed in the NBHCP)
· Reduction of ability for TNBC to establish or enhance Covered Species range and habitats in the southern Natomas Basin
· Continued viability of the land uses in the Natomas Basin as detailed in the NBHCP and MAPHCP
· Financial impacts to TNBC and fee payers under the NBHCP and MAPHCP, including the recent action by TNBC Board of Directors and the Sacramento City Council to address related ongoing financial challenges of continuing to implement the required conservation strategy in the Natomas Basin, and
· Cumulative impact of the Project, in combination with other development in the Natomas Basin approved since 2003 that is outside of the City of Sacramento and Sutter County's permitted area under the NBHCP (e.g., levee improvements by the Sacramento Area Flood Control Agency and the Greenbriar project). A visual representation of the mounting pressure on the continued viability of the NBHCP is shown in Figure 1."

15-19 cont.

Figure 1 is on page 17 of the CDFW letter and is titled Figure 1. Comparison of proposed land uses in the Natomas Basin (2020 & NBHCP signing in 2003). It reflects 2020 data and should be updated in your analysis to 2024.

The 17,500-acre permit area for the NBHCP is about 50 percent built out, mostly by City of Sacramento and MetroAirpark, with Permitted development in Sutter County's 7,467-acre Permit Area mostly unbuilt but subject to an adopted Specific Plan expected to start construction soon. The DEIR must consider the impacts on the species of all existing and permitted future development (i.e. Sutter Permit Area), as well as the proposed Upper Westside project, on the covered species and the implementation of the NBHCP. The DEIR does not provide this information.

iv) Federal Court Decision Finds Any Additional Development in the Basin Outside NBHCP Permit Area is a Significant Impact.

The USFWS Biological Opinion for the 2003 NBHCP, June 24, 2003, pp 11-12 (**ATTACHMENT 4**)[4]; the 2003 NBHCP pp. I-3; I-5,6; I-7,8; the 2003 NBHCP Implementation Agreement (IA) §3.1(a) and 3.1.2(c); and the decision of Judge David Levy in National Wildlife Federation v. Norton, Civ-S-04-0579 DFL JFM (E.D. Cal. Sep. 8, 2005) pg. 30 (**ATTACHMENT 5**)[5], clearly state that <u>any additional development in the Basin outside the 17,500 acre permit areas of the NBHCP would constitute a significant departure from the operating conservation plan and thus a significant impact on the NBHCP and the Natomas Basin populations of the species protected by the NBHCP.</u>

15-20

[4] Attachment 4: June 24, 2003 United States Department of the Interior FISH AND WILDLIFE SERVICE, Sacramento Fish and Wildlife Office Intra-Service Biological and Conference Opinion on Issuance of a Section 10(a)(1)(B) Incidental Take Permit to the City of Sacramento and Sutter County for Urban Development in the Natomas Basin, Sacramento and Sutter Counties, California.

[5] Attachment 5: National Wildlife Federation v. Norton, Civ-S-04-0579 DFL JFM (E.D. Cal. Sep. 8, 2005)

The project must apply and receive an Incidental Take Permit from the USFWS and a 2081 permit from CDFW, which these agencies may approve or deny, in order to justify a finding of no significant impact on the NBHCP. Yet the DEIR asserts without evidence that the Upper Westside project would have no significant impact on the NBHCP or MAPHCP.

15-20 cont.

As stated above, the NBHCP was prepared to satisfy a condition of an U.S. Army Corp of Engineers permit, with the program implementation under the direction of the U.S. Fish and Wildlife Service, CA Dept of Fish and Wildlife, City of Sacramento, and the County of Sutter. Any project in the Basin must meet the same criteria since the flood control provided as a result of the permit is Basin wide.

As stated in NWF v. Norton, ibid p. 28, any additional development in the Basin is a federal project requiring a federal permit. NWF v Norton, ibid. p. 28, states that "through the implementation agreement, the City has committed to ensuring that additional development does not occur in the Basin without federal review. . . any further development will necessarily be a federal action because further federal approval will be required under any scenario that could impair the efficacy of the NBHCP." (emphasis added)

NWF v. Norton affirms that the USFWS relied upon the remaining agricultural areas in the Natomas Basin to provide species protection benefits to issue the incidental take permits for City and Sutter County development in the Natomas Basin. On page 10, the decision references USFWS Biological Opinion (BioOp) to affirm that the NBHCP depends upon several key factors to ensure viability of the Giant Garter Snake population including:

"(3) the maintenance of connectivity between reserve lands; and (4) the continued existence of 16,000 acres of GGS habitat that will remain in the Basin after development;"

Likewise NWF v. Norton quotes the USFWS Biological Opinion (BioOp) that the proposed action [NBHCP] will not jeopardize the survival of the Central Valley population of the Swainson's Hawk or the species as a whole because “in part" (2) approximately 13,000 acres of foraging habitat will not be affected." (NWF v Norton, ibid, p. 11.) On p.12, the court references the USFWS BioOp that harm to Swainson's Hawk will be low because "substantial foraging habitat will exist in the Basin even after the planned development."

15-21

These elements are critical to the conservation strategy and would be affected by the Upper Westside project development since the project removes 2000 acres of foraging habitat in the Swainson's Hawk Zone of the NBHCP. Yet the DEIR does not address these important impacts of the project.

Further, "The court notes. . . that the Service and those seeking an ITP in the future will face an uphill battle if they attempt to argue that additional development in the Basin beyond 17,500 acres will not result in jeopardy. The NBHCP, BiOp, EIR/EIS, and Findings and Recommendations are all predicated on the assumption that development in the Basin will be limited to 17,500 acres and that the remaining lands will remain in agricultural use." (NWF v Norton, ibid, p 30, footnote 13)

v) The City may not participate in development beyond the NBHCP Permit Area permitted under the NBHCP, yet the Upper Westside project, located in the County’s jurisdiction outside the City, expects to use City sewer services and water rights and services; and project proponents reportedly have stated an intent to annex to the City after the County approves the development.

15-22

The UWSP conflicts with City obligations under 2003 NBHCP Implementation Agreement not to approve development beyond the City's NBHCP Permit Area. City's development in the Basin is subject to the 2003 NBHCP, and its Implementation Agreement, an agreement signed by the City, Sutter County and the Federal and State Wildlife Agencies. The 2003 NBHCP Implementation Agreement ("IA") §3.1.1 provides that "CITY agrees not to approve more than 8,050 acres of Authorized Development and to ensure that all Authorized Development is confined to CITY's Permit Area as depicted on Exhibit B. . . ." (see NBHCP IA, Exhibit B).

The City also agreed in the NBHCP that "in the event that future urban development should occur, prior to approval of any related rezoning or prezoning, such future urban development shall trigger a reevaluation of the Plan and Permits, a new effects analysis, potential amendments and/or revisions to the Plan and Permits, a separate conservation strategy and issuance of Incidental Take Permits to the permittee for that additional development and/or possible suspension or revocation of [Permit] in the event that the City or Sutter violates such limitations." ((IA 3.1 (a))."

The DEIR states that City water provision impact would be less than significant on pages ES-125 and ES-129:

"Water Treatment. The City of Sacramento would provide water to development allowed under the proposed UWSP. The City owns and operates two water diversion and treatment facilities: the Sacramento River Water Treatment Plant on the Sacramento River and the Fairbairn Water Treatment Plant on the American River. Enough excess treatment capacity exists at these two facilities to serve development allowed under the proposed UWSP, and thus no additional water treatment capacity would need to be constructed to accommodate the increase in water demand anticipated under the proposed UWSP. This impact would be less than significant."

"UT-2: Result in a Project Water Demand That Cannot Be Met by Supply. The City of Sacramento would provide water to development allowed under the proposed UWSP. The City of Sacramento would have adequate planned water supply to serve development allowed under the proposed UWSP during normal, single dry, and multiple dry years. This impact would be less than significant."

The DEIR at page 2-43 states:

"SacSewer would provide wastewater collection and treatment service to land uses allowed under the proposed UWSP. Wastewater generated within the UWSP area would be conveyed through local sewer systems to the regional interceptor system for treatment at the Sacramento Regional Wastewater Treatment Plant in Elk Grove. As discussed above, the proposed UWSP would require SacSewer annexation."

In fact, provision of water and sewer services by the City to new development outside the Permit area directly violates its obligations to state and federal governments included in the Implementation Agreement for the NBHCP cited above. (IA 3.1.1). These are significant impacts not identified or mitigated in the DEIR.

15-22 cont.

vi) The Project would urbanize part of the NBHCP Swainson's Hawk Zone (SHZ), obliterating its conservation value, which is a key element of the NBHCP Conservation Strategy for Swainson's Hawks in the Natomas Basin.

15-23

CDFW's NOP comment letter, page 13, (Nov. 6, 2020, in DEIR Appendix heading "Notice of Preparation") noted that "high value foraging habitat present in a majority of the Project area could contribute to foraging ability for hundreds of Swainson's hawks in the Natomas Basin, as well as those using surrounding nests in Yolo and east and south Sacramento County, and Swainson's hawk migrating through the Project area. (CDFW 2020). This highlights the Natomas Basin's unique contribution in providing valuable nesting and foraging habitat, both of which are essential for the species' life history. As such, a thorough evaluation in the EIR of the Project's impacts to both nesting and foraging habitat as independent factors will be crucial, considering the value of the Natomas Basin for the species."

The November 6, 2020 NOP comment letter by CDFW, page 14, also stated regarding analysis of the SHZ:

"Much of the Project area is mapped within the Swainson's Hawk Zone (SHZ), which the NBHCP describes as the area within one mile of the Sacramento River in the Natomas Basin. The SHZ was derived from the high density of Swainson's hawk nests within this area and scientific evidence for the value of the habitat (NBHCP 2003). The NBHCP recognizes the importance of the SHZ to this species and the viability of their plan which resulted in substantial effort from the City of Sacramento and Sutter County to replan development outside of this area. Replanning efforts in the SHZ have been vital to preserve the area's ecological value and the overall goals of the NBHCP, despite the associated economic and political opportunity costs. Although the County is not party to the NBHCP, CDFW recommends the County considers the Project's 1) biological impact in an ecologically valuable area and 2) the effect that Project development in the SHZ will have on the continued implementation and viability of the NBHCP, as well as the MAP HCP."

15-23 cont.

"As such, robust analysis of the Project's potentially significant effects on Swainson's hawk will be a critical part of the development of the EIR. With the Project in the SHZ, there could be several potentially significant effects to the species, both in the project- specific and cumulative context. Creating a feasible mitigation approach should be an early and focal part of the EIR development given the high utilization of the area by the species." CDFW, ibid, pg. 14.

"While typical projects often focus on initial surveys, this Project is in a particularly unique area where extensive surveys and biological resource mapping has already been completed. The most recent surveys indicated that 14 Swainson's hawk nests are present within the Project area or within a 0.5-mile radius that Project activities may impact (TNBC 2019, CDFW 2020). Due to the density of known nest sites, CDFW recommends the EIR analyze the individual nesting and foraging behavior patterns associated with each known nest pair and propose avoidance, minimization and mitigation that specifically addresses those patterns, rather than simply acknowledging presence. CDFW also recommends the EIR analyze the Project's regional impacts to the species, both to the overall persistence of Swainson's hawk within the Natomas Basin and indirect impacts to individual Swainson's hawk that may depend on the Project area's foraging habitat. Data from such studies can more effectively inform a mitigation strategy that complies with CESA." CDFW, ibid pg. 14.

The DEIR does not provide these analyses of the impacts of the project on nesting Swainson's Hawks in the project area.

The Swainson's Hawk Zone protects the Swainson's Hawk population which nests along the Sacramento River from urban disturbance and is of particular value as foraging habitat for reproduction of Swainson's Hawks because of its proximity to Swainson's Hawks' nests in tall riparian trees along the river. The success of the NBHCP in mitigating for the impacts of development on the Swainson's Hawk within the NBHCP Permit Areas (City, Sutter County, Metro Air Park) depends in large part on excluding urban uses within the Swainson's Hawk Zone and acquiring permanent preserve lands within the Swainson's Hawk zone. "The NBHCP's primary strategies to mitigate impacts to Swainson's hawks caused by Authorized Development are to avoid development within the Swainson's Hawk Zone" . . . " and to acquire upland habitat as Mitigation Lands inside the Swainson's Hawk Zone. . . " (NBHCP, IV-28-29. See also NBHCP pp. V-9, -10; V-20; VII-19; -20; NBHCP IA p. 4, §3.1.2; 2003 USFWS Biological Opinion p. 36.) Accordingly, the proposed project directly conflicts with and interferes with the NBHCP conservation strategy for Swainson's Hawks. 15-24

The DEIR fails to disclose what percentage of the area of the Swainson's Hawk Zone the project will convert to urban uses or in other ways render the land unavailable or unsuitable for Swainson's Hawk foraging habitat.
This impact needs to be disclosed. What will be the estimated impact on the Basin's Swainson's Hawk population reproductive capacity? How much will the project reduce the population of Swainson's Hawks in the Basin? The DEIR does not disclose the nesting territories within the project area, within one mile of the Upper Westside project area, within two miles of the project area and within five miles of the project area. What has been the typical productivity of those nesting sites over the last 20 years?

vii) The NBHCP permit area remains partly in habitat and undeveloped at this time so the impact of already permitted but unbuilt development on the performance of the NBHCP in protecting the species is not known.

Over half of the 17,500-acre NBHCP permit area remains in agricultural land as Sutter County is just now beginning to build in its Permit area. The NBHCP has not been fully tested as a conservation program for the species in the Basin. Yet the DEIR fails to fully consider how the already declining Swainson's Hawk population in Natomas will survive with the additional development of the Upper Westside project. 15-25

What is the likelihood that the increased reduction in habitat created by Upper Westside will result in the failure of the NBHCP and the reduction in range of the Swainson's Hawk and Giant Garter Snake in California?

b) Surveys for Giant Garter Snake and Swainson's Hawk presence and habitat were incomplete.

Species surveys by Applicant's biologist (Bargas) for presence and habitat of Swainson's Hawk and Giant Garter Snake were limited to 568.7 acres of the 2,066-acre project site, which is incomplete. See DEIR Appendix, Supplemental Biological Resources Assessment by Helix, §§3.2.4, 3.2.5.1, 3.2.5.2, pp 20, 21. 15-26

The DEIR fails to disclose impacts on key protected species in the project area.

c) Impacts on the Swainson's Hawk

The DEIR claims that "With the implementation of Mitigation Measures BR-2a and BR-7a, the impact on Swainson's hawk nesting habitat would be less than significant." This claim is contrary to recent monitoring data, conflicts with the NBHCP which protects Swainson's Hawk population in the Basin, and cannot be supported by the evidence in the EIR biological resources analysis which is inadequate and covers only a small part of the Upper Westside Specific Plan project area.

Recent monitoring data indicate a downward trend in reproduction in the Basin, and as pointed out earlier, the project interferes with the NBHCP which mitigates impacts within the Basin to less than significant for development already approved and permitted in the Basin. That build out is not complete and impacts of full build out of permitted development are not now known.

Even without build out of all the Swainson's Hawk habitat permitted in the Basin, the species is showing negative impacts. Monitoring data from Natomas Basin Conservancy show that "the number of young produced per occupied territory, per active nest, and per successful nest all now exhibit a statistically significant downward trend over the entire monitoring period (1999-2023. . . ." (p. 4.5, ICF. 2024. Natomas Basin Habitat Conservation Plan Area Biological Effectiveness Monitoring Report: 2023 Annual Survey Results. July. Prepared for the Natomas Basin Conservancy, Sacramento, CA. Prepared by ICF, Sacramento, CA) (**ATTACHMENT 6**)[6].

SWH nesting productivity has dropped over the last decade. "Since the first precipitous drop in 2011, reproductive metrics have exhibited a high degree of annual variation, suggesting instability in the population." (ICF, ibid., p. 4.5)

15-27

"The nesting of the Swainson's Hawk population in Natomas is concentrated in the project area. "Swainson's hawks continued to nest primarily in the southern portion and along the far western and northern edges of the Basin in 2023. The nest sites are predominantly located along the Sacramento River and within approximately 1 mile of the river." (ICF, Ibid., p. 4.5)

The removal of 2,000 acres of foraging habitat from an area directly serving nesting Swainson's Hawks can only further exacerbate that downward trend. The DEIR acknowledges this:

"Conversion of agricultural land to developed/landscaped land in the UWSP area would also potentially result in the loss of nesting territories, displacement of nesting pairs, reduction in reproductive potential, or decreased survival rates, particularly for Swainson's hawk nesting within 1 mile of the UWSP area, but also for Swainson's hawk nesting outside of the UWSP area. A telemetry study of Swainson's hawk nesting in the Natomas Basin found that adult Swainson's hawk travel distances of up to 6 miles from the nest to forage throughout the breeding season (Fleishman et al. 2016). Plate BR-4 shows suitable Swainson's hawk foraging habitat within 10 miles of the Natomas Basin. The impact associated with the loss of foraging habitat would be potentially significant." (DEIR pg. 7-58).

Further exacerbating the downward trend is the seemingly arbitrary ten-mile radius for replacement habitat in the proposed mitigation program. Based on the above, ten miles appears too distant for

[6] Attachment 6: ICF. 2024. Natomas Basin Habitat Conservation Plan Area Biological Effectiveness Monitoring Report: 2023 Annual Survey Results. July. Prepared for the Natomas Basin Conservancy, Sacramento, CA. Prepared by ICF, Sacramento, CA).

effective replacement habitat. How was ten miles selected? What is the availability and the quality of foraging habitat within 6 miles of the project area? Isn't six miles the more appropriate radius for assessment of the impact of the project on the foraging habitat available to the nesting pairs in or near the project location?

15-27 cont.

While the DEIR references the existence of the Natomas Basin Conservancy monitoring surveys of Swainson's Hawk nesting in the Basin, it fails to correctly identify the typical and historical reproductive capacity of these nesting sites. Instead it uses the Bargas surveys in just two recent low nesting success years to identify the number of territories and young fledged (DEIR p. 7-57), an historically low number, limited to only a portion of the plan area. This is an incorrect approach. The environmental document needs to identify the total nesting territories within 6 miles of the project as documented by the NBC over the last decade.

Removal of 2,000 acres of foraging habitat in close proximity to a number of nesting territories is very likely to have a substantial negative impact on reproduction for those nesting territories. The DEIR fails to fully disclose the likely impact and does not mitigate to less than significant.

15-28

SWH Mitigation Proposed in the DEIR Is Inadequate and Does Not Mitigate Impacts to Less than Significant:

The proposed mitigation does not identify the requirement that the project obtain a §2081 permit from the California Department of Fish and Wildlife, or an explanation for why such permit would not be required. This is an informational deficiency. The project cannot reduce its impacts on Swainson's Hawks to less than significant absent a §2081 permit from California Department of Fish and Game. Given the existence of a state and federally approved habitat conservation plan to conserve the Swainson's Hawk population in the Natomas Basin, and the conflict between the Upper Westside project and this plan, the project is obligated to obtain a §2081 permit to reduce impacts to less than significant.

15-29

Mitigation is described (DEIR pp. 7-60-61) as:

"BR-7b Compensate for Permanent Impacts on Swainson's Hawk Foraging Habitat
Compensation for the permanent loss of foraging habitat shall be determined for each development phase. The applicant for each development phase shall retain a Qualified Biologist to verify, map, and quantify (acres) foraging habitat (including annual grasses and forbs, field crops, grain and hay, partially irrigated crops, and truck crops), that would be permanently impacted by the current development phase."

"Prior to the approval of either grading permits or building permits, whichever is first, project applicants for each construction phase shall compensate for permanent loss of foraging habitat through the preservation of foraging habitat. This compensatory mitigation shall be at a ratio of at least 1:1 (mitigation habitat to permanently lost habitat). Mitigation sites shall be located outside, and within 10 miles of, the Natomas Basin."

"This mitigation may be provided through purchase of credits from a CDFW-approved conservation bank, or through protection of habitat, including acquisition of a conservation easement and funding long-term administration, monitoring, and enforcement of the easement".

15-30

"Mitigation provided through acquisition of a conservation easement must satisfy the following requirements":

- "The mitigation site(s) shall be subject to consultation with CDFW and approved by the County.
- "The form and content of the easement shall be acceptable to the County and CDFW, prohibit activities that substantially impair or diminish the land's suitability as Swainson's hawk foraging habitat, and protect any existing water rights necessary to maintain foraging habitat in agricultural production.
- "An endowment in an amount, form, and structure acceptable to the County and CDFW shall be established for administering, monitoring, and enforcing the conservation easement."

This mitigation program has a number of severe defects and fails to comply with CEQA:

i) Deferral of mitigation guarantees to a future stage is not consistent with CEQA. The EIR fails to provide sufficient information to indicate that mitigation will be effective. Further, piecemeal determination of mitigation requirements within the proposed Upper Westside project area is not consistent with CEQA or with the basinwide habitat conservation plan that the wildlife agencies have agreed to for the Natomas Basin and have found necessary to avoid significant impacts to protected species.

ii) The DEIR fails to identify suitable, available mitigation land. It appears to rely on unidentified land in Yolo County, but Yolo County Ordinance Chapter 10, "Habitat Mitigation Ordinance" (**ATTACHMENT 7**)[7] requires a discretionary use permit for mitigation projects exceeding 40 acres intended to mitigate for projects occurring outside of Yolo County. Yolo County may or may not approve a Sacramento County mitigation project in Yolo. Reliance on Yolo County for mitigation land is speculative and infeasible unless Yolo County issues a permit for an Upper Westside mitigation project.

iii) The DEIR requires only "consultation" with CDFW on the mitigation site on a development phase by development phase basis. In this critical location, where CDFW has already adopted a basin wide conservation plan, the CDFW must have approval on location as well as the endowment and conservation operator for all mitigation properties. The appropriate way to mitigate in this location is to accomplish an amendment to the NBHCP or to obtain state and federal approval for a separate HCP, as was done by Metro Airpark. Less than that cannot reduce impacts to less than significant.

15-30 cont.

d) Giant Garter Snake Impacts Not Mitigated to Less than Significant; Mitigation Program Inadequate.

The DEIR identifies a weak and unjustified mitigation program for impacts on the Giant Garter Snake, a federal and state listed threatened species covered by the NBHCP. In particular, the proposed options for a mitigation program outside the Natomas Basin are not compliant with CEQA in that they are speculative, deferred, and inadequate to mitigate for Upper Westside project impacts to the Giant Garter Snake.

15-31

The NBHCP defines the conservation strategy for the Giant Garter Snake in the Natomas Basin. However, the proposed Upper Westside project prohibits mitigation within the Natomas Basin, and states that GGS mitigation shall be somewhere in the American Basin. The American Basin is an historic flood basin running along the east side of the Feather and Sacramento Rivers from Oroville southward

[7] Attachment 7: Yolo County Ordinance Chapter 10, "Habitat Mitigation Ordinance"

to the American River, which includes the Natomas Basin. The 2017 USFWS Giant Garter Snake Recovery Plan, page II-8, shows the majority of known GGS recorded locations as being in Natomas Basin, some of which have not been occupied for some years and some of which have been urbanized and no longer provide habitat.

The proposed mitigation is not consistent with the NBHCP conservation strategy; in fact, it undermines and contradicts the provisions of the NBHCP regarding how additional development in the Basin should mitigate for its impacts. Specifically:

i) the location of mitigation is not identified;
ii) the requirements and availability of suitable conservation management in perpetuity are not identified;
iii) the suitability of the habitat is not specified, including water availability, water chemistry and security of availability;
iv) locating outside the Basin but within the American Basin means locating in an area lacking linked conservation lands already under protection;
v) the mitigation does not support the existing conservation strategy for Giant Garter Snake;
vi) piecemeal mitigation is far inferior to a comprehensive conservation strategy;
vii) there is no explanation as to how the mitigation supports the Giant Garter Snake Recovery Plan;
viii) the mitigation plan relies on availability of a CDFW approved Giant Garter Snake mitigation bank in the American Basin which does not exist.

15-31 cont.

The Giant Garter Snake in the Natomas Basin has suffered decline over the last 25 years of habitat loss, and urban disturbance. The Natomas Basin Conservancy monitoring reports document this problem. According to the NBC Biological Effectiveness Monitoring (ICF 2023: Figure 3-14) the probability of capture of giant garter snakes in HCP reserves steadily declined from 2011 through 2022. No giant garter snakes have been captured in the Fisherman's Lake Reserve since 2017 (Ibid., Table 3-10).

The DEIR fails to disclose and address the very real prospect that further development in the Basin could result in the reduction of the range of Giant Garter Snake in the American Basin by precluding options to expand and improve the southern portion (south of I-5) of conserved lands managed for Giant Garter Snake. The DEIR provides no explanation how the mitigation for this project would avert this possibility. What is needed is strengthening of the habitat values and protections in the Fisherman's Lake preserve area and the connectivity in the Basin. Instead it is more likely that this project will further degrade the Fisherman's Lake preserve area by bringing more people, vehicles and disturbance to the Fisherman's Lake area with its existing GGS habitat preserves. The development likely will preclude the area from ever serving conservation of the Giant Garter Snake, despite millions of dollars of investment in habitat creation and protection by the NBHCP and SAFCA habitat mitigation preserves. The project proponents in this DEIR offer almost nothing to offset this devastating impact on past conservation efforts and the permanent protection of a federally endangered species.

15-32

There are nine GGS populations in the Central Valley, in relatively small isolated patches of habitat separated by highly altered landscapes. Studies of genetic differentiation among Central Valley GGS populations have shown significant genetic differentiation between populations of GGS east of the Sacramento River (American, Sutter, and Butte Basins) and the few GGS West of the Sacramento River. The majority of GGS records have been in the Natomas Basin, which has already been impacted by urbanization under the NBHCP and would be further reduced by the Upper Westside project. (Wood, et al, "Defining Population Structure And Genetic Signatures Of Decline In The Giant Gartersnake

15-33

(Thamnophis gigas)" Conservation Genetics (April 11, 2015) p. 10 (**ATTACHMENT 8**)[8]. There is the real possibility that further reduction of GGS in the American Basin resulting from this project individually, in combination with future development in the Basin authorized under NBHCP, could cumulatively reduce the American Basin GGS population to less than viable, potentially leading to a jeopardy determination by USFWS and CDFW, which would halt development under existing permits in Sutter County and City of Sacramento.

15-33 cont.

The DEIR fails to consider that the current inadequacy of the Giant Garter Snake protections in the Fisherman's Lake preserve must be understood and corrected before any further disturbance and degradation of the habitat in the area can be permitted.

e) Mitigation Program Is Speculative, Deferred, Unenforceable, Infeasible, Not Compliant with CEQA

The DEIR must demonstrate that the impacts of the project on protected wildlife are mitigated to less than significant. The DEIR presents no evidence to support that finding. The mitigation program described for impacted species does not meet the requirements of CEQA:

i) it fails to commit to any deadlines for compliance with mitigation requirements; there is no correlation between destruction of habitat and actual acquisition or protection of compensatory habitat. Mitigation must be acquired and protection guaranteed before the habitat is removed, which is currently a requirement of the NBHCP.

ii) it fails to identify the amount of habitat to be removed and the amount of habitat to be conserved to mitigate for that loss. The public and wildlife agencies have not had the opportunity to assess whether the amount of mitigation land would be adequate to compensate for the loss because it is not disclosed.

iii) it fails to identify where mitigation will be achieved, with what guarantees that the habitat is occupied by GGS and capable of sustaining a GGS population in perpetuity. The 2017 Giant Garter Snake Recovery Plan, pg II-8, shows the preponderance of GGS sightings in the American Basin to be in the Natomas Basin. No conservation planning has been done in the rest of the American Basin. GGS planning has been ongoing in the Natomas Basin for almost 30 years under the NBHCP, and the species is declining. The project adds to the factors leading to decline and does nothing to strengthen and bolster conservation efforts where it counts, in the Natomas Basin.

iv) it defers ultimate mitigation commitments to a potential future permit process with the wildlife agencies, outside the CEQA process and at an open-ended unspecified future date. Instead, the project should have created its mitigation program in consultation with the wildlife agencies and included it in the CEQA document for public review and comment.

15-34

The DEIR says that mitigation options for Giant Garter Snake include purchase of credits from a CDFW- and USFWS-approved conservation bank but no such bank exists in the American Basin Recovery Unit;

i) mitigation options for Giant Garter Snake include payment to an "existing in-lieu fee program" which does not exist; an in-lieu fee program is not a guarantee for habitat protection at the specified mitigation ratios of 1 to 1 or, for rice field mitigation, 2 to 1, and does not meet the requirements of CEQA that mitigation be fully enforceable and feasible. Fees are not habitat conserved.

15-35

[8] Attachment 8: Wood, et al, "Defining Population Structure And Genetic Signatures Of Decline In The Giant Gartersnake (Thamnophis gigas)" Conservation Genetics (April 11, 2015)

ii) mitigation options for Giant Garter Snake include "Creation, restoration, or enhancement, and preservation and management of suitable aquatic and associated upland habitat for giant garter snake" by a non-existent entity.
iii) mitigation options for Giant Garter Snake include "Preservation and management of existing giant garter snake habitat through acquisition of fee-title or a conservation easement and funding for long-term management of giant garter snake habitat at a site" by a non-existent entity.

This piecemeal mitigation program is inappropriate due to the designation of the entire basin as part of a multispecies state and federal habitat conservation plan in which all the agricultural land in the basin is designated as habitat due to unique and historical factors underlying species occupancy.

A project by project mitigation assessment and mitigation program – as described in the DEIR -- is entirely inappropriate for a specific plan that will enable development in an area supporting threatened species through a multi species conservation plan.

The NBHCP relies on an interconnected reserve system within an agricultural landscape. Please refer to the biological opinions referred to above. The DEIR mitigation program disregards this critical context and proposes both out of basin mitigation that is not guaranteed to be available and species by species mitigation measures that are not consistent with the state and federal requirements for multispecies conservation planning to protect wildlife in the Natomas Basin.

Refer to FIGURE 1 (above). This map shows the Upper Westside project and the two other proposed projects, all outside USB; Source: ECOS. This map also shows the mitigation properties (green squiggles) in the Natomas Basin, forming an interconnected system of wildlife preserves managed via agreements with the state and federal wildlife agency permits. It also shows the Permitted development areas (hatched).

15-35 cont.

4) Other impacts that Should be Classified as Significant and Unavoidable

Impacts to biological resources and geology should be classified as “significant and unavoidable” in the DEIR. Instead the DEIR minimizes the irreparable impact that the Upper Westside project would have on them.

15-36

5) Significant Impacts that Cannot Be Mitigated to Less than Significant

ECOS finds it disturbing that there are so many significant and unavoidable impacts identified for the Upper Westside Project that CANNOT be mitigated. Aesthetics, agriculture, air quality, cultural resources, noise, population and housing, and transportation all matter to the quality of the environment and our quality of life.

ECOS believes there are other impacts as well, including biological resources, the impact on the Natomas Basin Conservancy, and of course, cumulative impacts of developing over 8,000 acres of prime farmland, if Upper Westside, Airport South Industrial, and Grand Park go forward.

15-37

a) Aesthetics

To the residents of Sacramento, being close to and seeing farmland, migrating birds, habitat and open space is one of our area's most cherished traits. Sacramentans list open space as the top reason they like living here.

"Natural spaces, trails, and community assets make the Sacramento region special. In the 2023 poll (and the polls dating back to 2017), people most value the natural places in our region, including parks, trails, waterfronts, and open space." — 2023 Valley Vision Livability Poll

Many residents of the Natomas Basin live in Natomas because they value seeing fields of sun flowers, rows of corn and pumpkin patches. They like walking in open spaces where they can see migrating birds. They also appreciate the local farm stands which sell local produce. Aesthetics are important to many in the Natomas community.

15-38

b) Agricultural Resources

The loss of agricultural land in the "Farm to Fork Capital" is ironic. Once farmland is lost, it's lost for good. Agricultural land is so important to the area's economy, and the world. When you are lucky enough to have the combination of good soil, water and weather, you have a role to preserve that land and produce food to a world struggling with hunger. Other areas have faced crop failure and famine due to drought, floods, war and climate change. We'd also lose the opportunity to sequester carbon, recharge ground water, and cool the climate.

15-39

<u>Role of Locally Important Farmland</u>. [Page 5-21] There are 429 acres of farmland of local importance in the project area. The analysis needs to clearly state that farmland of local importance as defined by and for Sacramento County, includes agricultural land that is no longer irrigated that would otherwise be included prime or statewide in significance if it were irrigated. [get proper wording from Conservation Dept]

<u>Inconsistency with Policy AG-2</u>. [Page 5-19] The Project is inconsistent with Policy AG-2 pertaining to the acceptance of applications outside the USB which would develop on prime ag lands. The County has already violated this policy by accepting the application for this project. One could argue that the whole process of approving this project, including this EIR, has been inconsistent with County policy from the get-go.

15-40

<u>Agricultural Buffer Adequacy</u>. [Page 5-19] The project would designate an agricultural buffer to the west of the developed area. There are several problems with this designation:

15-41

i) Despite the inclusion of a 30-50-foot open space strip, (a buffer for the buffer), a hedgerow and a fence, the buffer between development and the agricultural buffer will not eliminate noise, pesticide application and other impacts on neighbors and the resultant pressure for limitations on agricultural operations in the agricultural buffer.

15-41 cont.

ii) There is nothing in the DEIR suggesting that adequate maintenance of the buffer for the buffer be required and funded.

15-42

iii) None of the parcels included in that buffer are owned by the applicants, and it cannot be assumed that the owners of the buffer parcels will support that designation in the long term. Project development will inflate land prices in the agricultural buffer and lead to requests for residential development. Countless examples from around the country attest to the fact that this is inevitable rather than speculative.

iv) The only guarantee of permanent protection of the agricultural buffer from more intensive development is to acquire permanent agricultural easements for the buffer parcels. Even if the project is approved with such a condition, it is likely that the project developers will request its subsequent removal, claiming that the buffer landowners were not willing to sell the easements. In the interest of a complete and acceptable DEIR, easement mitigation and its limitations should be included in the analysis.

15-43

The DEIR notes that the proposed mitigation measure to acquire in-kind agricultural resource protection at a 1:1 ratio does not adequately mitigate the loss of quality farmland. The measure would be significantly strengthened by requiring mitigation within the Natomas Basin, mitigation at a minimum 1:1 ratio, and more specificity at what point in the approval process mitigation will be determined to be adequate. Moreover, given the County's own definition of farmland of local importance, the mitigation should not allow the County to set aside the requirement for farmland of local importance. Removal of this farmland also increases the likelihood that the Natomas Basin Habitat Conservation Plan (NBHCP) will fail. The NBHCP is designed to promote the continuation of agriculture within the 53,341-acre Natomas Basin, and the development of the ASIP acreage would increase the likelihood of failure for NBHCP's strategy to limit development in the basin. (See discussion of NBHCP impacts).

15-44

c) Air Quality

Sacramento has long been challenged with poor air quality due to our geography, climate, and auto-centric design. Despite those challenges, we must meet federal requirements or face the loss of federal funding. The cost here is too great to ignore.

15-45

i) The DEIR finds a significant and unavoidable conflict with state and federally adopted regional clean air plans but fails to explain the consequences for the County and the Sacramento region, particularly with respect to loss of federal funding for lack of compliance with the Clean Air Act's conformity clause.

ii) (p. 15) The statement is made, under "Local Air Quality Monitoring", that the Woodland-Gibson Road monitoring site is the closest to the project site, at approximately 10 miles. This is not correct as the SMAQMD Bercut Drive monitoring station, which records NO2, is only about 3 miles from the center of the project. Correspondingly, the CARB 13th & T Street monitoring station is approximately 4 miles from the center of the project and is much closer than the Davis-UCD Campus station referenced in the Analysis. These errors should be corrected and Table 4 (Air Quality Data Summary) should be revised accordingly.

15-46

iii) In February, US EPA tightened the PM2.5 air quality standard nationwide (from 12 to 9 micrograms per cubic meter), which means that our region is no longer in attainment of this federally mandated

15-47

standard. SMAQMD will need to come up with a new attainment plan, which would be made more difficult by U WS development. 15-47 cont.

iv) (p.63) "Full buildout of the project area would include operations of fast-food and sit-down restaurants...". The analysis fails to identify charbroilers in fast-food restaurants as significant sources of condensable PM2.5. The DEIR needs to be expanded to quantify anticipated PM2.5 emissions and impacts from these charbroilers. 15-48

v) The DEIR fails to include analyses of battery storage units as mitigation for operation of standby electrical generators, and of afterburners as controls for PM2.5 on fast-food charbroilers. 15-49

d) Noise

Upper Westside Specific Plan DEIR Comment draft, Noise Element (Section 15) excessively relies on deferred and speculative mitigation measures that basically require future project applicants to perform studies regarding what can be accomplished. This may make sense when individual applicants come before the County, but when over 1500 acres will include numerous, large projects and their components to be built over decades, in unknown configurations, over existing conditions that will vary from year to year, deferred and speculative global mitigation measures for the entire Upper Westside project do not serve the goals of the County as set forth in its General Plan Noise Element on page 9.

The establishment of a school stadium, hospitals, or new roadways, for instance, will increase the noise levels at existing surrounding properties and affect their desirability or market value, lessening the economic value of the Upper Westside project itself.

When environmental impacts are significant and unavoidable, CEQA requires identifying a “range of alternatives” as necessary to permit a reasoned choice and sets forth some broad parameters regarding these alternatives. The EIR must include “feasible” alternatives that foster meaningful public participation and informed decision making. 15-50

The General Plan establishes that setbacks and site design can be primary mitigation measures. Accepting deferred and speculative mitigation measures lessens the ability of the County to adhere to its own goals and violates CEQA.

The DEIR doesn’t establish any alternatives for significant or potentially significant noise, and instead it relies on the results of studies to be conducted in the future, and fails under CEQA by doing so. Specific instances of deferred and speculative noise mitigation measures in the DEIR are as follows:

i) <u>NOI-1, general construction noise</u>. Project applicants for any new construction must prepare a Master Construction Noise Reduction Plan that limits daytime construction noise to 10 dBA or less over existing ambient noise in noise-sensitive land areas.

The Master Plan shall consider as mitigation measures scheduling limitations, site perimeter barriers of specific materials, best equipment placement, equipment noise local barriers, temporary power sources, exhaust mufflers, restricting truck idling, locating loud construction tools (such as pile driving) away from property lines, using alternative methods of pile driving, and creating a noise liaison and construction noise notification system for residents within 500 feet. Other measures may be needed; for example, large scale construction may need to be curtailed to reduce noise impacts to less than significant. 15-51

These measures are potentially noise controlling, but as stated there is no guarantee what specific measures will accomplish, nor whether they are practically feasible and economical.

It is difficult to understand why this overarching measure is considered mitigated to less than significant. It is a "plan to plan" to mitigate, not a mitigation plan. The County must create a real plan for noise mitigation or admit in the DEIR that impacts from noise are significant both during construction and for the project in operation.

15-51 cont.

ii) NOI-3, increased traffic noise at existing sensitive receptors. The DEIR finds this noise significant and unavoidable. In an attempt to reduce noise, a study is required examining feasible traffic speed reductions and the value of noise barriers. The DEIR admits that lowering vehicle speed would require collaboration with Sacramento County DOT and may not be useful, and that noise barriers are cost prohibitive.

It also requires laying down rubberized asphalt. The Federal Highway Administration, as admitted by the DEIR, does not recognize special wearing roadways because they wear down with use and their noise reducing properties degrade. Given the scale of contemplated increased traffic and noise, the ineffectiveness of the two potential mitigation measures is not acceptable. Other alternatives should be identified and considered.

15-52

iii) NOI-4, increased stationary noise from plan components at existing receptors.
The DEIR adequately addresses noise impacts from HVAC equipment, car washes, parking lots, and delivery docks. It inadequately addresses noise impacts from school parking lots, high school sports fields and stadiums, and a pavilion area in a proposed park. The DEIR requires acoustical studies before building any of these components and defers to controls that will later be adopted. This is speculative and deferred.

15-53

Importantly, the DEIR indicates that nighttime crowds at local stadiums will create significant noise. The DEIR incorrectly identifies the maximum nighttime noise permitted under the GP. The level is 50 dB/70 dB, not 55 dB/75 dB. Mitigating to a level below 50/70 dB is more difficult than mitigating to 55/75 dB. Desirable noise limits are 30 dB or less; this extends dissipation to 600 feet from the sound source.

15-54

The DEIR does not cite the decibel level of a school stadium. The average level is about 95 dBA, with maximums over 115 dBA. If this is considered a large stationary source of noise and not a line source, the noise dissipates 6 decibels every 50 feet. A level of 95 dB will dissipate to 50 dB at approximately 500 feet. This can only be reasonably achieved by locating the stadium and its parking lot over 500 feet away from a noise sensitive receptor, such as a residence. The DEIR does not address whether this reasonable alternative is feasible or not.

15-55

The DEIR also identifies amplified events at a proposed park pavilion and analyzes the impact to be the same as that of a stadium. It also would have a significant and unavoidable impact.

15-56

iv) NOI-7, increase in stationary noise from plan components at proposed sensitive receptors including NOI-7a, commercial parking noise; NOI-7b, truck delivery noise; NOI-7c, commercial HVAC. These noise sources are identified as potentially significant. The DEIR requires an acoustical study to identify noise controls that would mitigate parking noise. It identifies a distance barrier between truck delivery unloading areas and residential boundaries, but if this is not possible, then the noise

15-57

shall be mitigated by reliance on a noise impact study. Noise from other commercial noises is to be mitigated by ensuring applicants use equipment that conforms to General Plan limits, but also requires an acoustical study to evaluate potential noise generated by mechanical equipment. Studies do not mitigate environmental impacts. This is not a mitigation plan.

15-57 cont.

Other types of stationary noise include: NOI-7d, employment highway parking noise; NOI-7e, truck delivery noise along employment highways; NOI-7f drive through restaurant noise; NOI-7g, car wash; NOI-7h, school parking noise; NOI-7i, school playground noise; NOI-7j, sports school stadium noise; NOI-7k, park activity noise. An acoustical study is all that is initially required to mitigate noise along employment highways near existing noise-sensitive receptors. Truck delivery unloading areas that cannot be located 150 feet from residential areas must be mitigated by a noise impact study. HVAC noise along employment highways is mitigated just as with HVAC and other mechanical noise along commercial highways, i.e., by distance barriers and an acoustical study as part of subsequent application review.

These are deferred measures that can only be speculated to mitigate these noise sources. Studies do not mitigate environmental impacts.

15-58

Drive through restaurants will either be located beyond a distance barrier, or an acoustical study will be prepared to evaluate available noise controls. Car wash noise must be addressed by acoustical study to identify feasible noise controls. Similarly, school parking noise will be addressed by an acoustical study identifying noise controls such as distance barriers. School playground noise will be mitigated by setbacks.

As in mitigation identified under NOI-4b, school stadium noise is potentially significant and unavoidable, but noise controls must be identified. Again, applicants must submit acoustical studies. Acoustical studies or something similar will be used to mitigate in seven of the above potentially significant, and significant and unavoidable noise levels. Studying everything is laudable, but these studies are likely to be flawed given the deferred and speculative nature of these components.

e) Population and Housing

Policies and a plan to ensure build-out of affordable housing and “missing middle housing” are not included in the DEIR. They are deferred to the release of a separate Affordable Housing Strategy. By contrast, the DEIR (pg. 2-28) identifies the mega-houses on Leona Circle, like the one shown in the photo below, as prototypes for the project’s 1-acre lots.

15-59

f) Transportation - There is no transit to the proposed project area at this time. Refer to the 350 Sacramento’s comment letter.

15-60

6) Cumulative Setting inadequately described/disclosed/analyzed

Chapter 4.0, Introduction to the Analysis, Page 4.0-4 states:

"the cumulative setting for the proposed project is generally considered to be a summary of projections contained in the City of Sacramento 2040 General Plan and the Sacramento County General Plan."

The cumulative setting is not fully disclosed. It is not clear what is included.

It should include the proposed Airport South Industrial and Grand Park projects in Unincorporated Sacramento County in the Natomas Basin.

It should include the traffic impacts of semi-trucks that will use I-5 and its side roads by the truck charging stations at the Watt EV project and the Airport South Industrial warehouse project. When traffic is backed up on I-5, overflow traffic will divert to El Centro Rd.

It should include the buildout of South Sutter County, the Sutter Pointe Specific Plan, which has been approved and has permits from US Fish and Wildlife and California Department of Fish and Wildlife.

It is essential to disclose and evaluate cumulative impacts to the Natomas Basin, including to the NBHCP, as well as impacts to agriculture, air quality, transportation, traffic congestion, flooding, evacuation plans, and wildlife habitat.

15-61

7) Geology, Soils, and Paleontology Impacts and Mitigation

Impacts were inadequately assessed. Impact evaluation and mitigation plans are deferred to future individual projects.

a) "Less than significant" classifications for impacts relating to seismic-related ground failure, soil erosion, unstable soil, and expansive soils are contingent upon site evaluations that have not yet been conducted. Impacts GEO-1–5 are classified as "less than significant" with the condition that construction requires compliance with the California Building Code (CBC), the County code, and the storm water pollution prevention plan (SWPPP). Additionally, impact GEO-6 indicates that a classification of "potentially significant" impacts relating to paleontological resources would be reduced to "less than significant" impacts based on the involvement of a project paleontologist. Deferred evaluation of the condition of sites and the necessary protocols that would be necessary to ensure code-compliant construction may significantly impact project affordability and regional impacts on the land. 15-62

b) The Upper Westside development would likely cause subsidence of the project area and exacerbate risks for natural hazards like flooding. The weight load of construction can have significant impacts on subsidence of an area. A recent study[9] demonstrates consistently higher rates and amounts of subsidence in areas where the ground has been loaded by urban development. Considering the proposed project area has experienced "moderate to high land subsidence in the past," (DEIR, 11-15) and considering that area consists largely of expansive soils that shrink and expand dynamically, then development-related subsidence should be expected. In addition to the structural hazards that progressive subsidence poses, further depression of the already low-lying land would increase the intensity and range of flooding in and surrounding the proposed project area. 15-63

   The EIR must establish standards and protocols to ensure that Upper Westside project designs will fully mitigate the increased subsidence and flooding that construction will cause in the region. Additionally, the EIR should ensure that project proposals evaluate their contribution to regional subsidence and flooding and ensure that existing structures in the surrounding areas will not be compromised as a result of new construction-related subsidence.

c) Questions about construction design costs and doubts surrounding project buildout:
   While safe, code-compliant designs would certainly mitigate the risks that the proposed project area's natural structure poses for construction, the selected method of risk-aversion/preparedness may significantly alter the land itself. Additionally, these methods may be incredibly costly, as the soil type, flood plain status, and proximity to the Hunting Creek-Berryessa fault system would require significant safety precautions in design. How costly would development of CBC- and County-compliant structures be, compared to development in already zoned vacant land within the USB? How do these costs affect the affordability of the housing constructed? Is it financially feasible to construct this infrastructure on a phase by phase basis? Typically, infrastructure is financed over the plan area to reduce individual project costs and to achieve economies of scale. 15-64

[9] Bateson, L., Novellino, A., Hussain, E., Arnhardt, R., Nguyen, H.K., 2023. Urban development induced subsidence in deltaic environments: A case study in Hanoi, Vietnam. International Journal of Applied Earth Observation and Geoinformation, 125.

8) Lack of Water Supply Assessment

The UWSP DEIR does not include the required water supply assessment (WSA) and, instead, requests the approval of a WSA for the 1,532-acre Development Area as an entitlement. Without the WSA, the DEIR fails to prove that the City accounted for the Project's water demands and will provide for the area's water needs. The EIR's request for entitlement of a WSA, combined with the claim that the City's urban water management plan (UWMP) accounted for the Project's water demand, as made by the applicant's legal counsel, is misleading and confusing. Moreover, this deferred compliance with CEQA requirements avoids providing information to the public and decision makers. 15-65

Please refer to Attorney Patrick Soluri's comments on the DEIR's failure to include a lawful WSA.

9) Water Management and Drainage Capacity

The cumulative analysis of the drainage impacts presumes that all potential projects will be required to have sufficient detention capacity to eliminate "down-drainage" impacts and, given that, concludes that the cumulative impacts with respect to drainage issues would be less than significant (pg 22-42). But questions remain: 15-66

a) Would the stormwater drainage for other developments in the drainage basin be routed to the same pump station that pumps drainage water into the Sacramento River as that proposed for the Upper Westside project?

b) In the area of the proposed Upper Westside project, are the drainage systems/basins designed to hold all the water from a 200-year event without any pumping into the Sacramento River? And for how many days? What about a 500-year event? 15-67

c) Are other existing and planned development's drainage systems designed to hold all water from a 200-year event without pumping into the Sacramento River? A 500-year event? 15-68

d) What if the pumps that pump water over the levee into the Sacramento River fail, or enough of those pumps fail, so that the ability to pump water out of the basin into the Sacramento River is substantially limited for an x amount of time? What if the Sacramento River is running too high to allow pumping water out of the Natomas Basin into the River? 15-69

e) The build-out plan for Upper Westside is phased. Logically, and for safety, the water management and drainage infrastructure for the entire project should be built during the first phase. It cannot be piece-mealed as different land owners decide to join the project. There are accumulating risks to the residents of the Natomas Basin as increasing amounts of open space are paved. The area of Upper Westside is important for holding run off and for water recharge in the Natomas Basin. Levees and drainage systems have the potential to fail, and that potential increases with the increasing impacts of climate change and extreme weather. Adding 25,000 more residents and acres of pavement to a floodplain is an increasingly risky proposition. 15-70

10) Public Services

Questions remain over who will provide emergency services, police, fire, medical as well as park maintenance and recreation programs. As build out is proposed to occur over a long period of time, how will these services be provided and how will infrastructure be built out?

a) Police Protection
DEIR states that the Sacramento County Sheriff will service the project area, but all reports from Garden Highway and area residents are that response time is very slow or nonexistent, even for serious traffic accidents. This area is far removed from the majority of unincorporated population of North Highlands and Foothill Farms that are served by the North quadrant, and sheriffs are rarely seen west of the City limits. The County must identify its plan and funding source for service to a new community of 25,000.

b) Fire Protection
If fire and emergency medical response is planned to be provided by the City of Sacramento under contract with the Natomas Fire Protection District, please identify the funding source and evidence that the city of Sacramento will not be subsidizing another unincorporated area of 25,000 and reducing services to city residents and businesses. Mutual aid requirements would require city response to police and fire in a community outside the city limits. The County must demonstrate that the City of Sacramento has agreed to provide fire and emergency medical services to the Upper Westside project area.

c) Public Schools
A representative of the Natomas Unified School District which includes this area, stated at the October 21, 2024 County Planning Commission meeting, that the funds generated by the project are inadequate to build the schools specified within the Upper Westside project plan. The County must explain how educational facilities will be funded for construction, operation, and maintenance.

d) Parks and Recreation
DEIR states that there is no park district serving the Upper Westside project area, and the Sacramento County Regional Parks department does not build or maintain local parks as shown in the Upper Westside plan.

Parks are identified and touted in the Upper Westside plan but no information about who will build these parks and how they will be maintained is provided. The County must identify what entity will build the parks, who will maintain them, manage recreation programs, and how they will be funded.

The DEIR identifies the benefits of the nearby Sacramento River Parkway, however, it only exists on paper in this area. The access and trails run from Discovery Park to south Sacramento. Given the Upper Westside project's plans for 25,000 more residents, a significant contribution to extend the Parkway would be appropriate. The County must state what the contribution of the Upper Westside project will be to the Sacramento River Parkway.

15-71

11) Inconsistency with City General Plan

The proposed Upper Westside project would rely on the City of Sacramento for water and sewer services, despite its location in Sacramento County. This contradicts the City's General Plan's policies.

15-72

12) Inconsistency with County General Plan

Items in the DEIR that conflict with the County General Plan include:

15-73

a) Agricultural Land Use - The Land Use Diagram (map), FIGURE 4 below, of the County's General Plan, updated in 2017, shows agricultural use at the proposed project site.

b) Urban Services Boundary - The proposed project would change the USB which was established in the Land Use Element of the County's General Plan, updated as recently as 2022, as "the ultimate boundary of the urban area."

15-74

c) Requirements for changing the USB - The requirements of County's General Plan Policy LU-127 are not addressed. Refer to Section 2 Sacramento County Urban Services Boundary of this letter.

15-75

d) Agricultural land protection policies are not adhered to.

15-76

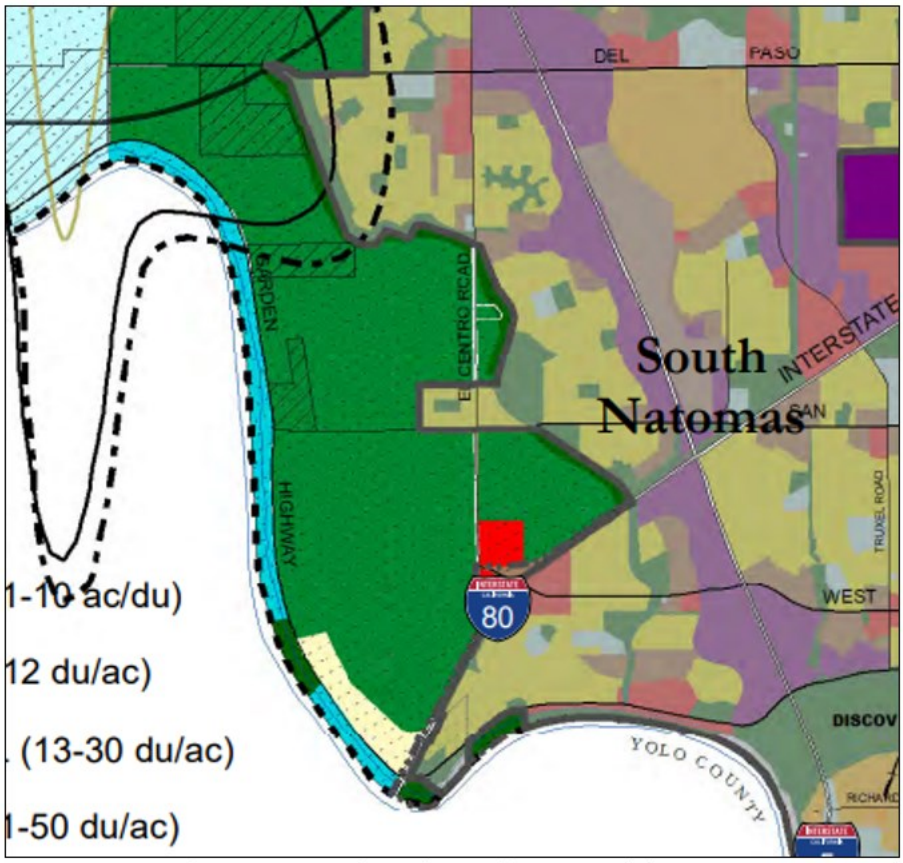


FIGURE 4: Excerpt from County Land Use Diagram from General Plan
Source: https://planning.saccounty.gov/LandUseRegulationDocuments/Documents/General-Plan/GPLU2030_UPDATED_FINAL_0918.pdf

e) Housing - The County's General Plan calls for affordable housing, the DEIR merely provides for developing a strategy for affordable housing.

15-77

f) Noise - See d) Noise in Section 6, Significant Impacts that Cannot Be Mitigated to Less than Significant, of this letter.

15-78

See letter from Attorney Patrick Soluri for additional comments.

13) Inconsistency with Regional Planning for Growth

The proposed Upper Westside project is inconsistent with SACOG's current Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS) and the selected land use scenario of the draft 2025 Blueprint, as well as the Air Quality Plan.

15-79

Inconsistencies with SACOG's draft 2025 Blueprint:

On November 4, 2020, SACOG commented on the Notice of Preparation of the Upper Westside DEIR, stating "implementation of the Blueprint vision depends greatly on the efforts of cities and counties through local plans and projects. . . [and] the Upper Westside project and the project area itself are not anticipated for development in either the MTP/SCS or the Blueprint."

This is still true today. SACOG's selected land use scenario for the draft 2025 Blueprint, dated April 2024, does not include the Upper Westside, or the other proposed developments in the Natomas Basin, the Airport South Industrial and Grand Park projects. The 2025 Blueprint projects no housing units built for the three projects between now and 2050, as shown in FIGURE 5 below.

15-80

Attachment A

2025 Blueprint (MTP/SCS) Discussion Scenario

April 2024

Jurisdiction/Community Type	Existing Conditions (2024)		Blueprint and Buildout		Spring 24 Discussion Scenario 2020 - 2035		2020 - 2050	
	Jobs	Housing Units	Jobs	Housing Units	Jobs	Housing Units	Jobs	Housing Units
Sacramento City								
Potential Developing Communities (not yet under construction)								
Panhandle	-	-	-	1,620	-	525	130	1,295
Airport South Industrial Project	-	-	-	-				
Sacramento County Unincorporated								
Potential Developing Communities (not yet under construction)								
Cordova Hills	-	-	3,190	8,000	320	350	600	1,500
Glenborough at Easton	-	-	1,800	3,239	-	-	80	300
South Mather	-	-	940	3,522	-	400	730	1,805
Aerojet	1,600	-	40,180	-				
Elverta	10	50	200	5,627				
Grand Park	20	10	3,010	23,892				
Jackson Township	10	30	900	5,690				
Jackson West	1,240	110	11,210	16,484			-	-
Newbridge	110	10	450	3,075				
Upper Westside	430	60	3,820	9,356				
New Induced Growth Areas	200	500	-	-				

FIGURE 5: Excerpt from SACOG's Attachment A, Discussion Land Use Scenario, April 2024
Source: SACOG https://www.sacog.org/planning/2025-blueprint/blueprint-land-use

In November of 2020, SACOG went on to say "The Upper Westside project . . . raises important policy questions for the region's implementation of the Blueprint. For example, the capacity for growth in existing entitled lands far exceeds expected demand over the next twenty years: collectively, the region's jurisdictions have entitled, or are in the process of entitling 2.5 times the region's projected need for the next 20 years. More than half of that capacity—387,000 units—is in greenfield areas that are on the edge of existing development."

15-81

This means there is far more entitled acreage for new homes than the market will bear. The EIR needs to disclose the excess capacity of housing units in Sacramento region and in Sacramento County.

For Sacramento County, the draft 2025 Blueprint does include six developments on greenfield sites with a total capacity of nearly 37,000 housing units. These units are already part of the County's general plan and are either under construction or in planning/design.

Between now and 2050, only 11,600 housing units are projected to be built. And using the rate of build-out projected for the 2020-2050 period, none of these developments will fully build out by 2050. One development may complete in 2066, and two may in 2079. The remaining three won't fully build out until the next century.

There is no housing need for Upper Westside.

Refer to FIGURE 6 below.

15-82

EXCERPT FROM 2025 Blueprint (MTP/SCS) Adopted Land Use Assumptions
June 2024

Jurisdiction/Developing Communities	Baseyear Existing Conditions (2020)	Potential Buildout	2020 - 2035	2020 - 2050 Built		Percentage of Development Built Out by 2050	2020-2050 ave per year	Total built by 2050	Total unbuilt in 2051	Years to complete after 2050	Est Year Complete based on rate of build out 2020-2050
	Housing Units	Housing Units	Housing Units	Housing Units							
Sacramento County Unincorporated											
North Vineyard Station	1,620	6,063	1,165	2,895		74%	97	4,515	1,548	16	2066
Mather South	0	3,522	400	1,805		51%	60	1,805	1,717	29	2079
Vineyard Springs	2,600	5,942	710	1,700		72%	57	4,300	1,642	29	2079
Florin Vineyard	690	9,919	1,305	3,400		41%	113	4,090	5,829	51	2101
Cordova Hills	0	8,000	350	1,500		19%	50	1,500	6,500	130	2180
Glenborough at Easton	0	3,239	0	300		9%	10	300	2,939	294	2344
Total	4910	36,685		11,600				16,510	20,175		

FIGURE 6: Estimation of year of full build-out
Source: SACOG https://www.sacog.org/planning/2025-blueprint/blueprint-land-use

14) Growth Inducement and Urban Decay

DEIR Chapter 23 provides an analysis of growth inducing impacts. The analysis must include the most significant growth inducing impact, that is, the increase in the value of the land in the Natomas Basin. Increased land values will encourage speculation on agricultural land by development interests, and make it more difficult for the Natomas Basin Conservancy to afford mitigation land (acquire the necessary conservation easements to meet the requirements of the NBHCP.) 15-83

The DEIR minimizes the impact that the Upper Westside project would have on growth inducement within and around the project area, stating that, "as the USB and UPA would not be extended to include the adjacent 534-acre Ag Buffer, the pressure to develop properties to the west of the development area would be reduced as any future development in this area would need to show consistency with General Plan Policy LU-120 and seek discretionary approval from the Sacramento County Board of Supervisors." (DEIR 23-2).

In this statement, the DEIR does not acknowledge the precedent-setting nature of the approval of the Upper Westside on the other two proposed developments -- Grand Park and Airport South Industrial – and related increases to land values and alterations to the USB and UPA, prompting more property owners in the Sacramento portion of the Natomas Basin to seek plan and zoning changes to allow conversion of agricultural land to urban uses. Upper Westside would provide the precedent, rationale, and justification for the approval of subsequent projects that convert agricultural land to urban uses. The DEIR avoids identifying and analyzing this impact. 15-84

15) Alternatives Analysis is Misleading and Deficient

The critical point of the alternatives analysis is whether there is an alternative location within Sacramento County jurisdiction that could accommodate the project and that would have reduced significant impacts.

The alternatives analysis in the DEIR does not adequately address this question by improperly eliminating unincorporated areas of the County that are suitable for similarly scaled development.

There are two major flaws in the Analysis of Project Alternatives:

First, the project objectives are designed to rule out alternative sites that don't meet the objectives – there are 18 very specific project objectives, at least two of which are specific to the project's location: 15-85

- Objective 5: Provide residential housing within five miles of the existing job centers of downtown Sacramento and West Sacramento, as well as in close proximity to newly developing or proposed job centers.
- Objective 10: Make efficient use of development opportunity as the project site is bordered on three sides by existing or planned urban development.

These objectives are self-serving. Taken together, they rule out any other area of suitable size that would meet those objectives.

Second, the document argues that "the applicants only control 292 acres of the UWSP area and an offsite alternative would not be feasible as the project applicants do not control any other properties within Sacramento County." This is another completely self-serving objective. Whether the applicant controls other lands that would afford a suitable alternative site is irrelevant. In addition, the "project applicants" only control 14 percent of the project area, and so it is difficult to see how the DEIR can rely on this factor to exclude consideration of offsite alternatives. 15-86

The alternative analysis does briefly address the possibility of alternative sites within the County that could accommodate a new planned community, but in a limited way, and only with respect to northwest Sacramento County:

"…while other large vacant properties located adjacent to the City of Sacramento in northwest Sacramento County could feasibly achieve many of the project objectives, those lands are not available as planning applications for these lands have already been filed with the City of Sacramento and with the County of Sacramento. Furthermore, while other large vacant properties are available in other portions of the county that could feasibly achieve many of the project objectives, none are located along a major transportation corridor within proximity of existing job centers in downtown Sacramento and West Sacramento, as well as near newly developing or proposed job centers, which is an objective of the proposed UWSP." [DEIR, pages 3-4,5] 15-87

The only reference to other alternative sites in the County that could accommodate a new planned community is in the context of the California State CEQA Guidelines, and the need for addressing them is blithely dismissed without substantive evidence:

"Only those locations that would avoid or substantially lessen any of the significant effects of the project need be considered. If no feasible alternative locations exist, the agency must disclose the reasons for this

conclusion. (Section 15126.6[f][2][B].) In this case, alternative sites would entail either the same or new significant environmental effects as those that would occur within the UWSP area. For example, development of the proposed UWSP on any suitable alternative site in or around the County may not avoid or substantially lessen the project's air quality or greenhouse gas (GHG) impacts, as those impacts would occur no matter where the development is located and could be worse if located farther away from a major transportation corridor or in areas with existing unacceptable traffic levels. Moreover, an alternative site that is not adjacent to already developed lands would likely result in greater aesthetic and utilities impacts than those that would occur within the UWSP area." [DEIR, page 3-4]

15-87 cont.

The County is considering three large new community development projects along the Jackson Highway Corridor. Although they may have greater air quality or greenhouse gas impacts, there are other areas of impact that would be reduced: they are within the planned growth area and would be less growth inducing, they are more consistent with existing County and regional plans, they do not involve prime agricultural land loss, they would not adversely impact a Habitat Conservation Plan, and they are in an area with likely fewer archaeological resources. A comparison of these impacts needs to be provided in the alternatives analysis for this project

Relevant CEQA Requirements:

- (f) Rule of reason. The range of alternatives required in an EIR is governed by a "rule of reason" that requires the EIR to set forth only those alternatives necessary to permit a reasoned choice. The alternatives shall be limited to ones that would avoid or substantially lessen any of the significant effects of the project. Of those alternatives, the EIR need examine in detail only the ones that the lead agency determines could feasibly attain most of the basic objectives of the project. The range of feasible alternatives shall be selected and discussed in a manner to foster meaningful public participation and informed decision making.
- (1) Feasibility. Among the factors that may be taken into account when addressing the feasibility of alternatives are site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries (projects with a regionally significant impact should consider the regional context), and whether the proponent can reasonably acquire, control or otherwise have access to the alternative site (or the site is already owned by the proponent). No one of these factors establishes a fixed limit on the scope of reasonable alternatives. (Citizens of Goleta Valley v. Board of Supervisors (1990) 52 Cal.3d 553; see Save Our Residential Environment v. City of West Hollywood (1992) 9 Cal.App.4th 1745, 1753, fn. 1).

- (Cal. Code Regs., tit. 14, § 15126.6 (Lexis Advance through Register 2024, No. 37, September 13, 2024).)

15-88

The Alternatives Analysis has been closely linked to the self-serving objectives of the project, objectives that are designed to exclude all other alternatives. The section should have been written from the perspective of significant impacts that cannot be mitigated - and how alternative sites would have fewer significant impacts.

Refer also to Attorney Patrick Soluri's comment letter on this topic.

16) Upper Westside conflicts with State Environmental Initiative

Inconsistency with Nature Based Solutions. Nature-based solutions (NBS) is a California State program established to harness the power of nature to build California's resilience to future climate-driven extremes, protect communities from the climate crisis, and remove carbon from our atmosphere. California State leaders recognize that expanding NBS is essential to meeting California's core climate goals.

In October 2020, Governor Newsom issued the Nature-Based Solutions Executive Order N-82-20, advancing biodiversity conservation as an administration priority and elevating the role of nature in the fight against climate change. As part of this Executive Order, California committed to the goal of conserving 30 percent of our lands and coastal waters by 2030. The initiative is called 30x30.

The Sierra Club has identified four land areas which are critical to accomplishing our Sacramento region's contribution to 30x30. The Natomas Basin is one of these areas.

15-89

The Sacramento Region has only conserved seven percent of its land and must conserve an additional 900,000+ acres to meet State planning goals. We are far behind other major metropolitan areas in California. For example, the Bay Area is near thirty percent. The conservation of accessible open lands, and specifically the conservation of lands in Natomas, would readily expand the total protected areas in the Sacramento Region to 19%.

Development of farmland in Natomas removes a key opportunity in Sacramento County to conserve natural and working lands to fulfill this commitment.

The area on which the Upper Westside is proposed is predominantly in agriculture that also serves as habitat for endangered species and a vital ecosystem for carbon sequestration. Development of this land would further encourage speculation of adjacent open lands for development, move us ever further from achieving State goals. The impact related to the goals of 30x30 is not addressed in the DEIR.

17) Attachments

Attachment 1: 1994 Permit Number 199200719 U.S. ARMY ENGINEER DISTRICT.SACRAMENTO CORPS OF ENGINEERS 1325 J STREET SACRAMENTO, CALIFORNIA 95814-2922

Attachment 2: March 11, 1994, US Fish and Wildlife Service, Endangered Species Act Consultation on the Revised Natomas Area Flood Control Improvement Project (PN 199200719) in Sacramento and Sutter Counties, California

Attachment 3: 2003 IMPLEMENTATION AGREEMENT FOR THE NATOMAS BASIN HABITAT CONSERVATION PLAN

Attachment 4: June 24, 2003 United States Department of the Interior FISH AND WILDLIFE SERVICE, Sacramento Fish and Wildlife Office Intra-Service Biological and Conference Opinion on Issuance of a Section 10(a)(1)(B) Incidental Take Permit to the City of Sacramento and Sutter County for Urban Development in the Natomas Basin, Sacramento and Sutter Counties, California.

Attachment 5: National Wildlife Federation v. Norton, Civ-S-04-0579 DFL JFM (E.D. Cal. Sep. 8, 2005)

Attachment 6: ICF. 2024. Natomas Basin Habitat Conservation Plan Area Biological Effectiveness Monitoring Report: 2023 Annual Survey Results. July. Prepared for the Natomas Basin Conservancy, Sacramento, CA. Prepared by ICF, Sacramento, CA).

Attachment 7: Yolo County Ordinance Chapter 10, “Habitat Mitigation Ordinance”

Attachment 8: Wood, et al, “Defining Population Structure And Genetic Signatures Of Decline In The Giant Gartersnake (Thamnophis gigas)” Conservation Genetics (April 11, 2015)

Appendix J

Documents Regarding Sacramento Area Flood Control Agency Army Corps of Engineers Permit Compliance.

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA 95814-2922

REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY PERMIT

Permittee: Sacramento Area Flood Control Agency
F.I. Hodgkins, Executive Director
926 J Street, Suite 424
Sacramento, California 95814

Permit Number: 199200719

Issuing Office: U.S. Army Engineer District, Sacramento
Corps of Engineers
1325 "J" Street
Sacramento, California 95814-2922

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description:

The discharges of dredged or fill material into waters of the United States associated with the following activities are authorized by this permit:

a. Raising the levees along the Natomas East Main Drain (NEMDC) using top only and sliver fill techniques.

b. Construction of a new 1000 cfs pump station on the NEMDC approximately 2600 north of Dry Creek.

c. Replacing the existing Main Avenue Bridge with a new four-lane structure.

d. Raising the levee, rebuilding the levee access road, and modifying the stoplog structures on Arcade Creek between the NEMDC and Marysville Boulevard.

e. Enlarging existing levees, construction of a new levee segment and construction of a floodwall along Dry Creek between the NEMDC and Marysville/Rio Linda Boulevard.

f. Extending the NEMDC north to Sankey Road.

g. Constructing a stoplog structure, a retaining wall, and raising the existing levee along the Pleasant Grove Creek Canal.

h. Raising the Natomas Cross Canal south levee between the Sacramento River and State Highway 99 along its existing alignment.

All work is to be completed in accordance with the attached plan(s).

Project Location:

The project is located in the City of Sacramento and Sacramento and Sutter Counties as shown on the attached location maps.

Permit Conditions

General Conditions:

1. The time limit for completing the work authorized ends on 31 March 1999. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

a. The Permittee shall fully implement all measures described in the Wetland Mitigation Plan for the Revised Natomas Area Flood Control Improvement Project, March 1994. The contents of this document are expressly incorporated into the terms of this permit except as otherwise modified by these Special Conditions. Permit Special Conditions shall supersede similar or conflicting conditions within this and other documents named within these special conditions.

Wetland mitigation acreage shall be 28.62 as described in the Wetland Mitigation Plan for the Revised Natomas Area Flood Control Improvement Project.

b. Construction of the compensatory mitigation areas shall commence concurrently with or in advance of the start of construction of the authorized activity and be complete within two years. The permittee shall notify the District Engineer of the start date and the completion date of mitigation construction in writing and no later than ten (10) calendar days after each date.

c. The following actions shall be taken prior to the start of construction of the authorized project.

1. Establishment of a long term funding mechanism intended to provide for maintenance and monitoring of mitigation areas.

2. Recordation of deed restrictions maintaining all preservation and mitigation areas as wetland preserve and wildlife habitat in perpetuity. Copies of the proposed deed restriction language shall be provided to the Corps of Engineers for approval prior to recordation.

3. Copies of the recorded documents shall be provided to the Corps of Engineers no later than 30 days prior to the start of construction of any of the activities authorized by this permit.

d. The permittee shall provide two complete sets of as-builts of the completed work within the mitigation areas to the Corps of Engineers. The as-builts shall indicate any changes made from the original plans in red ink. These as-builts shall be provided no later than 60 days after the completion of mitigation area wetland construction.

e. Monitoring of the vernal pool and freshwater marsh mitigation areas shall occur for five years or until the success criteria described in the Wetland Mitigation Plan for the Revised Natomas Area Flood Control Improvement Project are met, whichever is longer. This period shall commence upon completion of the construction of the mitigation wetlands. Additionally, continued success of the mitigation wetlands, without human intervention, must be demonstrated for three consecutive years, once the success criteria have been met. The mitigation will not be deemed successful until this criteria has been met. Monitoring reports shall be submitted annually to the Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, and the CA Department of Fish and Game for the five year monitoring period, and for each additional year, if needed due to remediation to the mitigation program.

f. Monitoring of riparian mitigation areas shall occur for ten years or until the success criteria described in the incorporated documents describing the mitigation plan are met, whichever is greater. This period shall commence upon completion of the construction of the mitigation wetlands. Additionally continued success of the mitigation wetlands, without human intervention, must be demonstrated for three consecutive years once the success criteria have been met. The mitigation plan will not be deemed successful until this criteria has been met.

Monitoring reports shall be submitted annually for years one through six and for years eight, and ten of the monitoring period, and for each additional year if needed due to remediation to the mitigation areas.

An additional monitoring report shall be provided at the end of the three year period demonstrating continued success of the mitigation program without human intervention. The only exception to this last requirement shall be if the three year period occurs wholly within the ten year monitoring period, in which case the ten year report may be used to meet this requirement.

g. All pumps shall be screened in accordance with the requirements of the California Department of Fish and Game Code.

h. Documentation of all sites potentially eligible for listing in the National Register of Historic Places that would be affected by construction activities shall be accomplished in accordance with standards developed in consultation with the California State Historic Preservation Officer.

i. Prior to initiating any construction on the pump station north of Dry Creek, a Historic Property Treatment Plan (HPTP) shall be developed and approved in accordance with the Programmatic Agreement Among the Corps of Engineers, Bureau of Reclamation, California State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding implementation of the American River Watershed Project.

j. Prior to initiating any construction on the pump station north of Dry Creek, the permittee shall develop a Natomas Basin Habitat Management Plan (Plan). This Plan shall provide the framework within which a mitigation program for the effects of development within the Natomas floodplain will proceed. The framework shall be incorporated into future planning processes by State, local, and Federal authorities as development reaches the appropriate planning stages. The plan shall: ensure that the development within the Natomas floodplain complies with applicable Federal, State and local laws and regulations, including the Endangered Species Act and the Clean Water Act; identify at a conceptual level, appropriate and practicable mitigation measures that may be contemplated under Federal, State, and local laws pertaining to future development; and describe the mechanism to be used for the long-term management and protection of any mitigation lands. The Plan shall be developed by the permittee in coordination with the on-going Corps of Engineers activities for the American River Watershed Investigation. The Plan, including its development, shall be coordinated with the Corps, the U.S. Fish and Wildlife Service, the Environmental Protection Agency, and other Federal, State, and local agencies having interest, expertise and jurisdiction over the Natomas floodplain.

The District Engineer will verify that the Final Plan is in compliance with this condition before work commences on the pump station. The final Plan shall be incorporated by reference as a condition of this permit. Enforcement of mitigation requirements of State and local land use agencies shall be the responsibility of the applicable State or local agency.

k. The applicant shall prepare and implement a plan for avoiding and minimizing construction related impacts to the giant garter snake. The plan shall be submitted to the Corps and Service for review and approval prior to the start of project construction.

l. The permit applicant shall not begin construction on the pumping station along the East Main Drain or otherwise complete the proposed project by providing 100-year flood protection for the lower American Basin until the Service first issues an incidental take permit and associated implementing agreement pursuant to Section 10(a)(1)(b) of the Act to the City and County of Sacramento, Sutter County and any other parties necessary to guarantee the successful implementation of a habitat conservation plan for the giant garter snake resident in the American Basin. This plan shall be compatible with and a component of the multispecies habitat management plan otherwise required by the Department of the Army as a condition of permit authorization.

m. The Biological Opinion from the U.S. Fish and Wildlife Service to the U.S. Army Corps of Engineers dated March 11, 1994 is expressly incorporated as a condition of this permit.

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

( ) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).

(X) Section 404 of the Clean Water Act (33 U.S.C. 1344).

( ) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal projects.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data. The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant.

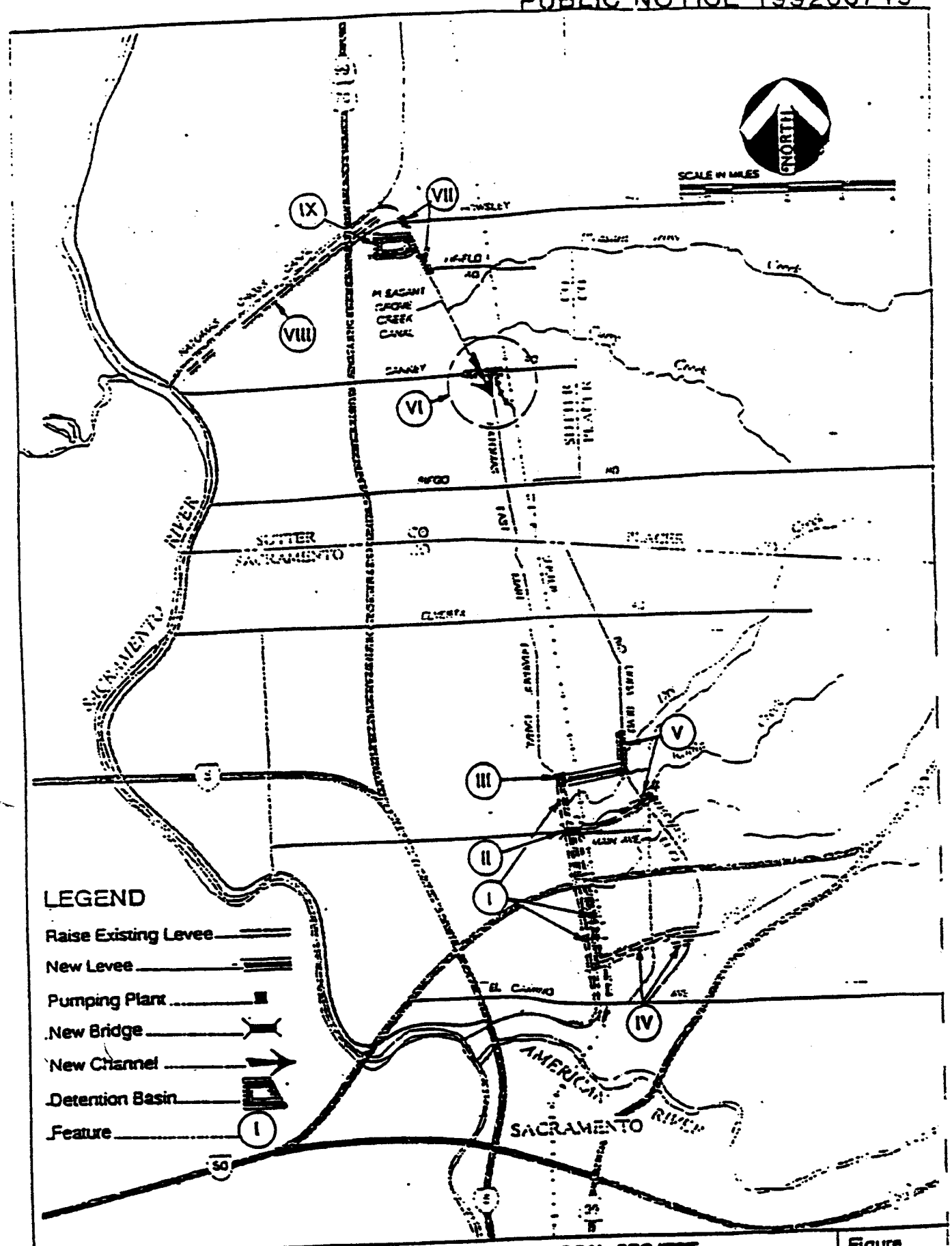
Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (see 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative

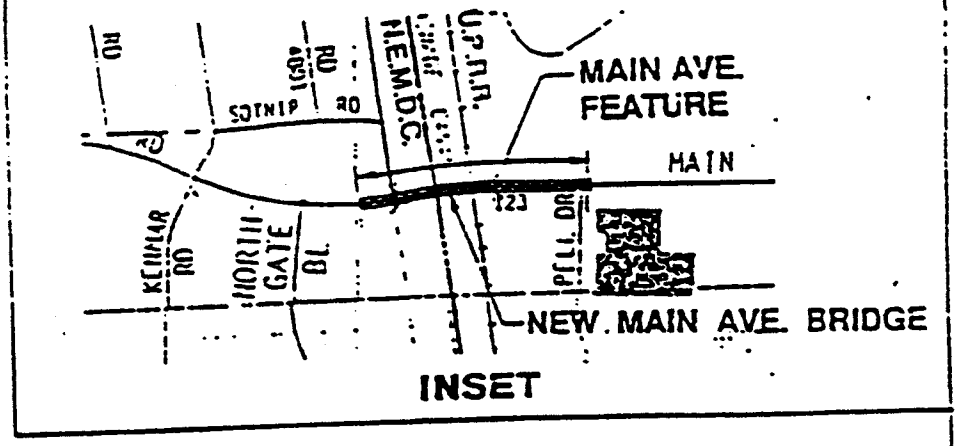


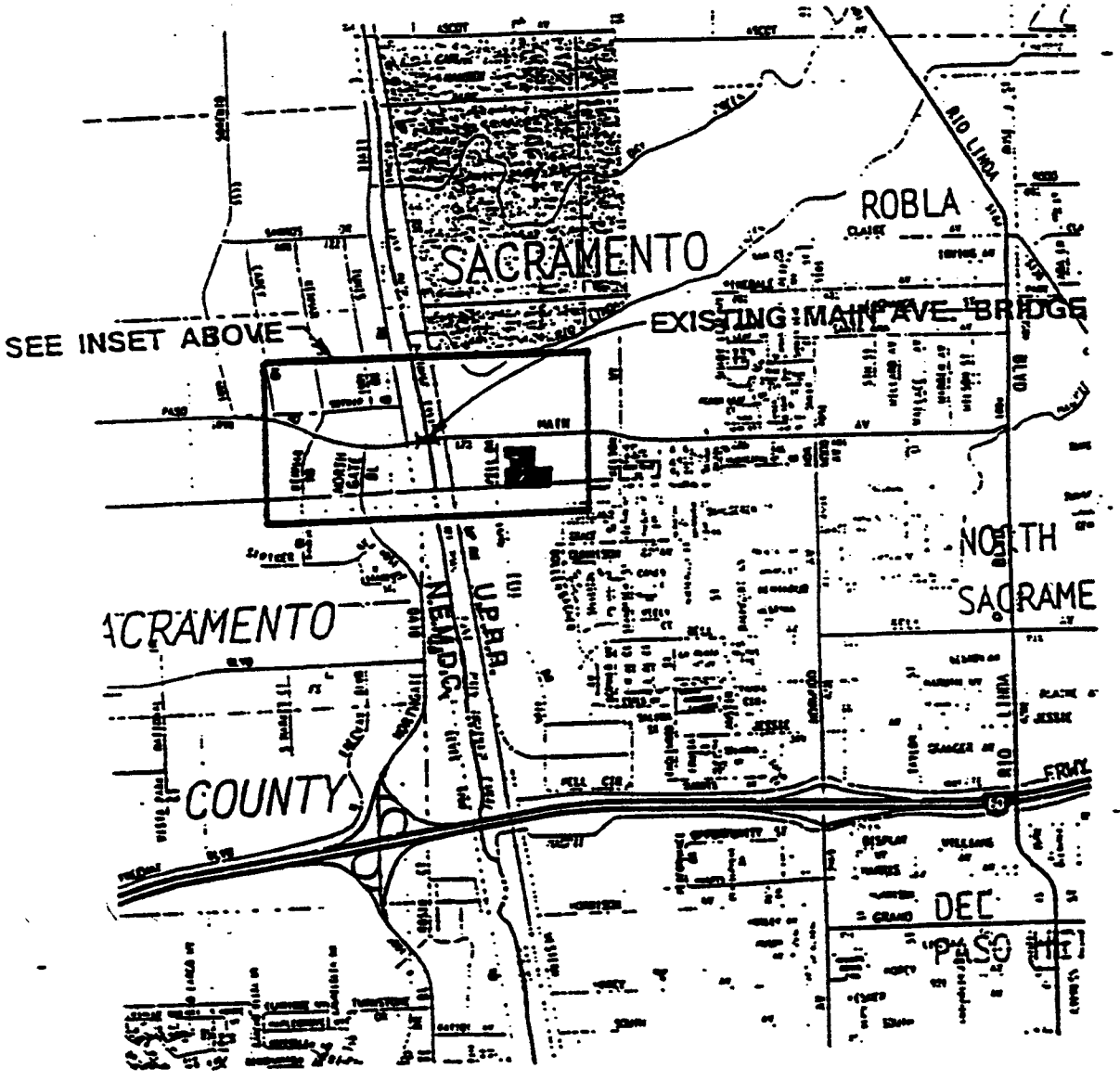
SAFCA LOCAL PROJECT

NATOMAS AREA FLOOD CONTROL

Parsons

Figure 2





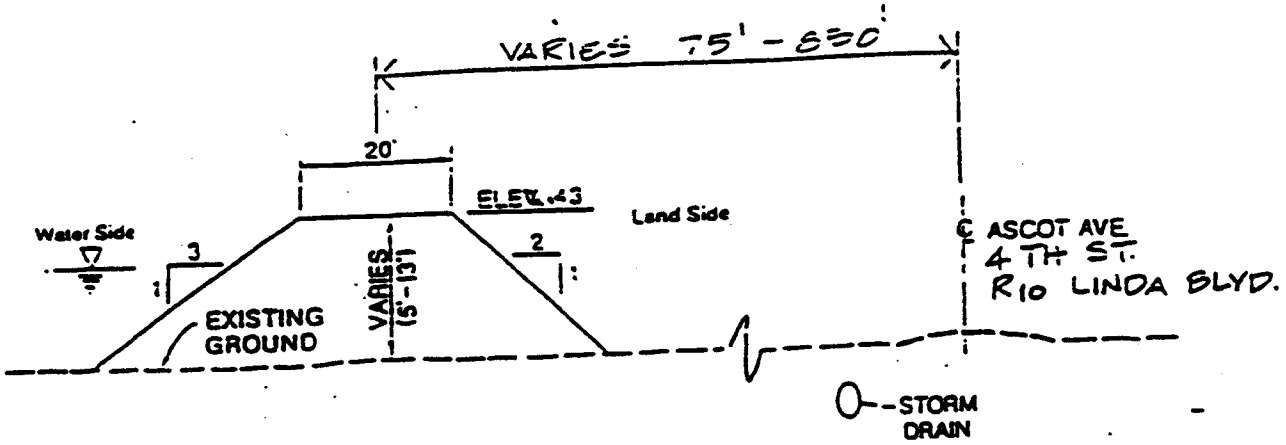
Parsons Brinckerhoff 100 YEARS

SAFCA LOCAL PROJECT

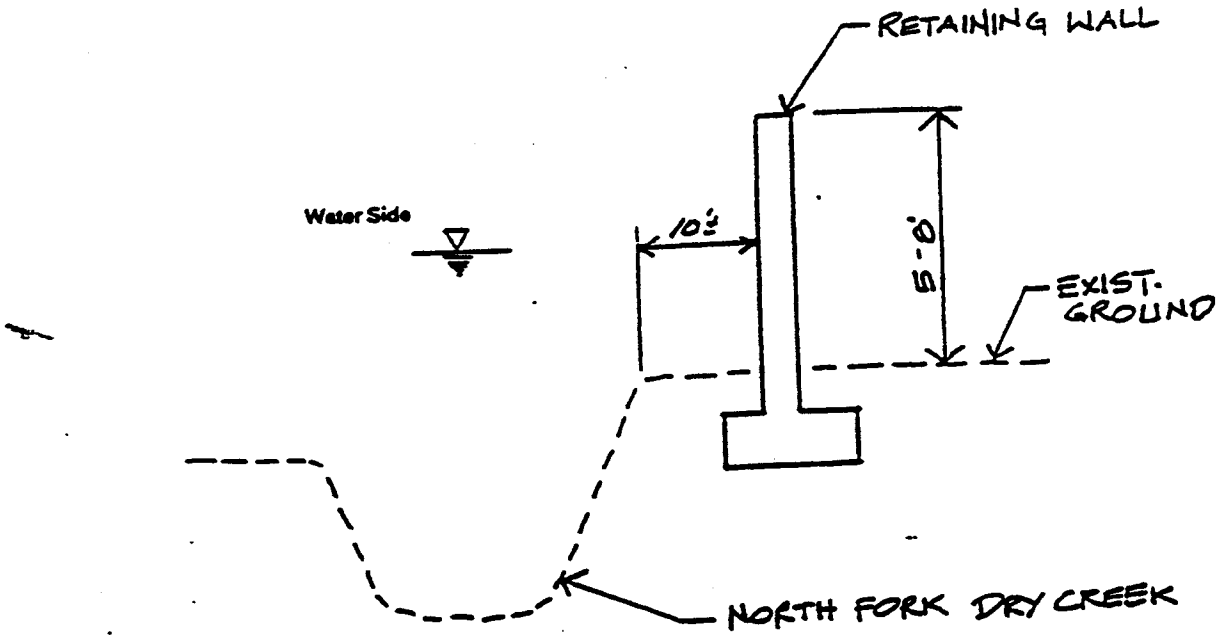
MAIN AVE. BRIDGE

VICINITY / LOCATION MAP

Figure 5



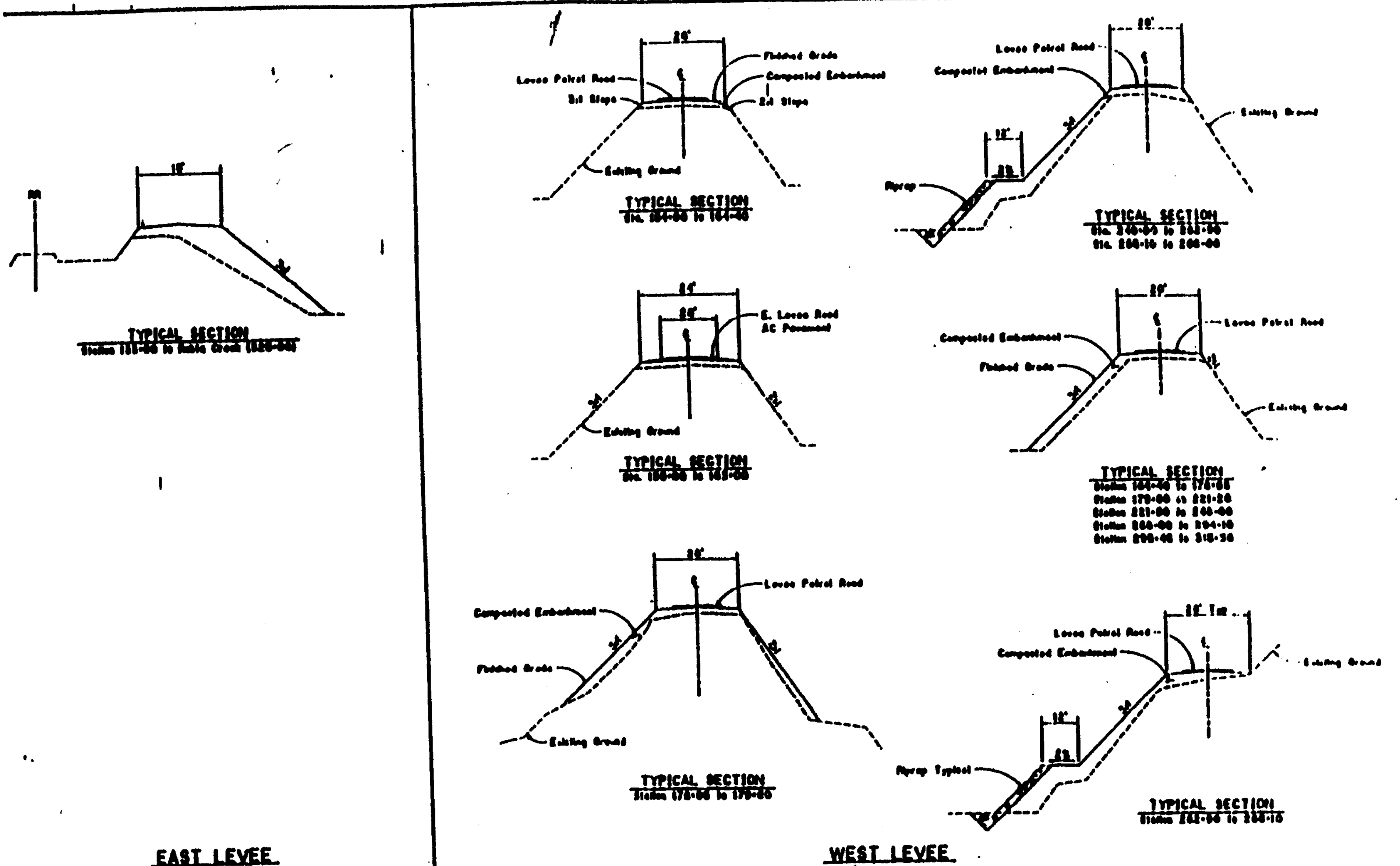
U.P.R.R. TO W. 2nd ST.



TYPICAL SECTION - DRY CREEK FLOOD WALL
STA. 73+20 TO 79+65
STA. 85+00 TO 89+25

Parsons Brinckerhoff 100 YEARS	SAFCA LOCAL PROJECT NORTH DRY CREEK LEVEE TYPICAL SECTIONS	Figure 12

ATTACHMENT 1



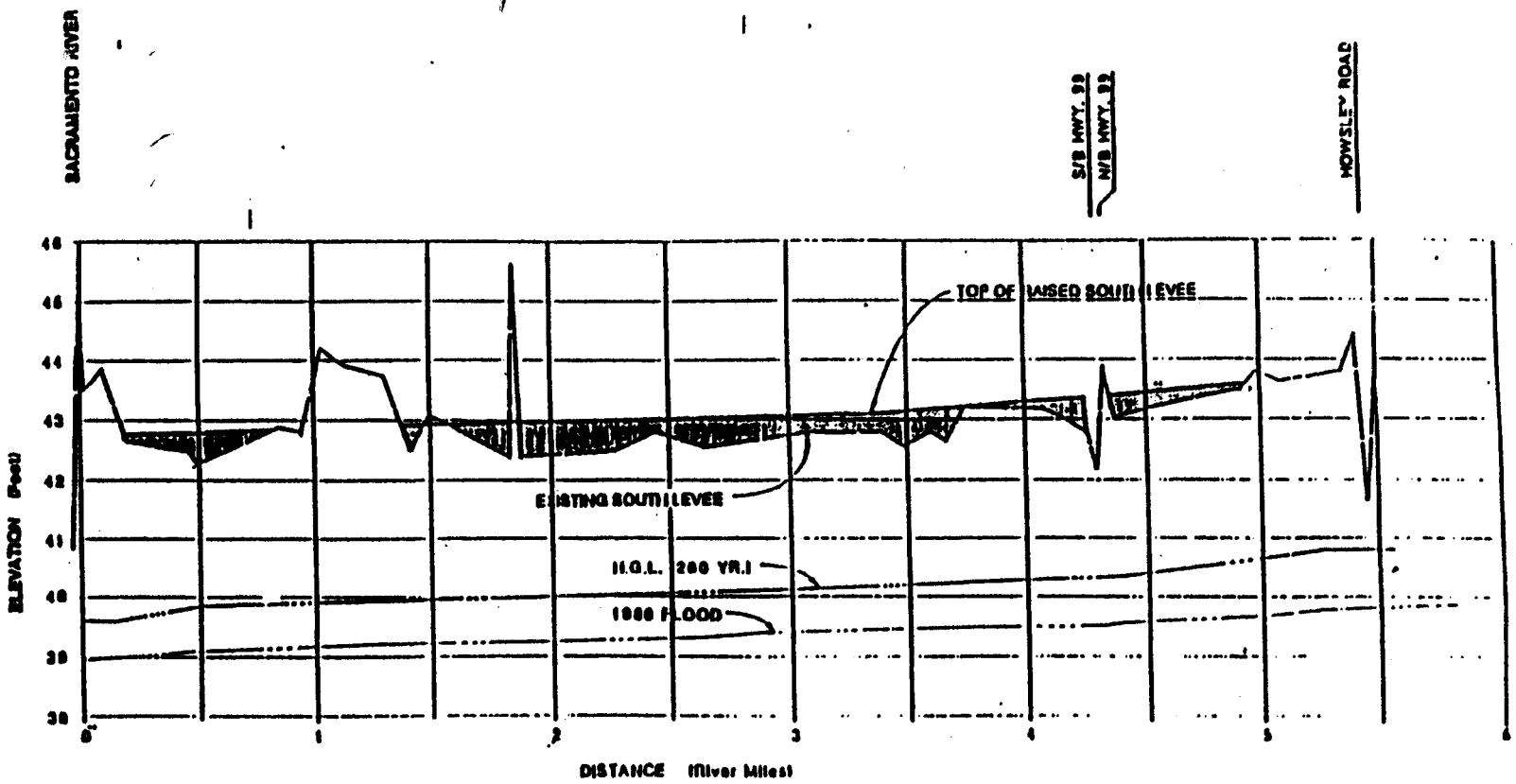
PUBLIC NOTICE 199200719

SACRAMENTO AREA FLOOD CONTROL AGENCY

NEMDC LEVEE PROJECT

TYPICAL LEVEE CROSS SECTIONS

4



SOURCE:

Topography is based on Corps of Engineers information contained in the American River Watershed Investigation, Feb 1986 Report, December 1991 and augmented by Field Surveys, conducted by Parsons Brinckerhoff Dec and Jan 1991

H.G.L. (200 YR) is based on Parsons Brinckerhoff hydraulic analysis using COE adopted flows

PUBLIC NOTICE 19920719

Parsons Brinckerhoff Quade & Douglas, Inc.		SACRAMENTO LOCAL PROJECT NATOMAS CROSS CANAL SOUTH LEVEE MODIFICATIONS	SHEET 21

ATTACHMENT 1

STATE OF CALIFORNIA—THE RESOURCES AGENCY
PETE WILSON, Governor

DEPARTMENT OF FISH AND GAME
REGION 2
1701 NIMBUS ROAD, SUITE A
RANCHO CORDOVA, CA 95670
(916) 355-7020

May 3, 1995

Colonel John N. Reese
District Engineer
US Army Corps of Engineers
1325 J Street
Sacramento, California 95814

Dear Colonel Reese:

The Department of Fish and Game recently received a copy of a letter from Mr. Butch Hodgkins of the Sacramento Area Flood Control Agency (SAFCA) regarding Permit No. 199200719 with a request for changes to two of the conditions.

These changes would require that the Habitat Conservation Plan (HCP) be completed and approved prior to the completion of the construction of the pump station rather than prior to commencement of construction. The original requirement was designed to facilitate the expeditious preparation of the HCP so that the indirect effects of the flood control project would be mitigated.

At this point in time, we would ask that you postpone your decision on this request. Currently, SAFCA, the City of Sacramento, and Sacramento and Sutter counties are expected to approve submittal of the HCP on July 18, 1995, prior to August when SAFCA needs to award the contract for the pump station. While we fully expect the HCP to be submitted on July 18, there has been some opposition to the overall concept of an HCP by some members of the public.

Our recommendation regarding the request for changes in the permit condition will depend, in part, on the actions by the various boards and councils on July 18. This delay in a decision should not prejudice SAFCA's proposed project because the contract wouldn't be awarded until August and it will allow us to better gauge the likelihood of success in the efforts to prepare an HCP.

If you have any questions, please contact myself at (916) 355-0922, or Ms. Cindy Chadwick, Environmental Services Supervisor, at (916) 355-0267.

Sincerely,

for L. Ryan Broddrick
Regional Manager

cc: Ms. Cindy Chadwick
Department of Fish and Game
Rancho Cordova, California

Mr. Wayne White
U.S. Fish and Wildlife Service
2800 Cottage Way, Room E-1803
Sacramento, California 95825

Mr. Butch Hodgkins
Sacramento Area Flood
Control Agency
926 J Street, Suite 424
Sacramento, California 95816

Copy Furnished:

U.S. Fish and Wildlife Service, Attn: Joel Medlin, 2800 Cottage Way, Room E-1803, Sacramento, California 95825
The Honorable Vic Fazio, Representative in Congress, 3rd District, California, 2113 Rayburn, Post Office Building, Washington, D.C. 20515
The Honorable Robert T. Matsui, Representative in Congress, 5th District, California, 2311 Rayburn, Post Office Building, Washington, D.C. 20515
The Honorable John T. Doolittle, Representative in Congress, 4th District, California, 2130 Professional Drive, Suite 190, Roseville, California 95661
The Honorable Richard W. Pombo, Representative in Congress, 11th District, California, 1519 Longworth, House Office Building, Washington, D.C. 20515
The Bohl Corporation, Attn: John A. Bohl, 1330 "Q" Street, Sacramento, California 95814
Law Offices Of Gregory D. Thatch, Attn: Gregory D. Thatch, 1730 I Street, Suite 220, Sacramento, California 95814

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA 95814-2922

REPLY TO
ATTENTION OF

May 5, 1995

Regulatory Branch (199200719)

F.I. Hodgkins, Executive Director
Sacramento Area Flood Control Agency
926 J Street, Suite 424
Sacramento, California 95814

Dear Mr. Hodgkins:

In response to your letter of April 19, 1995, we have modified Special Conditions i, j, and l of Department of the Army Permit number 199200719. These conditions have been modified as follows:

For purposes of these three conditions "complete construction" shall mean the placement of the embankment from the pump station east to the Union Pacific railroad tracks.

i. Prior to completing construction on the pump station north of Dry Creek, a Historic Property Treatment Plan (HPTP) shall be developed and approved in accordance with the Programmatic Agreement Among the Corps of Engineers, Bureau of Reclamation, California State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding implementation of the American River Watershed Project.

j. Prior to completing construction on the pump station north of Dry Creek, the permittee shall develop a Natomas Basin Habitat Management Plan (Plan). This Plan shall provide the framework within which a mitigation program for the effects of development within the Natomas floodplain will proceed. The framework shall be incorporated into future planning processes by State, local, and Federal authorities as development reaches the appropriate planning stages. The plan shall: ensure that the development within the Natomas floodplain complies with applicable Federal, State and local laws and regulations, including the Endangered Species Act and the Clean Water Act; identify at a conceptual level, appropriate and practicable mitigation measures that may be contemplated under Federal, State, and local laws pertaining to future development; and describe the mechanism to be used for the long-term management and protection of any mitigation lands.

The Plan shall be developed by the permittee in coordination with the on-going Corps of Engineers activities for the American River Watershed Investigation. The Plan, including its development, shall be coordinated with the Corps, the U.S. Fish and Wildlife Service, the Environmental Protection Agency, and other Federal, State, and local agencies having interest, expertise and jurisdiction over the Natomas floodplain.

The District Engineer will verify that the Final Plan is in compliance with this condition before completing construction on the pump station. The final Plan shall be incorporated by reference as a condition of this permit. Enforcement of mitigation requirements of State and local land use agencies shall be the responsibility of the applicable State or local agency.

1. The permit applicant shall not complete construction on the pumping station along the East Main Drain or otherwise complete the proposed project by providing 100-year flood protection for the lower American Basin until the Service first issues an incidental take permit and associated implementing agreement pursuant to Section 10(a)(1)(b) of the Act to the City and County of Sacramento, Sutter County and any other parties necessary to guarantee the successful implementation of a habitat conservation plan for the giant garter snake resident in the American Basin. This plan shall be compatible with and a component of the multispecies habitat management plan otherwise required by the Department of the Army as a condition of permit authorization.

All other conditions of the permit remain in full force and effect.

If you have any questions, please write to Tom Cavanaugh, Room 1444, or telephone (916) 557-5261.

Sincerely,

John N. Reese
Colonel, Corps of Engineers
District Engineer

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Sacramento Field Office
2800 Cottage Way, Room E-1803
Sacramento, California 95825-1846

IN REPLY REFER TO:

In Reply Refer To:
1-1-95-I-900

May 19, 1995

Colonel John Reese
District Engineer
U.S. Army Corps of Engineers
1325 J Street
Sacramento, California 95814-2922

Subject: Endangered Species Act Consultation on the Revised Natomas Area Flood Control Improvement Project (PN 199200719, 1-1-94-F-13) in Sacramento and Sutter Counties, California

Dear Colonel Reese:

This letter is in response to the April 19, 1995, letter from the Sacramento Area Flood Control Agency to your office regarding modifications to the above mentioned Army Corps of Engineers (Corps) permit, and your May 5, 1995, response. At issue are similar provisions of the Corps permit and the March 11, 1994, biological opinion prepared pursuant to section 7 of the Endangered Species Act of 1973, as amended (Act), requiring that construction of the pumping station along the East Main Drain not be initiated until the applicants obtain a permit pursuant to section 10(a)(1)(B) of the Act. Since issuance of the biological opinion, the applicants have made substantial progress toward completing the section 10(a)(1)(B) process. To date, the applicants have submitted a draft Habitat Conservation Plan (HCP) that my staff has reviewed. We have determined that, with minor additions to provide clarification, this draft will be acceptable in principle. At this time my staff is working with the applicants to complete the HCP process.

It has come to our attention, however, that to meet timing needs, the applicants must initiate construction on the pumping station prior to completion of the section 10(a)(1)(B) process. To aid the local community in this matter, we are modifying term and condition 2) of the biological opinion to read as follows:

> The Sacramento Area Flood Control Agency shall not commence construction of the pumping station along the East Main Drain until it and any other necessary parties have submitted to the Service an application for an incidental take permit pursuant to section 10(a)(1)(B) of the Act accompanied by an Habitat Conservation Plan and Implementing Agreement for the giant garter snake that have been conceptually agreed to by the Service. This plan will be compatible with and a component of the multi-species habitat management plan otherwise required by the Corps as a condition of permit authorization. The permit applicants shall not complete construction of the pumping station or otherwise complete the proposed project until the Service issues the subject section 10(a)(1)(B) permit. For purposes of this condition, "complete construction" shall mean the placement of the embankment from the pump station east to the Union Pacific railroad tracks.

This modification will allow the applicants to initiate construction activities, thus alleviating their concerns.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Sacramento Field Office
2800 Cottage Way, Room E-1803
Sacramento, California 95825-1846

In Reply Refer To:
1-1-94-F-13

March 11, 1994

District Engineer
U.S. Army Corps of Engineers
Regulatory Branch (Attention: Tom Kavanaugh)
1325 J Street
Sacramento, California 95814-2922

Subject: Endangered Species Act Consultation on the Revised Natomas Area Flood Control Improvement Project (PN 199200719) in Sacramento and Sutter Counties, California

Dear Sir:

This responds to your request of January 21, 1994, for initiation of formal consultation pursuant to section 7 of the Endangered Species Act of 1973, as amended (Act), on the proposed provision of 200-year flood protection for the lower American Basin. Your request was received by the U.S. Fish and Wildlife Service (Service) on January 25, 1994. At issue are the effects of the proposed project on the giant garter snake (*Thamnophis gigas*), listed as a threatened species by the State and Federal governments.

This biological opinion is based on the public notice for this project, numerous environmental documents prepared under the National Environmental Policy Act and California Envnironmental Quality Act, and other scientific and commercial information in Service files.

Biological Opinion

It is our biological opinion that the proposed Revised Natomas Area Flood Control Improvement Project, together with the five proposed permit conditions described in the Corps' letter dated January 21, 1994, is not likely to jeopardize the continued existence of the giant garter snake. Critical habitat has not been designated for this species; therefore, none will be adversely modified or destroyed.

Description of the Proposed Action

Please refer to the public notice (PN 199200719) for a description of the construction related details of the proposed project. In brief, the Sacramento Area Flood Control Agency (SAFCA) proposes to improve levee systems needed to provide 200-year flood protection to the 55,000-acre lower American

(Natomas) Basin. Your January 21, 1994, request for consultation included a list of five special conditions proposed for inclusion as part of any permit issued for the proposed project--three conditions designed to avoid, minimize, and offset the direct effects of project construction on the garter snake, and two conditions that would offset the indirect effects of the proposed flood control project. By mutual agreement, the Corps and Service consider these permit conditions to be part of the project proposal. Please refer to the Incidental Take section below for more details on conditional language to be included in any Department of the Army authorization of the proposed project.

To avoid, minimize, and offset the direct effects of the proposed project on the giant garter snake, the Corps proposed three permit conditions to supplement the applicant's proposed Wetland Mitigation Plan, dated June 1993. These three permit conditions, as described by letter dated January 21, 1994, would (1) require preconstruction surveys for the giant garter snake, (2) include measures to minimize the extent of incidental take, and (3) compensate for any direct losses of giant garter snake habitat. To address indirect effects of the proposed project, the Corps also proposed (in the same letter) to require (4) completion of a habitat management plan prior to start of construction of the proposed pumping station, per direction of the Assistant Secretary of the Army (Civil Works), that addresses mitigation requirements for the giant garter snake, and (5) inclusion of a habitat management plan and signed agreement among the City of Sacramento, Sacramento and Sutter counties, and the Service, to guarantee implementation of the plan. Relative to items #1 and 2 above, the permit applicant, by letter dated February 3, 1994, submitted a proposed plan to avoid direct effects of project construction on the giant garter snake. This plan will be modified and approved by the Service per requirements described in the Incidental Take section below.

Species Account/Environmental Baseline

Please refer to the October 20, 1993, Federal Register notice (58 FR 54053-54066) listing the giant garter snake as a threatened species, for detailed information on the biology/ecology of the species. One of the largest garter snakes, reaching a total length of at least 64 inches, this highly aquatic species feeds exclusively on small fishes, tadpoles, and frogs. The giant garter snake inhabits small mammal burrows and other soil orifices above prevailing flood elevations throughout its winter dormancy period (November to mid-March). The breeding season commences immediately upon emergence in the spring, extending through March and April; females give birth to live young from late July through early September (Hansen and Hansen 1990). Brood size is variable, ranging from 10 to 46 young, with a mean of 23.1 (n=19) (*ibid.*). Although growth rates are variable, young typically more than double in size by one year of age (*ibid.*). Sexual maturity averages 3 years of age in males and 5 years for females (*ibid.*).

The giant garter snake is endemic to valley floor emergent marshes in the Central Valley, historically distributed throughout the large flood basins from the former Buena Vista lakebed in Kern County northward to the Butte Basin. Reclamation of wetlands for agriculture and flood control have resulted in severe habitat fragmentation, to the extent that wetland habitats with natural hydrologic and vegetative characteristics effectively have been eliminated throughout the entire range of the species. The remaining giant garter snake populations identified since the mid-1970s are clustered in 13

distinct areas that largely coincide with historical riverine flood basins and tributary streams (Hinds 1952, Brode and Hansen 1992). In agricultural areas (predominantly rice), giant garter snakes primarily occur along water delivery and drainage canals. Nine of the remaining 13 regional populations occur discontinuously in typically small, isolated patches of valley floor habitat that support few individuals due to limited extent and quality of suitable habitat (Hansen 1988). These nine populations, encompassing about 75 percent of the species' current geographic range, are vulnerable to extinction at any time from anthropogenic causes, as well as stochastic (random) environmental, demographic, and genetic processes. Despite repeated censusing, giant garter snakes have not been observed throughout the San Joaquin Valley since the mid-1970's. Considering the urbanization threats to the American Basin population portended by the proposed project, 10 of the 13 (77 percent) extant populations are imminently imperiled.

The American Basin supports the largest extant giant garter snake population (Broda and Hansen 1992). Throughout this area, reconnaissance level surveys (USFWS 1991) indicate that about 1,400 acres of giant garter snake habitat exist in the form of man-made irrigation and drainage canals, as well as an undetermined acreage of suitable habitat within nearly 13,000 acres of adjoining rice fields. The giant garter snake also uses an undetermined amount of habitat at higher elevations to escape from winter flooding during the inactive winter phase of the snake's life cycle.

Effects of the Proposed Action

Direct Effects

The proposed levee improvement work could directly affect giant garter snakes if they occur along the reaches specified for upgrading. The applicant proposes to conduct field surveys to determine if suitable habitat and the species occur in any of the proposed work areas. If giant garter snakes are found, construction will be scheduled to avoid the period between October 1 to May 1, thereby precluding the likelihood of impacting snakes while dormant underground. Levee construction will predominantly occur along levee tops and banks, areas seldom used by this highly aquatic species during its active season. Therefore, death or injury from construction activities during the summer along levee banks and slopes is unlikely because snakes center their activities in aquatic habitats at this time.

Nonetheless, as currently formulated, the proposed levee improvements do not address the possibility of eliminating terrestrial retreat habitat during the summer while garter snakes are restricted largely to aquatic habitats. Under this scenario, terrestrial retreat habitat may become a limiting factor to any garter snakes inhabiting project reaches scheduled for levee improvement. However, it is likely that small mammals and other processes that create soil holes and fissures will relatively quickly reestablish any terrestrial retreat habitat lost due to project construction.

Indirect Effects

The proposed flood control project would provide 200-year flood protection for the 55,000-acre lower American Basin. This area currently consists 7,140 of acres of urban land uses and 47,742 acres of agricultural lands. The draft

and final Environmental Impact Statement (EIS) for the American River Watershed Investigation (U.S. Army Corps of Engineers 1991) and Environmental Impact Report (EIR) for the Revised Natomas Area Flood Control Improvement Project (SAFCA 1993) defined this 55,000-acre basin as the project area. Both documents acknowledged that flood control would result in intensive urbanization of the Basin throughout the foreseeable future. In addition, various City and County plans identify proposed development for the region, to wit: draft EIR for the Sutter Bay Village Specific Plan and Golf Course Residential (Sutter County 1992); draft EIR for the Metropolitan Airport/Vicinity Special Planning Area General Plan Amendment and Rezone No. 89-GPB-ZOB-0781 (Sacramento County 1992); North Natomas Community Plan (City of Sacramento 1993); draft and final EIR's for the South Sutter County General Plan Amendment (Sutter County 1991, 1992). These documents establish a clear link between the proposed flood protection and resulting flood plain development. For example, the North Natomas Community Plan acknowledges that further development is precluded until the proposed flood control project is constructed. The Sutter Bay Village Specific Plan states that "[u]ltimate approval of the proposed project (Sutter Bay) is dependent on the eventual approval of a regional flood control project, which is being proposed by the Sacramento Area Flood Control Agency, the Army Corps of Engineers, and the State Reclamation Board." Moreover, Joe Serna, Mayor of the City of Sacramento, stated at a September 16, 1993, meeting of the Floodplain Management Association, that "the decision already has been made in Natomas, we're going to develop it" (Sacramento Bee, 9/17/93).

Absent measures to address the prospect of future basin-wide losses of existing giant garter snake habitat, this flood control project and consequent urban development could extirpate the giant garter snake from the American Basin [California Department of Fish and Game (CDFG) 1992, Brode and Hansen 1992)]. The North Natomas Community Drainage System and associated urban development, proposed by the City of Sacramento, would affect about 26 miles of giant garter snake habitat along existing canals and ditches, and additional rice field habitat (*ibid.*). Potential effectiveness of a proposed mitigation plan remains undetermined. The proposed Sutter Bay project, at the north end of the American Basin, could eliminate and/or degrade about 42 miles of suitable canals (*ibid.*) and thousands of acres of associated rice fields and giant garter snake habitat. The proposed South Sutter Industrial Center, located near the Sutter Bay project, could eliminate another 9.0 miles of aquatic habitat and associated rice fields. The Metro Air Park is proposing about 1,890 acres of development on agricultural and vacant lands that potentially could result in major adverse impacts to the species, including the loss of about 9.0 miles of canal habitat and 1,500 acres of rice fields, as well as the disruption of movement corridors (*ibid.*). Roadway improvement and construction projects, or the planned extension of the Sacramento Regional Transit system in this area, also increases the likelihood for major impacts to the species, including elevated mortality from increased traffic on local roads and highways (*ibid.*). Numerous species of aquatic snakes are vulnerable to roadway mortality (Bernardino *et al.* 1992). Giant garter snakes also are killed and injured by vehicular traffic, as evinced by numerous observations (Sacramento County 1992; G. Hansen, pers. comm., 1992; J. Brode, pers. comm., 1992); of the cumulative total of 1,056 giant garter snake records compiled by G. G. Hansen over his many years of study, 76 (7.2 percent) were road kills (G. Hansen, pers. comm., 1992).

With nine of the twelve other extant populations on the verge of extinction throughout 75 percent of the current range of the species, including the entire San Joaquin Valley (see Species Account/Environmental Baseline), survival of the species cannot be assured by the additional loss or degradation of the largest remaining population. Because of the severe, declining trends in habitat suitability/availability and population levels throughout 75 percent of the range of the species, the Service concludes that the maintenance of a viable giant garter snake population in the American Basin is vital to the survival of the species.

To address the prospective habitat losses of the proposed project to the American Basin population, the Corps has proposed, by letter dated January 21, 1994, a special permit condition that would establish a multispecies habitat management plan for the 55,000-acre lower American Basin, scheduled for completion prior to the start of construction of the proposed pumping station. An element of this habitat management plan would include an agreement among local governments and the Service that guarantees the conservation needs of the giant garter snake. Based on ongoing habitat conservation planning discussions with representatives of the applicant, Corps, CDFG, and landowners, this agreement, at the Federal level, will take the form of an incidental take permit and implementing agreement issued by the Service under section 10(a)(1)(B) of the Act, and at the State level, a permit issued by the CDFG under section 2081 of the State Fish and Game Code.

This habitat management plan would provide certainty for the maintenance of a viable population in the American Basin if the proposed project is authorized. The Service, therefore, concludes that the proposed project is not expected to reduce appreciably the likelihood of the survival and recovery of the giant garter snake by adversely affecting reproduction, numbers, and distribution of the species.

Cumulative Effects

Cumulative effects are those effects of future non-Federal (State and local governments, or private) activities on endangered and threatened species or critical habitat that are reasonably certain to occur during the course of the Federal activity subject to consultation. Future Federal actions are subject to the consultation requirements established in section 7 and, therefore, are not considered cumulative to the proposed action.

Various farming and canal maintenance practices adversely affect most remaining giant garter snake populations (58 FR 54063). For example, sodium sulfate and selenium contamination throughout most of the Grasslands region of the San Joaquin Valley has been documented to adversely affect giant garter snake prey species and overall habitat quality (USFWS file information). In addition, acrolein (Magnacide H) is commonly used as a herbicide in irrigation and drainage canals throughout much of the range of the giant garter snake. This compound, when used at levels needed to control target plant species, is toxic to virtually all aquatic vertebrates (CDFG and USFWS file information). Livestock grazing is known to be contributing to the elimination and degradation of available habitat at four populations (58 FR 54061).

Cumulative effects together with the impacts of the proposed project are not likely to reduce appreciably the likelihood of the survival and recovery of the giant garter snake.

Incidental Take

Sections 4(d) and 9 of the Act, as amended, prohibit any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without special exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as actions that create the likelihood of injury to such an extent as to significantly disrupt normal behavioral patterns that include but are not limited to breeding, feeding, or sheltering.

Under the terms of §7(b)(4) and §7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such take is in compliance with this incidental take statement. The measures described below are nondiscretionary and must be undertaken by the agency so that they become binding conditions of any permit issued to the applicant for the exemption in §7(o)(2) to apply. The Federal agency has a continuing duty to regulate the activity that is covered by this incidental take statement. If the agency fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit, the protective coverage of §7(o)(2) may lapse.

The Service anticipates that an unquatified amount of potential giant garter snake habitat could be lost during construction of the proposed levee improvements. Surveys have not been conducted to determine the extent, if any, of giant garter snake habitat within the project reaches proposed for improvement. The Corps and applicant propose preconstruction surveys to obtain the information needed to design and schedule the project so that impacts can be avoided and minimized to the extent possible. The Service also anticipates that an unquantifiable amount of giant garter snake habitat would be eliminated by future commercial development over the next ±50 years throughout much of the lower American Basin consequent to the provision of the proposed flood protection.

The Service establishes the following reasonable and prudent measures to minimize the impact of take. The measures below are nondiscretionary and must be undertaken by the Corps:

1) Construction related disturbance to the giant garter snake shall be minimized.

2) A conservation plan to address indirect effects of the proposed project shall be approved by the Service prior to the start of construction on the pumping station.

To be exempt from the prohibitions of section 9 of the Act, the following terms and conditions, which implement the reasonable and prudent measures described above, must be complied with in their entirety and included as

special conditions in any Department of the Army permit issued for the proposed project:

1) The applicant shall prepare and implement a plan for avoiding and minimizing construction related impacts to the giant garter snake. The plan shall be submitted to the Corps and Service for review and approval prior to the start of project construction.

2) The permit applicant shall not begin construction on the pumping station along the East Main Drain or otherwise complete the proposed project by providing 100-year flood protection for the lower American Basin until the Service first issues an incidental take permit and associated implementing agreement pursuant to §10(a)(1)(B) of the Act to the City and County of Sacramento, Sutter County, and any other parties necessary to guarantee the successful implementation of a habitat conservation plan for the giant garter snake population resident within the American Basin. This plan shall be compatible with and a component of the multispecies habitat management plan otherwise required by the Department of the Army as a condition of permit authorization.

Pursuant to 50 CFR §402.14(i)(4), if during the course of the action the amount or extent of incidental taking is exceeded, the causative action must cease and the Corps must reinitiate consultation immediately with the Service to avoid violation of section 9 of the Act.

Reporting Requirements: The Service shall be notified immediately of any information about take or suspected take of giant garter snakes associated with project construction and implementation of the habitat conservation plan for the giant garter snake. Upon locating a dead, injured, or sick giant garter snake specimen, the Corps, permittee, and/or contractors must immediately notify the Service within 3 working days of any such information. Notification must include the date, time, and precise location of the incident/specimen, and any other pertinent information. The Service contact for this information is the Field Supervisor at 916/978-4866. Care shall be taken in handling sick or injured specimens to ensure effective treatment and care and in handling dead specimens to preserve biological material in the best possible state for later analysis of cause of death. The finder and handler of any such animals has the responsibility to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed. Injured animals or specimens shall be delivered to the Service's Division of Law Enforcement at 2800 Cottage Way, Sacramento, California 95825-1846 (916/978-4861).

This concludes formal consultation on the project as described above. Reinitiation of formal consultation is required if (1) the amount or extent of incidental take is exceeded, as previously described or the requirements under the Incidental Take section are not implemented, (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent that was not considered in this opinion, (3) the proposed action is subsequently modified in a manner that causes an effect to the giant garter snake that was not considered in this opinion, and/or (4) a new species is listed or critical habitat is designated that may be affected by the action.

The 404 permit expressly incorporates the decision by the Assistant Secretary of the Army (Civil Works), and the biological opinion including accompanying terms and conditions of the incidental take statement provided by the Service. Your May 5, 1995, letter purports to modify the 404 permit in a manner inconsistent with the decision rendered by the Assistant Secretary and the terms and conditions of the biological opinion or the modified language set out above. Consequently, the Service recommends that the Corps either modify the Corps permit conditions to be consistent with the above modified term and condition of biological opinion 1-1-94-F-13, or that we meet at your earliest convenience to resolve this issue.

The Corps also should be aware that the Service is currently working with local entities to develop a procedure that will allow the completion of the proposed flood control project prior to the issuance of a section 10(a)(1)(B) permit. We welcome your participation in these discussions. If you have any questions, please contact Mr Joel Medlin, Field Supervisor, Sacramento Field Office at (916) 979-2710.

Sincerely,

Wayne S. White
State Supervisor

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IMPLEMENTATION AGREEMENT FOR THE

NATOMAS BASIN HABITAT CONSERVATION PLAN

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LIST OF EXHIBITS

IMPLEMENTATION AGREEMENT FOR THE NATOMAS BASIN HABITAT CONSERVATION PLAN

THIS IMPLEMENTATION AGREEMENT FOR THE NATOMAS BASIN HABITAT CONSERVATION PLAN is entered into as of the _____ day of _____, 2003 by and among the UNITED STATES FISH AND WILDLIFE SERVICE, an agency of the Department of the Interior of the United States of America ("USFWS"), the CALIFORNIA DEPARTMENT OF FISH AND GAME, a subdivision of the Resources Agency of the State of California ("CDFG"), the CITY OF SACRAMENTO, a chartered city ("CITY"), the COUNTY OF SUTTER ("SUTTER"), a political subdivision of the State of California, and The Natomas Basin Conservancy, Inc. ("TNBC", or "Conservancy"), a California nonprofit public benefit corporation, (hereafter collectively referred to as "Parties"). The CITY, SUTTER and TNBC are hereafter also referred to collectively as "Permittees" and each is individually referred to as "Permittee."

1. RECITALS AND PURPOSES

The Parties have entered into this Agreement in consideration of the following facts and assumptions, intentions and expectations:

1.1 Purpose. This Implementation Agreement ("Agreement") describes the mechanisms for implementation of the Natomas Basin Habitat Conservation Plan ("NBHCP" or "Plan") a cooperative federal, state and local program for the conservation of those plant and animal species listed on Exhibit D (collectively the "Covered Species") and their habitats in the Natomas Basin. The purposes of this Agreement are: a) to ensure the implementation of each of the terms of the NBHCP; b) to describe remedies and recourse should any party fail to perform its obligations as set forth in this agreement; and c) to provide assurances to the Permittees that as long as the terms of the NBHCP are properly implemented, no additional mitigation will be required of them except as provided for in this Agreement or required by law. This Agreement also establishes terms and conditions that support issuance of Permits by the USFWS under Section 10(a)(1)(B) of the Endangered Species Act ("ESA") and CDFG under Section 2081 of the California Fish and Game Code to allow the taking of the Covered Species within the Permit Area a) by the CITY and SUTTER, and third persons under the CITY's and SUTTER's direct control, incidental to Authorized Development and b) by TNBC, and third persons under TNBC's direct control, incidental to management activities for a period of fifty (50) years.

1.2 Parties' Intent. The intent of the Parties, in addition to the purposes set forth above, is that a comprehensive conservation program be established, and be implemented under the auspices of TNBC for the conservation of the Covered Species and their habitats, to provide an opportunity for individual Authorized Development project proponents to obtain incidental take authorization, through CITY's and SUTTER's Take Permits, for a broad array of Covered Species under the ESA and CESA including both currently listed species and species that may be listed in the future; to minimize the review of individual projects by the USFWS and CDFG; and to standardize take mitigation and onsite take avoidance and minimization measures for projects covered by the NBHCP.

1.3 Coordination. The NBHCP will be implemented by the Parties through execution of this Agreement, subject to and in accordance with the Permits.

1.4 Habitat. The Covered Species may use or inhabit portions of the Natomas Basin area which is situated northeasterly of the confluence of the American River and Sacramento River. Consequently, Planned Development of 17,500 acres, including CITY and SUTTER Authorized Development and Metro Air Park's 1,983 acres of authorized development, related infrastructure, and government public works planned in this area over the next fifty (50) years may result in a loss

of habitat and takings of the Covered Species, incidental to the normal course of this Planned Development.

1.5 Mitigation. Implementation of the NBHCP through this Agreement is intended to avoid, minimize and mitigate to the maximum extent practicable, and minimize and fully mitigate, the individual and cumulative impacts of take of Covered Species resulting from Authorized Development within the CITY's and SUTTER's respective Permit Areas in the Natomas Basin. All required mitigation is specified in the NBHCP.

1.6 Integrity and Viability of NBHCP. While the NBHCP was developed as a comprehensive multi-species habitat conservation plan to avoid, minimize and mitigate for the expected loss of habitat values and incidental take of the Covered Species that could result from urban development, operation and maintenance of irrigation and drainage systems, and certain activities associated with TNBC management of its system of reserves within the Natomas Basin when it is fully implemented, the biological viability of the NBHCP is not compromised by the failure of other Potential Permittees to participate in the NBHCP and execute this Agreement. The mitigation strategies provided in the NBHCP are designed to allow for separate and independent implementation of NBHCP mitigation measures by CITY, SUTTER or other Potential Permittees, and may be adjusted under the terms of the Plan if fewer than all land use jurisdictions or other Potential Permittees participate, so that the NBHCP is viable and will minimize and mitigate the impacts associated with take of Covered Species resulting from Covered Activities carried out within the Natomas Basin by each Permittee, even if the Plan is not implemented by other Potential Permittees.

1.7 Reliance. In reliance upon this Agreement, CITY and SUTTER are making long range plans and financial investments in public infrastructure improvements necessary for the preservation of the public health, safety and welfare. Without the assurances identified in this Agreement, they would not enter into, support or approve any such plans or financial commitments.

1.8 Local Land Use Authority. The parties to this Agreement intend that nothing in the NBHCP or in this Agreement shall be interpreted to mean or operate in a manner that expressly or impliedly diminishes or restricts the local land use decision making authority of CITY or SUTTER, provided that the Parties acknowledge that should either CITY or SUTTER exercises its respective land use authority in a manner that conflicts with the terms of the NBHCP, this Agreement or the Permits, the Service and/or CDFG may suspend or revoke CITY's or SUTTER's Permits pursuant to Section 7.4 of this Agreement and applicable laws and regulations.

1.9 CITY, SUTTER and TNBC as Permittees. This Agreement also establishes the conditions under which the incidental take granted to CITY and SUTTER under their respective Permits will apply to landowners and developers within their respective Permit Areas in the Natomas Basin as of the Effective Date (as depicted on Exhibits B and C attached hereto and incorporated herein) in order to allow the taking of the Covered Species incidental to Authorized Development. TNBC's Permit will authorize incidental take of the Covered Species by TNBC anywhere within its Permit Area with respect to the management and other activities and responsibilities that TNBC or third parties under its control assumes on behalf of CITY and SUTTER under the NBHCP.

1.10 USFWS Authorities. USFWS is authorized to enter into this Agreement pursuant to the ESA (16 U.S.C. 1531 et seq.), the United States Fish and Wildlife Coordination Act (16 U.S.C. 661-666c) and the Fish and Wildlife Act of 1956 (16 U.S.C. 742(f) et seq.).

1.11 CDFG Authorities. CDFG is authorized to enter into this Agreement pursuant to CESA sections 2080 and 2081.

AGREEMENT

FOR AND IN CONSIDERATION of the recitals set forth above, which are incorporated by reference herein, the covenants set forth herein, and other considerations, the receipt and adequacy of which is hereby acknowledged, the Parties hereto agree as follows:

2 DEFINITIONS

Terms used in this Agreement with reference to the ESA shall have the same meaning as those same terms have under the ESA, or in regulations adopted by the USFWS, and terms used in this Agreement with reference to CESA, shall have the same meaning as those same terms have under CESA, or regulations adopted by CDFG. Capitalized terms used in this Agreement shall have the defined meanings specified in the NBHCP as attached hereto as Exhibit A and incorporated herein into this Agreement. Where additional terms are used in this Agreement, definitions are included within the applicable text. Any amendments to the definitions contained in this Agreement shall be deemed automatically to be amendments to the definitions contained in the NBHCP.

3 OBLIGATIONS OF THE PARTIES

3.1 CITY and SUTTER.

3.1.1 Limitation on Total Development in Natomas Basin and Individual Permit Areas. The NBHCP anticipates and analyzes a total of 17,500 acres of Planned Development in the Natomas Basin, 15,517 acres of which constitutes Authorized Development within CITY and SUTTER. (An additional 1,983 acres of development is allocated to the Metro Air Park project in Sacramento County under the Metro Air Park Habitat Conservation Plan and is analyzed within the NBHCP.) CITY agrees not to approve more than 8,050 acres of Authorized Development and to ensure that all Authorized Development is confined to CITY's Permit Area as depicted on Exhibit B to this Agreement). SUTTER agrees not to approve more than 7,467 acres of Authorized Development and to ensure that all Authorized Development is confined to SUTTER's Permit Area as depicted on Exhibit C to this Agreement). The Parties further agree:

(a) Because the effectiveness of the NBHCP's Operating Conservation Program is based upon CITY limiting total development to 8,050 acres within the CITY's Permit Area, and SUTTER limiting total development to 7,467 acres within SUTTER's Permit Area, approval by either CITY or SUTTER of future urban development within the Plan Area or outside of their respective Permit Areas would constitute a significant departure from the Plan's Operating Conservation Program. Thus, CITY and SUTTER further agree that in the event this future urban development should occur, prior to approval of any related rezoning or prezoning, such future urban development shall trigger a reevaluation of the Plan and Permits, a new effects analysis, potential amendments and/or revisions to the Plan and Permits, a separate conservation strategy and issuance of Incidental Take Permits to the permittee for that additional development, and/or possible suspension or revocation of CITY's or SUTTER's Permits in the event the CITY or SUTTER violate such limitations.

(b) For purposes of the NBHCP and this Agreement, CITY agrees that although the West Lakeside Annexation area is proposed by the landowners to be annexed to the CITY, this area currently is located within Sacramento County and is outside of the County's Urban Services Boundary and the City's Sphere of Influence, and it is not included in the 8,050 acres of Authorized Development or within the CITY's Permit Area. Thus, CITY agrees that in the event this annexation occurs, it shall, prior to approval of any rezoning or prezoning associated with such annexation, trigger a reevaluation of the Plan, a new effects analysis, potential amendments and/or revisions to the Plan and Permits, a separate conservation strategy and issuance of Incidental Take Permits to the City for that additional urban development, and/or possible

suspension or revocation of CITY's Permit in the event the CITY violates such limitations without completing such reevaluation, amendment, or revision or new conservation strategy for that additional urban development.

3.1.2 EXCLUSION OF DEVELOPMENT FROM SWAINSON's HAWK ZONE. With the exception of 252 acres included as Authorized Development by CITY in the NBHCP, the Parties agree that the CITY's and SUTTER's Permit Areas shall exclude a one mile wide strip of land adjacent to the Sacramento River within their respective jurisdictions known as the Swainson's Hawk Zone (SHZ). The Parties further agree as follows:

(a) CITY and SUTTER shall not approve any future urban development within their respective portions of the Swainson's Hawk Zone beyond the 252 acres of Authorized Development identified by CITY in the NBHCP.

(b) Within One Hundred and Eighty (180) days of the Effective Date, SUTTER shall initiate a General Plan Amendment to remove all land within SUTTER's portion of the Swainson's Hawk Zone from the Industrial/Commercial Reserve designation in the Sutter County General Plan and to redesignate such land for agricultural uses.

(c) Because the effectiveness of the NBHCP to adequately minimize and mitigate the effects of take of the Covered Species depends, in part, on the exclusion of urban development from both the CITY and SUTTER's portions of the Swainson's Hawk Zone, approval by either CITY or SUTTER of future urban development in the Swainson's Hawk Zone, except as otherwise explicitly allowed under the NBHCP, would constitute a significant departure from the Plan and would trigger a reevaluation of the Plan and Permits, a new effects analysis, potential amendments to the Plan and/or Permits, a separate conservation strategy and issuance of Incidental Take Permits to the permittee for that additional development, and/or possible suspension or revocation of CITY or SUTTER's Permits in the event CITY or SUTTER violate such restrictions.

3.1.3 Timing of Mitigation. CITY and SUTTER agree to comply with the NBHCP Chapter VI requirements applicable to the timing of acquisition of Mitigation Lands, including, but not limited to, the requirement to maintain a 200-acre cushion of Mitigation Lands, and other timing restrictions on approval of Authorized Development as provided in Sections 4 and 5 of this Agreement and Chapter VI of the NBHCP.

3.1.4 Baseline Map. CITY and SUTTER have prepared, and USFWS and CDFG have approved, the Baseline Maps set forth in Exhibits B and C, attached hereto and incorporated herein by this reference, which depict: (1) those land areas within their respective Permit Areas which are designated as "Exempt Area-Existing Development" and therefore not subject to the NBHCP, the Permits, or this Agreement; (2) those land areas designated as "Development Subject to 1997 HCP," within their respective Permit Areas for which Authorized Development projects have been approved between 1997 and 2002 and have been developed in compliance with the Mitigation Requirements of the NBHCP in effect in 1997; and (3) those undeveloped land areas designated as "Development Subject to 2002 HCP," within the Permit Areas which will be subject to the Mitigation Requirement of the NBHCP.

3.1.5 Restriction on Urban Development/Mitigation Alternatives. CITY and SUTTER shall not issue any Urban Development Permit for any Authorized Development project on a parcel of land in their respective Permit Areas, outside of those areas depicted as "Exempt Area-Existing Development" on the Baseline Map, unless the Authorized Development project proponent has satisfied the Mitigation Requirement specified in Chapters IV through VI of the NBHCP.

3.1.6 Determination of Compliance. CITY and SUTTER shall ensure that an Authorized Development project proponent has complied with the Mitigation Requirements of Chapters IV through VI of the NBHCP prior to issuing an Urban Development Permit for the Authorized Development project.

3.1.7 Urban Development Permit Conditions. CITY and SUTTER shall include in any Urban Development Permit the on-site Take avoidance, minimization and mitigation measures specified in Chapter V of the NBHCP (the "Conservation Measures") to reduce or eliminate to the extent feasible, the direct and indirect impacts of Authorized Development on the Covered Species and shall include in such Urban Development Permit notice of the need to comply with the requirements of other agencies applicable to the project.

3.1.8 Full Compliance with the NBHCP. The Parties agree that for purposes of CITY's and SUTTER's determination that an Urban Development Permittee is in full compliance with the NBHCP, the Urban Development Permittee must: (1) comply with the Mitigation Requirement, (2) implement the Conservation Measures including any such measures that are required to be conducted prior to commencement of grading and/or construction (e.g., pre-construction surveys, species avoidance measures, allowing USFWS or TNBC to conduct transplantation and relocation of Covered Species, etc.), and (3) implement any measures specified in or provided for in Chapter V of the NBHCP which are required to be implemented after commencement of grading and/or construction, including but not limited to, pre-construction surveys, retention of Swainson's Hawk nesting trees, and elderberry shrub preservation.

3.1.9 Transfer of Mitigation Fees. CITY and SUTTER shall promptly transfer all Mitigation Fees collected on account of Authorized Development to TNBC in accordance with the provisions of Chapter VI of the NBHCP.

3.1.10 Enforcement. CITY and SUTTER shall comply with the NBHCP, this Agreement and the Permits and, following their applicable land use permit enforcement procedures and practices, shall take all necessary and appropriate actions to enforce the terms of the Section 10(a)(1)(B) Permit, the Section 2081 Permit, the NBHCP, and this Agreement as to themselves and all third persons subject to their jurisdiction or control, including Urban Development Permittees, that are subject to the requirements established by the NBHCP, the Permits and this Agreement, specifically including the urban permitting and approval requirements set forth in this Section 3. Provided CITY and SUTTER take actions within their respective authorities to enforce compliance with the terms of the NBHCP, this Agreement and the Permits, a violation of the Permits by such third persons shall not be a basis to suspend or revoke the CITY or SUTTER Permits, unless USFWS or CDFG determine that continuation of the Permits would appreciably reduce the likelihood of the survival and recovery of a Covered Species in the wild or USFWS or CDFG determine that the violation renders CITY or SUTTER unable to implement successfully the NBHCP.

3.1.11 Relationship of TNBC to CITY and SUTTER. To comply with the requirements of the NBHCP, CITY and SUTTER have chosen to implement their Mitigation Requirement and other obligations under the NBHCP, including their reporting and monitoring obligations, in part, through the selection of TNBC as the Plan Operator. The Parties further agree:

(a) In the event that the Service determines pursuant to Section 7.6.1 of this Agreement, or CDFG determines pursuant to Section 7.6.2 that TNBC has violated the terms of the NBHCP, the Permits or this Agreement, such violation shall be considered a failure by CITY and SUTTER to implement their obligations of the Operating Conservation Program under the NBHCP. Provided, however, that if the violation by TNBC related to MAP mitigation acquisition or management requirements, or to other violations resulting from and solely pertaining to a violation of the MAP HCP, the provisions of this subsection shall not apply and neither City nor Sutter shall be considered to have failed to implement their obligations of the Operating Conservation Program under the NBHCP.

(b) Notwithstanding the foregoing in the event USFWS or CDFG make the determination set forth in Section 3.1.11(a), CITY's and SUTTER's Permits shall not be revoked or suspended, if CITY and/or SUTTER implement corrective measures, within the period

specified by the USFWS and/or CDFG, to remedy TNBC's violation which may include, but shall not be limited to (1) replacing TNBC with another conservation entity qualified to serve as a Plan Operator, (2) transferring the Mitigation Lands to CDFG in accordance with Section 3.2.12 of this Agreement, (3) implementation by TNBC of measures specified by the USFWS and/or CDFG as necessary to remediate the violation unless USFWS or CDFG determine that continuation of the Permits would appreciably reduce the likelihood of the survival and recovery of a Covered Species in the wild or USFWS or CDFG determine that the violation renders CITY or SUTTER unable to implement successfully the NBHCP; or (4) implementation by CITY and/or SUTTER of measures necessary to remediate the violation.

(c) Should the USFWS or CDFG determine that CITY or SUTTER has violated their separate obligations under the NBHCP, the Permits or this Agreement, such violation shall not be attributed to TNBC nor shall TNBC's Permits be affected, so long as TNBC continues to properly implement its obligations under the NBHCP with respect to the Mitigation Lands, including its obligations as the Plan Operator.

3.1.12 Certification of Urban Development Permittee. Urban Development Permits (i.e., the grading permit or notice to proceed) issued by CITY and SUTTER shall constitute a certification to the Urban Development Permittee that the Urban Development Permittee has complied with the Mitigation Requirements of the NBHCP and will be allowed to construct, maintain and operate a public or private project which may result in the Incidental Take of the Covered Species consistent with the conditions in the Permits and the Urban Development Permit, on the parcels for which the Urban Development Permit was issued. The issuance of such certifications shall be considered ministerial actions for the purposes of the laws of the State of California.

3.1.13 Public Works Projects. CITY and SUTTER shall apply the Mitigation Requirement and Conservation Measures set forth in this Section and in Chapters IV through VI of the NBHCP to all public works projects in their respective Permit Areas.

3.1.14 Assistance. CITY and SUTTER shall provide staff members to serve on the NBHCP Technical Advisory Committee.

3.1.15 Annual Report of Authorized Development. CITY and SUTTER shall each implement the Annual Report requirements described at Chapter VI of the NBHCP. In addition, at any other time during the Permit terms, CITY and SUTTER, at the request of USFWS or CDFG, shall provide within thirty (30) days, to the Wildlife Agencies additional information relevant to implementation of the NBHCP reasonably available to CITY and SUTTER.

3.1.16 Adaptive Management. CITY and SUTTER agree to abide by and implement all Adaptive Management provisions specified in, and subject to the limitations of, Chapter VI of the NBHCP, including, but not limited to, implementing revisions to management of Mitigation Lands, such as those which may be included in recovery plans for the Covered Species, in response to monitoring results in the Plan Area or to peer-reviewed new scientific information, in response to substantial land use changes in the Basin outside the Permit Areas and system of reserves, and Plan responses to Changed Circumstances.

3.1.17 Overall Program Review/Independent Midpoint Reviews. CITY and SUTTER agree to implement the Overall Program Review and Independent Mid-Point Reviews described in Chapter VI of the NBHCP to evaluate the performance and effectiveness of the NBHCP in achieving its biological goals and objectives.

3.1.18 CITY and SUTTER Liaison. CITY and SUTTER shall each designate a liaison to CDFG and USFWS for communications concerning this Agreement and the NBHCP. The CITY's and SUTTER's liaisons shall be responsible for reporting on their respective agency's implementation of and compliance with this Agreement, the NBHCP, and the Permits. CITY and SUTTER shall notify CDFG and USFWS of the name, address and telephone number of the liaison within 30 days of the Effective Date and shall subsequently notify CDFG and USFWS within 30 days in writing if the name, address or telephone number of the liaison is changed.

3.1.19 Implementation of other NBHCP Components. CITY and SUTTER agree to implement each of the other components of the NBHCP identified in the Plan or this Agreement, specifically including enactment of and periodic revisions to the Mitigation Fee ordinances and Catch Up Fee ordinances or through other funding mechanisms except for the CITY or SUTTER general funds, as described in Chapter VI of the Plan as necessary to ensure the NBHCP is fully funded. The commitments set forth herein shall be subject to the limitation that implementation of such measures is within the CITY's or SUTTER's land use or other legal authority.

3.2 The Natomas Basin Conservancy.

3.2.1 Establish Mitigation. TNBC agrees that it will serve as the Plan Operator under the NBHCP, and will Acquire, locate, operate, manage, and maintain Mitigation Lands in accordance with Chapters IV through VI of the NBHCP and Section 5 of this Agreement. To the extent provided in the NBHCP, such activities shall be carried out in consultation with the TAC and with the approval of the Wildlife Agencies.

3.2.2 Acceptance of Mitigation Fees. TNBC agrees that it will accept Mitigation Fees from CITY and SUTTER and use them exclusively to implement its Acquisition, management, monitoring, reporting and other responsibilities identified in Chapters IV through VI of the NBHCP.

3.2.3 TNBC Land Management; Site Specific Management Plan/NBHCP Biological Monitoring Plans/Surveys. TNBC agrees that it shall be responsible for implementing the following management obligations within its Permit Area:

(a) TNBC, in consultation with the TAC and subject to the approval of the Wildlife Agencies as provided in the NBHCP, shall prepare a Site Specific Management Plan for each Mitigation Land site acquired by TNBC under the Plan. Each Site Specific Management Plan shall be completed in accordance with the timing requirements specified in Chapter IV and VI, of the NBHCP and shall contain each of the elements described in Chapters IV and VI, E. of the NBHCP. TNBC agrees to implement the Site Specific Management Plans in accordance with the NBHCP and upon approval.

(b) TNBC, in consultation with the TAC and subject to the approval of the Wildlife Agencies as provided in the NBHCP, shall prepare an overall Biological Monitoring Plan consistent with the provisions of Chapter VI of the NBHCP. Upon approval, TNBC agrees to implement the overall NBHCP Biological Monitoring Plan in accordance with the NBHCP.

(c) TNBC shall conduct annual surveys of the Covered Species on Mitigation Lands and periodic surveys of the Covered Species throughout the Plan Area as provided in the NBHCP, the Site Specific Management Plans and Plan-wide Biological Monitoring Plan.

3.2.4 Implementation Annual Report. TNBC shall provide the Parties with an Implementation Annual Report by May 1 of each calendar year the NBHCP is in effect. The Implementation Annual Report shall include all of the information identified in Chapter VI of the NBHCP, including the results of the Compliance Monitoring implemented by CITY, SUTTER and TNBC and the Effectiveness Monitoring implemented by TNBC during the prior calendar year, and provide an accounting of all Mitigation Fees collected, all Urban Development Permits Issued, and all Mitigation Lands Acquired.

3.2.5 Implementation Annual Meeting. On or before July 1 of each calendar year each Permittee, USFWS and CDFG shall meet to discuss the Implementation Annual Report submitted by the TNBC, and any concerns, comments or recommendations any of the Parties may have regarding implementation of the NBHCP.

3.2.6 Funding. At least annually, TNBC shall evaluate the adequacy of Mitigation Fees to fund implementation of the NBHCP and shall recommend to CITY and SUTTER adjustments to the Mitigation Fee as necessary to ensure the Plan is fully implemented.

3.2.7 Budgeting and Planning. Prior to the end of each calendar year, the TNBC

shall prepare a budget and a plan for its proposed activities for the forthcoming year and provide copies to each Permittee, CDFG and USFWS.

3.2.8 Successor. With the prior written approval of CITY, SUTTER, USFWS and CDFG, the assets and obligations of TNBC may be transferred to any other non-profit corporation provided that the successor corporation assumes each of the obligations of TNBC as set forth under the NBHCP the TNBC Permit, and this Agreement.

3.2.9 Transfer to CDFG. In the event TNBC is unable to meet its financial obligations and is dissolved, becomes insolvent or goes bankrupt, and no other suitable successor is found, then the ownership of the Mitigation Lands (including conservation easements), accumulated Mitigation Fees and other sums designated for enhancement and maintenance of those lands, shall be transferred to the CDFG or a non-profit association or corporation organized for conservation purposes that is approved by USFWS, CDFG, CITY and SUTTER, which shall hold the Mitigation Lands (including conservation easements) in perpetuity and use the Mitigation Fees for the acquisition and permanent management, operation, maintenance, monitoring, and conservation of the Mitigation Lands in accordance with the NBHCP. In the event the ownership of Mitigation Lands (including conservation easements), accumulated Mitigation Fees and other sums designated for enhancement and maintenance of those lands are transferred to CDFG, CDFG shall have the authority to seek adjustments to the Mitigation Fee consistent with the provisions of the NBHCP.

3.2.10 Operation in Perpetuity. Subject to the requirements of Chapters IV and VI of the NBHCP, Mitigation Lands acquired to meet the NBHCP's Mitigation Requirement shall function in perpetuity to provide Habitat Values for the Covered Species. TNBC shall establish a sufficient endowment from the endowment components of the Mitigation Fees adopted by CITY and SUTTER to permanently sustain management of the Mitigation Lands in accordance with the NBHCP following expiration or termination of the Permits.

3.2.11 Conflicts of Interest. TNBC shall establish and maintain by-laws which include, at a minimum, restrictions on interests in contracts by Board members and employees which are at least as stringent as those applied to government officers and employees by California Government Code §1090 and following, as well as restrictions on participation in decisions and requirements of financial disclosure which are at least as stringent as those applied to government officers and employees by the Political Reform Act of 1974 and any regulations promulgated pursuant thereto.

3.2.12 TNBC Proceedings Open to Public. TNBC agrees that its actions and proceedings shall be conducted in public, in a manner consistent with the Ralph M. Brown Act, California Government Code Sections 54950, et seq. TNBC may conduct closed sessions for real estate negotiations as permitted in its Bylaws, referenced in the NBHCP, as may be amended from time to time ("TNBC Bylaws"). Pursuant to the TNBC Bylaws, the provisions of the Ralph M. Brown Act regarding the disclosure of information with respect to real property transactions (including, but not limited to Government Code Sections 54954.5(b), 54956.8 and 54957.1(a)(1)), whether such transactions are pending or completed, shall not apply. As used herein, "real property transactions" shall include options to purchase or lease, purchases, and leases of real property, as well as farming contracts affecting real property that TNBC has acquired or is in negotiations to acquire.

3.2.13 Implementation of Other NBHCP Components. TNBC shall implement each of the other components of the NBHCP identified in the Plan or this Agreement, including but not limited to the conservation strategies and Take avoidance, minimization and mitigation measures, to the extent such measures fall under its authority and control.

3.3 USFWS.

3.3.1 Oversight. After issuance of each Section 10(a)(1)(B) Permit, the USFWS shall monitor the implementation of such Permit, this Agreement, and each Permittee's activities thereunder, to ensure compliance with the NBHCP, this Agreement and the Permits.

3.3.2 Technical Assistance. Subject to Section 8.12 of this Agreement, the USFWS shall provide staff to serve on the NBHCP Technical Advisory Committee (TAC), shall provide responses to TNBC as required under the NBHCP in a timely manner, and recommend, as appropriate, revisions to the NBHCP under the Plan's Adaptive Management, Overall Program and Independent Mid-Point Reviews, and other applicable provisions, to ensure the viability of the Plan. USFWS shall also make available USFWS staff for informal consultations and meetings with the staffs, boards or councils of the Permittees to assist with implementation of the NBHCP. Consistent with its legal authorities, the USFWS shall cooperate with TNBC in obtaining additional funding from sources including, but not limited to, existing and future state and federal grant programs and bond issues to augment the conservation strategies of the NBHCP. Such funds are in addition to, and not in substitution of, the funding required to implement the NBHCP as described in this Agreement.

3.3.3 Newly Listed Uncovered Species. Coverage and authorization for Take of newly listed species which are not covered under the Permits shall require amendment of the NBHCP and the Permits. Until and unless the Section 10(a)(1)(B) Permits are amended to cover the newly listed species, the Permittees shall adhere to the Changed Circumstances provisions applicable to the listing of a new species as described in Chapter VI of the NBHCP. Modification of the NBHCP as necessary to amend the Permits to authorize take of new species not previously covered by the NBHCP shall be at the discretion of all parties to the NBHCP, this Agreement and the associated Permits.

3.3.4 Effective Date and Issuance of Section 10(a) Permits.

(a) For purposes of the Section 10(a)(1)(B) Permit, as to each Land Use Agency Permittee, the USFWS and TNBC, the Effective Date of this Agreement shall be the date, following execution of this Agreement by that Land Use Agency Permittee, the USFWS and TNBC, that the Section 10(a)(1)(B) Permits are issued to that Land Use Agency Permittee and TNBC.

(b) Following execution of this Agreement, the Service will issue a Section 10(a) Permit to each signatory Permittee authorizing the Take of each listed Covered animal Species incidental to the Covered Activities, subject to and in accordance with the NBHCP, this Agreement and the Permits.

(c) For Covered animal Species not listed as an endangered species or threatened species under ESA as of the Effective Date, the Section 10(a) Permits shall become effective as to each such species concurrent with the listing of the species as a threatened species or endangered species under the ESA. The NBHCP also covers seven (7) plant species. Take of listed plants is not prohibited under the ESA and therefore will not be authorized under the Section 10(a) Permits. Plants are included as Covered Species under the NBHCP and will be listed on the federal permits in recognition of the conservation measures provided for them under the NBHCP. Plant species covered under the NBHCP will also be provided assurances under the federal "No Surprises" rule.

3.3.5 Permit Findings. USFWS, based on the best scientific and commercial data available and the terms and provisions of this Agreement and the NBHCP, has found that with respect to the Covered Species:

(a) The Taking of Covered Species will be incidental to otherwise lawful activities.

(b) Implementation of the NBHCP by the Permittees will, to the maximum extent practicable, minimize and mitigate the impacts of the Incidental Take of Covered Species.

(c) CITY and SUTTER will ensure that adequate funding for the NBHCP will be provided and the NBHCP and this Agreement provide procedures for addressing Changed Circumstances and Unforeseen Circumstances.

(d) The Take of Covered Species in accordance with this

Agreement will not appreciably reduce the likelihood of the survival and recovery of the Covered Species in the wild.

(e) The measures agreed upon by the Permittees and the USFWS for purposes of the NBHCP will be met.

(f) Through this Agreement, the USFWS has received the required assurances that the NBHCP will be implemented.

3.4 CDFG.

3.4.1 Oversight. After issuance of the Section 2081 Permit to CITY and SUTTER, CDFG shall monitor the implementation of the Section 2081 Permit, this Agreement and TNBC's activities thereunder, including but not limited to, the modification, enhancement, operation and maintenance of the Mitigation Lands in order to ensure compliance with this Agreement and consistency with CDFG's trustee agency duties pursuant to CESA, and recommend any amendments to the NBHCP CDFG deems desirable, in the reasonable exercise of its discretion, under the Plan's Adaptive Management provisions as described in Chapter IV, Section E of the NBHCP or the Overall Program Review as described in Chapter IV, Section I of the NBHCP.

3.4.2 Assistance. CDFG shall provide staff to serve on the NBHCP TAC, and shall ensure the availability of its staff for informal consultations and meetings with TNBC and the staffs, boards or councils of the other Parties to this Agreement to ensure the appropriate monitoring of permitted activities which may lead to the Incidental Take of State Protected Species. CDFG will assist TNBC (to the extent authorized by the California Legislature) in obtaining additional funding from sources including, but not limited to, existing and future state and federal grant programs and bond issues to augment the conservation strategies of the NBHCP. Such funds are in addition to, and not in substitution of, the funding required to implement the NBHCP as described in this Agreement.

3.4.3 New Species. CDFG shall make available to Permittees information it has or acquires regarding new sightings or occurrences of any species in the Permit Areas which is state listed as threatened or endangered, is a candidate for listing as threatened or endangered, or is otherwise likely to be state listed, and which is determined to be dependent upon habitat in the Permit Area, if such species is not otherwise described in Exhibit D hereof. Once a year, upon the request of TNBC, CDFG shall provide TNBC with updated information from the California Natural Diversity Data Base ("CNDDB") covering new sightings and occurrences of any species not otherwise described in Exhibit D within the Permit Areas. At the same time, CDFG may propose any amendments to the NBHCP CDFG deems reasonably necessary to preserve Habitat Values for the benefit of such species.

3.4.4 CDFG Land Management. CDFG shall manage in perpetuity, in a manner consistent with the NBHCP, for the conservation of the Covered Species any Mitigation Lands conveyed to it by TNBC pursuant to the terms and provisions of this Agreement.

3.4.5 Effective Date and Issuance of Section 2081(b) Permit.

(a) For purposes of the Section 2081(b) Permit, as to each Land Use Agency Permittee, CDFG and TNBC, the Effective Date of this Agreement shall be the date, following execution of this Agreement by that Land Use Agency Permittee, CDFG and TNBC, that the Section 2081(b) Permits are issued to that Land Use Agency Permittee and TNBC.

(b) Following execution of this Agreement, CDFG will issue a Section 2081(b) Permit or modification to an existing Permit to each Permittee authorizing the Take of each Covered Species incidental to Covered Activities, subject to and in accordance with the NBHCP and this Agreement.

(c) As to each Covered Species that is not currently listed under CESA, the Incidental Take Authorization under the Section 2081(b) Permits shall become effective consistent with Section 6.2.4 of this Agreement.

3.4.6 Section 2081(b) Permit Findings.

CDFG, based on the best scientific and other information that is reasonably available, and the terms and provisions of this Agreement and the NBHCP, has found that with respect to the Covered Species:

(a) Incidental Take. The authorized Take of Covered Species will be incidental to an otherwise lawful activity.

(b) Minimize and Fully Mitigate. The impacts of the authorized Take will be minimized and fully mitigated.

(c) Roughly Proportional. The measures required to minimize and fully mitigate the impacts of the authorized Take will be roughly proportional in extent to the impact of the authorized Take of Covered Species.

(d) Applicant's Objectives. The measures required to minimize and fully mitigate the impacts of the authorized Take will preserve Permittee objectives to the greatest extent possible, consistent with the obligation to minimize and fully mitigate the impacts of the authorized Take.

(e) Capable of Successful Implementation. All required measures will be capable of successful implementation.

(f) Adequate Funding. Permittees have ensured adequate funding to implement the required minimization and mitigation measures, and for monitoring compliance with, and effectiveness of, those measures.

(g) No Jeopardy. The issuance of the Section 2081(b) Permits will not jeopardize the continued existence of any Covered Species.

(h) Unlisted Species. Covered Species that are not currently listed as threatened or endangered under CESA have been treated in the NBHCP as if they were listed, and the NBHCP identifies measures to minimize and fully mitigate the impacts of the authorized Take of such unlisted species. The findings in this Section 3.4.5 apply to all Covered Species, including Covered Species that are not listed.

4 MITIGATION

4.1 Mitigation Lands. Mitigation Lands will be established and managed pursuant to the NBHCP.

4.2 Respective Permit Areas. Developers of all lands within the respective Permit Areas that are developed pursuant to an Urban Development Permit, shall provide mitigation pursuant to the NBHCP for the direct, indirect and cumulative impacts of development upon Covered Species and their habitat. CITY and SUTTER shall require an Urban Development Permittee to provide mitigation for the conversion of land to Authorized Development in the respective Permit Areas, in conformity with the NBHCP and the following sections.

4.3 Existing Development Exempt. Parcels of land within the respective Permit Areas that are shown as "Exempt Area-Existing Development" and "Development Subject to 1997 HCP" on the Baseline Maps depicted on Exhibits B and C of this Agreement are not covered by the NBHCP, this Agreement, or the Permits, provided, however, that nothing in this Agreement shall be construed to exempt such existing development from any applicable requirements of the ESA or CESA.

4.4 Mitigation Ratio. Mitigation for the conversion of land in the respective Permit Areas to Authorized Development will be required at the ratio of one half (½) acre of land protected or conserved for every one (1) acre of land converted to Authorized Development (the "Mitigation Ratio").

4.5 Calculation of Mitigation Requirement for Authorized Development Projects. The Mitigation Requirement for each public or private project is determined by applying the Mitigation Ratio to the land area converted to Authorized Development (the "Mitigation Requirement"). The

land area converted to Authorized Development is determined as follows:

(1) For both private and public development projects, except as provided in (2) and (3) below, the gross area of a particular project is considered "land area converted to Authorized Development" whether the entire project is graded or not. The fees payable shall be calculated by multiplying the Mitigation Fees (in dollars per acre) times the land area converted to Authorized Development, prorated for fractional acres.

(2) For private development projects, a separate parcel or portion of a parcel which will be transferred to a public agency for a public use consisting of a park, school or other public building, is exempt. The Mitigation Requirement for such uses must be satisfied when the parcel of public use property is developed by the respective public agency owning the parcel. With respect to other lands designated for public use, the following criteria will apply: (a) Roads: where a road is included within the respective Land Use Agency's finance plan for purposes of financing, the land transferred or to be transferred by fee or easement to the agency for the road project is excluded; where a road is not one which is financed pursuant to the agency's finance plan, but is to be paid for entirely by the private landowner or developer of the project, even though ultimately it will be dedicated to the agency, the land transferred or to be transferred to the agency for the road is included; (b) Utilities: where the landowner or developer is required to transfer to the respective Land Use Agency or another public entity (e.g., Sacramento Municipal Utility District), by easement or fee, land for a structure such as a pump station, outfall station, or similar structure, such land is excluded; where the landowner or developer is required to transfer to the agency non-exclusive easements for utility lines (water lines, sewer lines, and similar lines), the land covered by such easements is included; if the easement is exclusive, the land covered by the easement is excluded, but the transferee agency will be required to provide mitigation upon development of the transferred parcel. With respect to each parcel or portion of a parcel exempted or excluded pursuant to this section, the Mitigation Requirement shall be satisfied by CITY or SUTTER at the time such parcel or portion of land is converted to Authorized Development.

(3) For both private and public projects, excluded is any parcel or portion of the parcel approved as Mitigation Land by TNBC and the Wildlife Agencies in accordance with the NBHCP and which will be transferred in fee to TNBC or will be encumbered by a Conservation Easement in favor of TNBC for purposes of satisfaction of the Mitigation Requirement for the particular development project.

4.6 Satisfaction of Mitigation Requirement. The Land Use Agency Permittes each retains authority to require an Urban Development Permittee/landowner to satisfy the Mitigation Requirement by: (1) payment of the Mitigation Fees; or (2) subject to the approvals required by the NBHCP, transfer of Mitigation Land to TNBC, together with payment of all components of the Mitigation Fee except the Land Acquisition Fee as specified in the NBHCP. Credit against the Land Acquisition Fee component of the Mitigation Fees is based on the number of acres of land being transferred and is not based on cost or perceived value of the land transferred. Where a Land Use Agency Permittee elects to require an Urban Development Permittee to transfer land to TNBC, (1) TNBC and the Wildlife Agencies must approve the transfer of each parcel of Mitigation Land considering its location, proximity to urban uses and roads, current land condition, and all other factors specified in the NBHCP, and (2) such land must be dedicated prior to authorization by the applicable Land Use Agency Permittee for dissturbance of the land resulting from the associated Urban Development Project. If the amount of land transferred to TNBC is less than the Mitigation Land required for the public or private project, the landowner is obligated to pay the outstanding balance of the Land Acquisition Fee component of the Mitigation Fees. If the amount of land transferred to TNBC is greater than the amount of Mitigation Land required for the development project, the landowner may choose one of the following credit options: (i) receive credit from the excess amount of land toward required Mitigation Land under the NBHCP for future Authorized Development of property owned by the landowner; or (ii) transfer credit from the excess amount of

land toward required Mitigation Land under the NBHCP for Authorized Development of property owned by another specified landowner. If either credit option is chosen, then prior to the transfer of Mitigation Land being finalized, the landowner shall inform CITY or SUTTER, as appropriate and TNBC in writing of the choice to receive or transfer credit and to whom the credit is to be transferred. Any transfer of fee title to lands or a Conservation Easement therein in order to satisfy the Mitigation Requirement shall be accomplished by a deed or grant of a conservation easement to TNBC in a form acceptable to USFWS and CDFG, in recordable form on or before issuance of an Urban Development Permit (i.e., a building permit, grading permit, or other permit which allows a disturbance of the surface of the earth for the public or private project). All land proposed to be transferred to TNBC in satisfaction of the Mitigation Requirement must meet the acquisition criteria specified in the NBHCP.

4.7 Jurisdictional Wetlands. Nothing in this Agreement shall relieve any Urban Development Permittee desiring to discharge any fill or other material into any jurisdictional wetlands, of any requirement to obtain a Clean Water Act Section 404 Permit from the U.S. Army Corps of Engineers and comply with all the terms and conditions thereof. Take of Covered Species related to jurisdictional wetlands by the Urban Development Permittee shall be authorized through the incidental take permits issued to CITY and SUTTER and shall be subject to the requirements of the NBHCP.

4.8 Rivers, Streams or Lakes. Nothing in this Agreement shall relieve any Urban Development Permittee desiring to substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated by the CDFG, or use any material from the streambeds, of any requirement to comply with Fish and Game Code, Division 2, Chapter 6, commencing with Section 1600 (concerning Streambed Alteration Agreements). This Agreement and implementation of the NBHCP are intended to satisfy only site-specific mitigation requirements for impacts of taking Covered Species as a result of an Authorized Development project which may be imposed under Chapter 6 of the California Fish and Game Code, with the exception of mitigation specifically directed at those vernal pool species included on the list of Covered Species.

4.9 Funding for Operating Conservation Program. CITY and SUTTER shall fund the Operating Conservation Program in accordance with Chapter VI of the NBHCP.

4.9.1 Mitigation Fees. Where an Urban Development Permittee selects payment of Mitigation Fees as its method of satisfying the Mitigation Requirement for the public or private project, the provisions of Section 4 shall govern the calculation and collection of such fees, and such Urban Development Permittee shall pay the Mitigation Fees as so calculated. The amount payable for the Mitigation Fee shall be the amount specified by ordinance or resolution adopted by the governing body of the CITY or SUTTER, including but not limited to the "catch-up fee" ordinances or other ordinances or resolutions adopted prior to or after the Effective Date.

4.9.2 Adjustments to the Mitigation Fee for Purposes of Funding the Operating Conservation Program Other than Changes to the Managed Marsh Component. Notwithstanding any other provision of this Agreement, upon request of TNBC or upon the written request of USFWS or CDFG as supported by documented evidence in the form of a written report and technical analysis, and as otherwise necessary, CITY and SUTTER shall review, and at the discretion of each, adjust the Mitigation Fees to take into account costs of land acquisition and TNBC operations, to maintain or meet the Mitigation Ratio specified in Section 4.4 of this Agreement, and to meet TNBC management, monitoring, adaptive management, or related costs required to fund the Operating Conservation Program as set forth in Chapters IV, V and VI of the NBHCP. The decision to adjust the Mitigation Fees may include but is not limited to consideration of the following factors: (1) the market price of land being acquired as Mitigation Land; (2) the necessity to maintain the 0.5 to 1 Mitigation Ratio; (3) the need to fund ongoing and permanent management and monitoring costs in accordance with the NBHCP; (4) the necessity to ensure the

effectiveness of the NBHCP's Operating Conservation Program; and (5) the availability of other sources of revenues, including the sale of hunting rights on Mitigation Lands, proceeds from the cultivation of rice on Mitigation Lands and other funds and grants.

(a) Notwithstanding the foregoing and in accordance with, and subject to the limitations of, Chapter VI of the NBHCP, CITY or SUTTER shall be obligated to increase the Mitigation Fees to fund recommended changes to the Operating Conservation Program resulting from future recovery plans, monitoring results from the Plan Area or peer-reviewed new scientific information relevant to the Plan only when such recommendations:

(1) Relate to the physical management of Mitigation Lands;

(2) Would improve the effectiveness of the NBHCP's Operating Conservation Program by identifying relevant new information, approaches, techniques, or species protection needs;

(3) Can be implemented within the NBHCP Plan Area; and

(4) Fit within the overall intent and framework, are consistent with the NBHCP's biological goals and objectives and would not exceed the established Mitigation Ratio of the NBHCP; and

(5) Would not substantially sacrifice habitat values for Covered Species that are not addressed by the recovery plan, the monitoring results or other peer-reviewed new scientific information.

(b) Adjustment of the Mitigation Fees pursuant to this subsection is independent of adjustments made on account of inflation/deflation pursuant to Section 4.9.4 of this Agreement. Nothing in this Agreement shall be construed to diminish or otherwise affect the discretionary authority of the Land Use Agencies with respect to fee adjustments under this Section 4.9.1.

4.9.3 Adjustments to the Mitigation Fee for purposes of Funding the Changes to the Managed Marsh Component. Upon written notification supported by documented evidence in the form of a written report and technical analysis by USFWS or CDFG to CITY and SUTTER of the adoption of a future Giant Garter Snake Recovery Plan, the availability of monitoring results from the Plan Area, or peer-reviewed new scientific information indicating an adjustment in the enhancement and management activities for managed marsh as specified in Chapter VI of the NBHCP, the CITY and SUTTER shall review, and at the discretion of each, adjust the Mitigation Fees to take into account increased costs of TNBC's enhancement and management of a higher proportion of managed marsh on Mitigation Lands acquired after adoption of the final Giant Garter Snake Recovery Plan by the USFWS, the availability of peer-reviewed new scientific information or monitoring results from the Plan Area indicate an adjustment in the enhancement and/or management activities for managed marsh is warranted as specified and subject to the limitations contained in Chapter VI of the NBHCP. The obligation to adjust the Mitigation Fees shall be subject to the following limitations set forth in Chapter VI of the NBHCP:

(b) the obligation to increase the Mitigation Fees shall be applied prospectively to future Mitigation Lands acquired after adoption of the Recovery Plan, in response to monitoring results from the Plan Area or in response to peer-reviewed new scientific information.

(c) if the Recovery Plan, monitoring results collected from the Plan Area, or peer-reviewed new scientific information indicate a higher proportion of managed marsh (1) will improve the effectiveness of the NBHCP's Operating Conservation Program to meet its biological goals and objectives, (2) is beneficial to the snake, and (3) will not adversely affect any other listed Covered Species.

(d) the maximum levels of managed marsh which may apply to future Mitigation Land acquisitions which occur after the results of monitoring from the Plan Area or

peer-reviewed new scientific information, or Giant Garter Snake Recovery Plan adoption shall not exceed seventy-five percent (75%) of such Mitigation Lands.

Adjustment of the Mitigation Fees pursuant to this subsection is independent of adjustments made on account of inflation/deflation pursuant to Section 4.9.4 of this Agreement. (Nothing in this Agreement shall be construed to diminish or otherwise affect the discretionary authority of the Land Use Agencies with respect to fee adjustments under this Section 4.9.2.)

4.9.4 Fee Adjustments for General Inflation. On or before January 1 of each year, CITY and SUTTER shall review and, at the discretion of each, adjust the dollar amount of the Mitigation Fees (as adjusted from time to time pursuant to Section 4.4.1), to take into account the effects of inflation/deflation generally. Adjustments will be calculated as follows: the current Mitigation Fee shall be multiplied by the index for October of the year prior to January 1, divided by the index for October of the preceding year [e.g., 2003 Fee = 2002 Fee x (October, 2002 CPI Index/October, 2001 CPI Index)]. For purposes of making this adjustment, the index utilized shall be the Consumer Price Index for All Urban Consumers, All Items, San Francisco–Oakland–San Jose (1982-1984=100), as published by the U.S. Department of Labor, or its successor. Technical adjustments made pursuant to this Section 4.9.4 shall be independent of, in addition to and not a part of adjustments to, the Mitigation Fee adjustments made pursuant to Section 4.9.2 and 4.9.3.

4.9.5 Failure to Adjust Mitigation Fees. CITY and SUTTER acknowledge that the failure of either CITY or SUTTER to adjust the Mitigation Fees as necessary to maintain the Mitigation Ratio and ensure implementation of each of the other requirements of the NBHCP identified in Chapters IV through VI of the NBHCP and/or in this Section 4 may result in suspension or revocation of their respective Permits as set forth in Section 7.6 of this Agreement.

5 Mitigation Lands

5.1 Location of Mitigation Lands. TNBC shall locate Mitigation Lands in accordance with Chapters IV through VI of the NBHCP and this Section.

5.2 Setbacks and Buffers. All Mitigation Lands Acquired by TNBC shall conform to the buffer and setback requirements set forth in Chapters IV and VI of the NBHCP.

5.3 In-Basin Acquisition. All Mitigation Lands shall be acquired within the Natomas Basin as provided in the NBHCP.

5.4 Coordinating Mitigation Land Acquisition With Agency Acquisitions. Prior to the Acquisition of any parcel of Mitigation Land, TNBC shall provide written notice to the USFWS, CDFG, and both CITY and SUTTER of its intent to Acquire such lands. USFWS and CDFG agree that they will not knowingly interfere or compete with TNBC for the Acquisition or control of such lands and that they will consult with TNBC in formulating any Acquisition plans. As to those lands identified by USFWS or CDFG for acquisition, TNBC, likewise, shall not knowingly interfere with or compete with the affected agency for acquisition or control until TNBC is notified by that agency that it is no longer pursuing acquisition or control of the lands.

5.5 Timing of Mitigation Land Acquisition. TNBC shall comply with the requirements of the NBHCP relating to the Acquisition of Mitigation Lands in advance of approval of Authorized Development set forth in Chapter VI of the NBHCP. The Parties further agree that in order to ensure that Mitigation Lands are Acquired in an amount sufficient to meet the Mitigation Requirement that attaches to all Authorized Development under the NBHCP, TNBC shall establish a 200 acre cushion of Mitigation Lands prior to the approval of any Authorized Development by CITY or SUTTER under the Plan and shall maintain the 200 Acre Mitigation Land cushion until the approval of the last 400 acres of Authorized Development under the Plan. CITY, SUTTER and TNBC shall implement this requirement in accordance with the NBHCP, as follows.

(a) No Urban Development Permits for Authorized Development shall be issued by CITY or SUTTER after September 30 of each calendar year until TNBC notifies CITY and SUTTER that it has Acquired Mitigation Lands which equal the number of acres necessary to meet the Mitigation Requirement attached to all prior Urban Development Permits issued by CITY and SUTTER plus an additional 200 acres of Mitigation Land.

(b) Because TNBC is responsible for Acquiring Mitigation Lands for Planned Development, TNBC will credit mitigation fees collected under the Metro Air Park HCP (MAP HCP) along with all Mitigation Fees collected by CITY and SUTTER for Authorized Development. The collection of Mitigation Fees for Planned Development will be credited against the Mitigation Lands Acquired by TNBC, in chronological order, with priority given to the oldest project among those approved under the MAP HCP and the CITY's or SUTTER's Permits to have paid Mitigation Fees.

5.6 Acquisition of 400 and 2,500-Acre Blocks. TNBC shall comply with those provisions of the NBHCP relating to Acquisition of Mitigation Lands to ensure that the Mitigation Lands are consolidated in minimum 400-acre habitat blocks and at least one 2,500 acre habitat block prior to the expiration of the Permits. The 400 acre minimum block requirement and the 2,500 acre minimum block requirement shall be applied in the aggregate to all Permittees and to all other approved HCPs in the Natomas Basin that are based on the NBHCP, so that the plans as a whole must achieve the identified habitat block consolidation requirements set forth in the NBHCP upon Plan completion. Notwithstanding the above, CITY and SUTTER each retain the independent obligation to provide 400 acre minimum blocks and one 2,500 acre minimum block prior to the date their respective Permits expire in the event the other Permittees cease participation in the NBHCP, or in the event the Potential Permittees choose not to participate in the NBHCP. None of the provisions contained herein shall be construed to prohibit the USFWS or CDFG from authorizing Mitigation Land acquisitions that do not comply with the minimum 400-acre minimum block size in the event that TNBC identifies potential Mitigation Lands which otherwise provide opportunities for the preservation of important biological resources.

5.7 Accounting for Mitigation Lands

5.7.1 Managed Marsh. Mitigation Lands acquired and converted to and managed as seasonal or perennial marsh, and existing marsh lands acquired by TNBC and managed as seasonal or perennial marsh, will count fully toward the 0.5:1 Mitigation Ratio described in Section 4.4 of this Agreement.

5.7.2 Rice Land. Mitigation Lands in current rice production as Rice Lands will count fully toward the 0.5:1 Mitigation Ratio described in Section 4.4 of this Agreement.

5.7.3 Uplands. Mitigation lands providing upland habitats will count fully towards the 0.5:1 Mitigation Ratio described in Section 4.4 of this Agreement.

5.7.4 Proportion of Mitigation Lands as Marsh. Within three years of the approval of a Site Specific Management Plan a minimum of 25 percent of the Mitigation Lands must be in managed marsh as specified in the NBHCP. Thereafter, a minimum of 25 percent of the Mitigation Lands shall be in managed marsh until and unless that amount is increased up to a maximum of 75 percent of the Mitigation Lands in accordance with Section 4.9.3 of this Agreement and Chapter VI

of the NBHCP. Pursuant to Section 4.9.3 of this Agreement and Chapter VI of the NBHCP, any increase in the amount of Mitigation Lands required to be in managed marsh shall apply only to Mitigation Lands Acquired to satisfy the Mitigation Requirement for Authorized Development which are acquired after the USFWS or CDFG provide written notice and its accompanying documentation of Recovery Plan adoption, the availability of monitoring results from the Plan Area, or the availability of credible scientific information collected in the Plan Area. Provided the Wildlife Agency's requested increase in managed marsh complies with Chapter VI of the NBHCP, the failure of TNBC to adopt the increase in managed marsh as requested by either Wildlife Agency shall trigger a reevaluation of the Plan and possible suspension or revocation of the CITY and SUTTER's Permits as set forth under Section 7.6 of this Agreement.

5.8 Conservation Measures. CITY and SUTTER shall include in each Urban Development Permit the Conservation Measures provided in Chapter V of the NBHCP.

6 ASSURANCES

6.1 USFWS

6.1.1 No Surprises Assurances.

(a) Unforeseen Circumstances. As provided in 50 C.F.R. 17.3, the term "Unforeseen Circumstances" shall mean changes in circumstances affecting a species or geographic area covered by the NBHCP that could not reasonably have been anticipated by the plan developers and USFWS at the time of the Plan's negotiation and development, and that results in a substantial and adverse change in the status of a Covered Species.

(1) "No Surprises" Assurances. Pursuant to the No Surprises Rule at 50 C.F.R. Sections 17.3, 17.22(b)(5) and 17.32(b)(5), and provided that CITY, SUTTER and TNBC are properly implementing the NBHCP, USFWS shall not require CITY, SUTTER or TNBC to provide additional land, water or other natural resources, or financial compensation or additional restrictions on the use of land, water, or other natural resources beyond the level provided for under the NBHCP, this Agreement and the Permits with respect to Covered Activities under the Permits without the consent of CITY or SUTTER. However, nothing in this Section or in the Assurances Rule shall be interpreted: (1) to restrict the authority of USFWS to take appropriate action under the ESA or applicable regulations to ensure that the NBHCP is properly implemented in accordance with this Agreement; (2) to apply to future Adaptive Management modifications for Mitigation Lands that are deemed necessary or appropriate by the USFWS or CDFG as determined in accordance with Chapter VI of the NBHCP and in consultation with CITY, SUTTER and TNBC, to respond to the results of monitoring in the Plan Area, or to new scientific information relevant to the NBHCP, (3) to apply to future modifications to the NBHCP as a result of future recovery plans as determined in accordance with Chapter VI of the NBHCP, (4) to apply to the NBHCP responses to Changed Circumstances identified in Chapter VI of the NBHCP, or (5) to apply to changes anticipated to occur as a result of the Urban Development activities anticipated by the Section 10(a)(1)(B) Permit, Section 2081(b) Permit, or as otherwise approved by the USFWS, provided that such actions, modifications and changes comply with the limitations and restrictions set forth in Chapter VI of the NBHCP. If USFWS makes a finding of unforeseen circumstances, during the period necessary to determine the nature and location of additional or modified mitigation, CITY, SUTTER and TNBC will avoid contributing to appreciably reducing the likelihood of the survival and recovery of the affected species and ensure that third persons under their control that are carrying out Covered Activities avoid contributing to appreciably reducing the likelihood of the survival and recovery of the affected species.

(2) Unforeseen Circumstances Finding. In the event that USFWS believes that Unforeseen Circumstances may exist in accordance with the "No Surprises" rule, it shall notify CDFG, CITY, SUTTER and TNBC in writing of the applicable specific facts described in Section 6.1.1 above. In the notification, USFWS shall clearly document the basis for

the proposed finding regarding the existence of Unforeseen Circumstances in accordance with the requirements of 50 C.F.R. § 17.22(b)(5)(iii)(C) and 17.32(b)(5)(iii)(C). Within fifteen (15) days of receiving such notice, CITY, SUTTER and TNBC, USFWS and CDFG shall meet to consider the facts cited in the notice and potential changes to the NBHCP's Operating Conservation Program or management and operation of the Mitigation Lands. Pursuant to 50 C.F.R. § 17.22(b)(5)(iii)(C) and 17.32(b)(5)(iii)(C), USFWS shall make an Unforeseen Circumstances finding based on the best scientific evidence available, after considering any responses submitted by any other Parties pursuant to this section, and USFWS shall have the burden of demonstrating that Unforeseen Circumstances exist.

(3) Effect of Unforeseen Circumstances Finding. Pursuant to 50 C.F.R. 17.22(b)(5) and 17.32(b)(5), in the event that USFWS makes a finding of Unforeseen Circumstances and additional conservation and mitigation measures are deemed necessary to respond to such Unforeseen Circumstances, USFWS may require additional measures from CITY, SUTTER or TNBC where the NBHCP is being properly implemented, but only if such measures are limited to modifications within the Mitigation Lands and the NBHCP's Operating Conservation Program for the affected species and maintain the original terms of the NBHCP to the maximum extent possible. Additional conservation and mitigation measures shall not involve the commitment of additional land, water or other natural resources without the consent of CITY and SUTTER.

(b) Changed Circumstances.

(1) Changed Circumstances Defined. As provided in 50 C.F.R. 17.3, the term "Changed Circumstances" means changes in circumstances affecting a species or geographic area covered by the NBHCP that can reasonably be anticipated by CITY, SUTTER or TNBC and that can be planned for in the NBHCP (e.g. the listing of a new species, or a fire or other natural catastrophic event in areas prone to such events.) Changed circumstances and planned responses to those circumstances are described in Chapter VI of the NBHCP.

(2) Permittee-Initiated Response to Changed Circumstances. CITY, SUTTER or TNBC, as appropriate, will immediately notify USFWS and all other Permittees upon learning that any of the Changed Circumstances listed in Chapter VI of the NBHCP has occurred, and shall provide written notice within seven (7) days**.** Permittees shall modify their activities and shall require third persons under the Permittees' control to modify their activities, as appropriate, in accordance with Chapter VI of the NBHCP, to the extent necessary and feasible to minimize and mitigate the effects of the Changed Circumstances. CITY, SUTTER and TNBC and will report to USFWS on their actions. Such modifications will be initiated without awaiting notice from USFWS. Such changes are provided for in the NBHCP, and hence do not constitute unforeseen circumstances or require amendment of Permits or the NBHCP.

(3) USFWS-Initiated Response to Changed Circumstances. If USFWS determines that Changed Circumstances have occurred and that CITY, SUTTER or TNBC have not responded in accordance with Chapter VI of the NBHCP, the USFWS in coordination with CDFG will so notify CITY, SUTTER and TNBC and, as appropriate, direct them to make the required changes. Within thirty (30) days after receiving such notice, CITY, SUTTER or TNBC, as appropriate, will make the required changes and report to USFWS on their action. Such changes are provided for in the NBHCP, and hence do not constitute unforeseen circumstances or require amendment of Permits or of the NBHCP.

6.1.2 Migratory Bird Treaty Act (MBTA). If during the term of the Section 10(a)(1)(B) Permits, an avian Covered Species which is protected under the MBTA is listed under the ESA, the Section 10(a)(1)(B) Permits will also constitute Special Purpose Permits under 50 C.F.R. Section 21.27 for the "take" (for purposes of this Section, as that term is understood under the MBTA) of those Covered avian Species which are listed as threatened or endangered under the ESA and which are also protected by the MBTA. The take of such species in conjunction with any Authorized Development Project, in accordance with the terms of this Agreement, the NBHCP and

CITY's, SUTTER's or TNBC's Section 10(a)(1)(B) Permits, will not be in violation of the MBTA. Such Special Purpose permits shall be valid for a period of three years from the date the species is listed under the ESA provided that City's, Sutter's, or TNBC's Section 10(a)(1)(B) Permit, as applicable, remains in effect for that period. Such Special Purpose Permit will authorize take of any avian Covered Species listed under the ESA during the three year Special Purpose Permit term. Such Special Purpose Permit shall be renewed as to each Permittee, provided that each Permittee continues to fulfill its obligations under this Agreement. Each such renewal shall be valid for the maximum period of time allowed by 50 C.F.R. Section 21.27 or its successor at the time of renewal.

6.1.3 Beneficial Effects With Respect to Future Listings. To the extent permitted by the ESA and consistent with the provisions of the NBHCP, the USFWS shall consider the NBHCP and this Agreement in any future determination by the USFWS with regard to the listing of one or more of the currently unlisted Covered Species as an endangered species or threatened species pursuant to the ESA.

6.1.4 Critical Habitat. The USFWS further agrees that it will consider the NBHCP in its preparation of any proposed designation of critical habitat concerning any Covered Species and agrees that, consistent with 50 C.F.R. 424.12, the NBHCP incorporates those special management considerations necessary to manage the Covered Species and their habitats in a manner that will provide "for the conservation of the species involved" within the CITY, SUTTER's and TNBC's respective Permit Areas in the Natomas Basin. Consistent with the No Surprises Rule set forth in Section 6.1.2(a), in the event that a critical habitat designation is made for any Covered Species and upon a determination that CITY, SUTTER and TNBC are properly implementing the NBHCP, no additional mitigation in the form of land, land restrictions or financial compensation, beyond that required by the NBHCP, shall be required of any Permittee in connection with Urban Development in its Permit Area as a result of such critical habitat designation without the consent of that Permittee.

6.1.5 ESA Listing of Currently Unlisted Covered Species. In the event that one or more of the Covered animal Species that are not currently listed as an endangered species or threatened species are so listed pursuant to the ESA, the Section 10(a)(1)(B) Permit shall become effective to permit the Incidental Take of such species in connection with Urban Development within each Permittee's Permit Area as of the date the species is listed provided the CITY, SUTTER and TNBC are properly implementing the NBHCP. The Parties expressly acknowledge that it is the intent of this Agreement that the Mitigation Lands will be administered so as to conserve and enhance the habitat values for all listed and unlisted Covered Species reasonably expected to be found in Natomas Basin , to the extent provided for in the NBHCP.

6.2 CDFG

6.2.1 CESA Compliance. CDFG shall consider adherence to the terms of this Agreement to be compliance with the CESA and the California Native Plant Protection Act for the impacts of Authorized Development on State Protected Species in the Permit Area. Take of Fully Protected Species is not authorized by this Agreement.

6.2.2 Adequate Mitigation Under CESA. CDFG shall consider adherence to the terms of the Section 2081 Permit, the NBHCP and this Agreement to minimize and fully mitigate the impacts associated with the Incidental Take of State Protected Species in the Permit Areas as authorized by the Section 2081 Permit and this Agreement pursuant to CESA.

6.2.3 Assurances. Except as otherwise required by law, no further mitigation from Urban Development Permittees and/or CITY and SUTTER consisting of land, additional land restrictions, or financial compensation beyond that described herein and provided for in the NBHCP, will be required by CDFG to address the impacts of Authorized Development within the respective Permit Areas on the State Protected Species, Covered Species which become listed in the future as State-protected species, or their habitats pursuant to the CESA.

6.2.4 CESA Listing of Currently Unlisted Covered Species. In the event that one or more of the Covered Species that are not State Protected Species are listed as an endangered species or threatened species or candidate species pursuant to the CESA ("Additional State Protected Species"), the Section 2081 Permit shall become effective to permit the Incidental Take of such species in connection with Authorized Development within each Permittee's Permit Area as of the date the species is accepted and designated as a candidate species pursuant to California Fish and Game Code section 2074.2, upon confirmation by CDFG that substantial evidence demonstrates that the Section 2081 Permit will continue to meet the standards in California Fish and Game Code Section 2081(b) and Title 14 of the California Code of Regulations, Section 783,4 for the Additional State Protected Species. In the event CDFG determines that such standards will not be met, and the Section 2081 Permit does not become effective upon the designation of an Additional State Protected Species as a candidate, threatened, or endangered species under CESA, CDFG shall accept and give due consideration to the minimization and mitigation measures in the NBHCP and this Agreement in support of an application for a permit amendment or for a separate Section 2081 Permit authorizing Incidental Take of any such Additional State Protected Species. CDFG shall make reasonable efforts to review and process the application for an amendment to the Section 2081 Permit or a new Section 2081 Permit to authorize Incidental Take of an Additional State Protected Species to ensure, to the extent consistent with CESA, that the Incidental Take authorization is effective at the time the Covered Species is accepted and designated as a candidate species under CESA.

(a) The Parties expressly acknowledge that it is the intent of this Agreement that the Mitigation Lands will be administered so as to enhance their Habitat Values for all the Covered Species reasonably expected to be found in the Permit Areas.

(b) To the extent permitted by the CESA, the CDFG shall consider the NBHCP and this Agreement in any future determination by the CDFG with regard to the listing of one or more of the currently unlisted Covered Species as an endangered species or threatened species pursuant to the CESA.

6.2.5 Changed Conditions. For the purposes of this Agreement, the term "Changed Conditions" shall have the same meaning as expressed in CESA and its related implementing regulations in Title 14 of the California Code of Regulations, commencing with section 783.0. Prior to making a finding of Changed Conditions, CDFG shall provide notice to CITY, SUTTER, TNBC and other Parties hereto of any proposed amendments to this Agreement which CDFG proposes to remedy the Changed Condition. CDFG shall, to the extent feasible, meet with CITY, SUTTER, TNBC, and other Parties hereto at least ninety (90) days prior to making a finding of Changed Conditions to provide such parties with an opportunity to submit their comments and suggested revisions to the proposed amendment.

6.3 Limits on Future Revisions to NBHCP. The Parties acknowledge that the NBHCP expressly provides for revisions to the Plan's Operating Conservation Program and Mitigation Lands as a result of monitoring results collected from the Plan Area, peer-reviewed new scientific information, or future recovery plans for the Covered Species, as part of the Adaptive Management program, in response to Changed Circumstances and for any other cause identified in Chapter VI of the NBHCP, provided that such revisions comply with Chapter VI of the NBHCP. Such revisions are provided for under the Plan and are therefore not subject to the restrictions on additional Mitigation contained in USFWS's No Surprises Rule or agreed to by CDFG, nor do such revisions require amendment of the Plan or the Permits. Notwithstanding the above, such revisions shall be subject to the following limitations unless such limitations are waived in writing by CITY, SUTTER and TNBC.

(a) The modifications shall not require more than 75 percent of the Mitigation Lands to be converted to or maintained as managed marsh; and

(b) The modifications shall not require the Mitigation Ratio to be greater than 0.5 acre mitigation to 1.0 acre development.

(c) The modifications shall comply with the requirements, limitations and restrictions specified in Chapter VI of the NBHCP.

6.4 Reservation of Rights Re: Subsequent Listing of Species. This Agreement shall not be construed as a waiver of any rights or objections that any of the Parties hereto or Urban Development Permittees may have with respect to the proposed listing of any Candidate Species under the ESA or CESA or of any of the other Covered Species described in this Agreement. The Permittee and the Urban Development Permittees reserve their right to oppose any formal listing of any Candidate Species or other Covered Species pursuant to the ESA or CESA. Likewise, nothing in this Agreement is intended, nor shall be construed to limit the authority of USFWS or CDFG to enforce or otherwise carry out their respective responsibilities under the federal or state Endangered Species Acts and other applicable federal and state laws.

6.5 Land Use Authority. Nothing in the NBHCP or in this Agreement shall be interpreted or operate in a manner that expressly or impliedly diminishes or restricts the local land use authority of CITY and SUTTER. Notwithstanding the foregoing sentence, CITY and SUTTER acknowledge that they have chosen to implement several of the commitments made by them under the NBHCP through the exercise of their respective land use authorities. Therefore, a failure of CITY or SUTTER to exercise their land use authorities in a manner consistent with their obligations under the NBHCP could compromise the effectiveness of the Plan, would trigger a reevaluation of the Plan and their respective Permits and could result in suspension or revocation of such Permits as set forth in Section 7.6 of this Agreement.

6.6 No Liability. All Parties hereto agree that under no circumstances shall CITY, SUTTER and TNBC have any liability whatsoever for any debts, liabilities or financial obligations incurred by another Permittee under the NBHCP. Notwithstanding the foregoing sentence CITY and SUTTER acknowledge that they are obligated under their Permits to fully implement the NBHCP, including funding each of the obligations assigned to TNBC as the Plan Operator under the NBHCP. Therefore, a failure of CITY or SUTTER to fully fund TNBC's obligation under the Plan could compromise the effectiveness of the Plan, would trigger a reevaluation of the Plan and CITY, SUTTER and TNBC's respective Permits and could result in suspension of revocation of such permits pursuant to Section 7.6 of this Agreement.

7 AMENDMENTS AND REMEDIES

7.1 Revisions and Amendments to the NBHCP. Revisions to the NBHCP shall be implemented in accordance with Chapter VI of the Plan. Revisions shall not require Amendment of the Plan or Permits. Amendments to the NBHCP shall require amendment of the Permits and shall be processed in accordance with the amendment provisions of Chapter VI of the Plan and all applicable laws and regulations.

7.2 Amendments to Agreement. This Agreement may be amended only by written document signed by all of the Parties.

7.3 Land Use Changes. The Parties to this Agreement agree that the adoption and amendment of General Plans, Specific Plans, Community Plans, zoning ordinances and similar ordinances, and the granting of implementing land use entitlement by CITY or SUTTER pertaining to land in their respective Permit Areas, shall be matters within the sole discretion of CITY and SUTTER, and shall not require amendments to this Agreement or the approval of the other Parties to this Agreement. No such action by CITY or SUTTER shall in any way alter or diminish its obligations under this Agreement and the NBHCP. Notwithstanding the foregoing sentences, CITY and SUTTER acknowledge that they have chosen to implement several of the commitments made

by them under the NBHCP through the exercise of their respective land use authorities. Therefore, a failure of CITY or SUTTER to exercise their land use authorities in a manner consistent with their obligations under the NBHCP could compromise the effectiveness of the Plan, would trigger a reevaluation of the Plan and their respective Permits and could result in suspension or revocation of such Permits as set forth in Section 7.6 of this Agreement.

7.4 Remedies in General. The Parties acknowledge that each of the Covered Species is unique and that the loss of any of the Covered Species would be irreparable and that therefore injunctive and/or temporary relief may be appropriate in certain circumstances involving a breach of this Agreement. Notwithstanding any other provision of this Agreement, the Parties shall not be liable in monetary damages to any Party or any person for any breach of this Agreement, in the performance or failure to perform a mandatory or discretionary obligation imposed by this Agreement, or any other cause of action arising from this Agreement. Subject to the foregoing, the Parties shall have all of the remedies available in equity (including specific performance and injunctive relief) and at law to enforce the terms of this Agreement and the Section 10(a)(1)(B) Permit and Section 2081 Permit and to seek remedies for any breach thereof, consistent with and subject to the terms of this Agreement. It is expressly understood by the Parties that monetary damages will not provide an adequate remedy for material breach of this Agreement.

7.5 Third Party Enforcement. This Agreement shall not create in the public, any member of the public, or any other person or entity, including any Urban Development Permittee, any rights under this Agreement, nor shall it authorize anyone not a signatory to this Agreement to maintain a suit (1) in equity or law to enforce the terms of this Agreement and/or the NBHCP, Section 10(a)(1)(B) Permit or Section 2081 Permit, or (2) for compensation or damages under the provisions of the Agreement, NBHCP, or Permits.

7.6 Suspension or Revocation.

7.6.1 Suspension or Revocation by USFWS. The Parties acknowledge that the USFWS has the authority to suspend or revoke any of the Section 10(a)(1)(B) Permits, in whole or in part, in the event of a material violation of the Section 10(a)(1)(B) Permit and pursuant to any applicable federal laws or regulations that govern the permitted activity. The regulations found at 50 C.F.R. §§13.27 - 13.29 and 17.22(b)(8), or any successor regulations, shall govern the suspension or revocation of the Section 10(a)(1)(B) Permit issued by the USFWS.

7.6.2 Suspension or Revocation by CDFG. The Parties acknowledge that CDFG shall have the authority to suspend or revoke the Section 2081 Permit in the event of a material breach or violation of the Section 2081 Permit or any applicable California laws or regulations governing the permitted activity.

7.6.3 Status of Urban Development Permittees after Suspension or Revocation. Notwithstanding the suspension or revocation of a Permittee's Permit, CITY and SUTTER shall remain liable under this Agreement to carry out all of their responsibilities under the Permits and this Agreement arising from any Authorized Development approved, authorized, or carried out by CITY or SUTTER, within their respective Permit Areas between the Effective Date of the Agreement and the date a Permittee's Permit is suspended or revoked. As to any Authorized Development project approved or authorized by CITY or SUTTER prior to the Permit suspension or revocation and that is in compliance with the Permit, but as to which construction activity has not commenced as of the suspension or revocation, so long as CITY or SUTTER and the Urban Development Permittee, if any, continue to fulfill their obligations under the Permit, the Permit shall continue in effect for that Authorized Development project until that project is completed.

7.6.4 No Further Approvals by Permittees. Subject to the provisions of section 7.6.3 above, if a Permit is suspended or revoked, CITY and SUTTER shall not have the authority to rely upon the Permit to approve or carry out any actions that would violate the ESA or CESA in the absence of such Permit. Notwithstanding the suspension or revocation, CITY and SUTTER shall remain fully liable under the Permits and this Agreement to carry out all of their responsibilities,

including the Mitigation Requirement, under the NBHCP, the Permits and this Agreement arising from Authorized Development approved, authorized or carried out by an Urban Development Permittee within the respective Permit Areas between the Effective Date and the date the Permit is suspended or revoked.

7.6.5 Severability. The violation by CITY or SUTTER of their respective Permits shall not adversely affect or be attributed to, nor shall it result in the loss or diminution of any right, privilege or benefit under a Permit held by a non-responsible Permittee. Nor shall CITY and SUTTER be deemed to have violated the Permits solely as a consequence of the actions of an Urban Development Permittee or other third person subject to CITY's or SUTTER's jurisdiction and control, so long as CITY or SUTTER takes all necessary and appropriate steps, if any are available, to halt and correct the violation in accordance with this Agreement and consistent with their police powers and local land use authority. However, the violation by TNBC of its Permits shall be considered a failure by CITY and SUTTER to implement their obligations of the Operating Conservation Program under the NBHCP. In such event, CITY and SUTTER's Permits shall not be revoked or suspended, if CITY and/or SUTTER implement corrective measures in accordance with Section 3.1.11 of this Agreement. Notwithstanding the above, to the extent that action or inaction by a Permittee, an Urban Development Permittee or other third party subject to CITY's or SUTTER's jurisdiction and control, or TNBC prevents proper implementation of the NBHCP or compliance by one or more of the remaining Permittees with their Permits or results in a determination by the USFWS or CDFG that continuation of the Permits would appreciably reduce the likelihood of the survival and recovery of a Covered Species in the wild, such Permits may be suspended or revoked in accordance with applicable USFWS and CDFG regulations.

7.6.6 Validity of Permits. In the event a court of competent jurisdiction invalidates either City, County's or TNBC's Section 10(a)(1)(B) or Section 2081 Permits with regard to one or more Covered Species, other than the Giant garter snake or Swainson's hawk, such action shall not be construed to invalidate the permits with regard to the remaining Covered Species. The requirements of the State and Federal Incidental Take Permits and the NBHCP shall continue to be implemented by each Permittee with regard to the remaining Covered Species.

8 MISCELLANEOUS

8.1 Term of Agreement. This Agreement shall remain in effect for a period of fifty (50) years from the Effective Date.

8.2 Termination

8.2.1 Termination by Mutual Consent. CITY or SUTTER may, by mutual agreement with the Wildlife Agencies, terminate this Agreement as to itself. In the event that such mutually agreed-upon termination occurs, a written termination agreement shall be executed to ensure that the mitigation required under the NBHCP and this Agreement for all Authorized Development approved, authorized or carried out prior to termination is carried out. Upon execution of such agreement and surrender of the Permits to the Wildlife Agencies, no further take shall be authorized under the terms of the surrendered Permits.

8.2.2 Termination by USFWS or CDFG. The USFWS or CDFG may terminate this Agreement upon revocation of the Section 10(a)(1)(B) Permit or the Section 2081 Permit in accordance with Section 7.6.

8.2.3 Termination by the TNBC. The TNBC may terminate voluntarily its participation under this Agreement only if it has an agreement to do so with the CITY, SUTTER, USFWS and CDFG. Any agreement allowing TNBC to terminate its participation and its status as Plan Operator, shall contain provisions for assuring that the provisions of the NBHCP will be implemented.

8.2.4 Effect of Termination. In the event this Agreement is terminated by the USFWS or CDFG with respect to a Permittee, that Permittee's Section 10(a)(1)(B) Permit or

Section 2081 Permit, as applicable, shall, subject to Section 8.2.1 above, be void. CITY and SUTTER acknowledge that, although the NBHCP Operating Conservation Program would mitigate for effects resulting from the Land Use Agencies' Covered Activities, because the percentage of uplands to wetlands differs between their respective Permit Areas, the NBHCP allows for the Operating Conservation Program provided for under the NBHCP to be reevaluated and revised in the event either CITY's or SUTTER's Permits are terminated or revoked to ensure that the configuration of Mitigation Lands provided for under the NBHCP continues to adequately mitigate for the impacts of Authorized Development in the remaining jurisdiction.

8.2.5 Status of Mitigation Lands Upon Termination. The Mitigation Lands are to be established in perpetuity. Management of the Mitigation Lands by TNBC in accordance with the NBHCP shall continue in perpetuity, notwithstanding termination, suspension or revocation of CITY's or SUTTER's Section 10(a)(1)(B) Permit or Section 2081 Permit for any reason, unless the suspension or revocation of CITY's or SUTTER's Permits is due to a violation by TNBC of its Permits. TNBC's management activities shall be funded from the Mitigation Fees collected on account of past Authorized Development under the Permits which includes endowment components to fund permanent management. None of the assets of the TNBC, including lands or interests in land may be transferred, conveyed, or assigned to any person or entity, except as specified in Sections 3.2.11 and Section 3.2.12 of this Agreement. However, take previously authorized through Urban Development Permits or for public or private projects for which the Mitigation Requirement was been completed or is otherwise assured shall continue to be authorized. In the case of the federal Permit, upon notification from the Service that implementation of all minimization and mitigation measures identified in the termination agreement have been implemented, the permit shall be deemed canceled.

8.3 Binding Effect. The terms, provisions and conditions of this Agreement shall be binding upon and inure to the benefit of the Parties hereto and their respective successors and assigns.

8.4 Notices. Any notice required or permitted to be given hereunder shall be in writing, shall be deemed made upon receipt, and shall be given by personal delivery or by certified mail/return receipt requested, addressed to the Parties as follows:

City of Sacramento
915 I Street, Room 109
Sacramento, CA 95814
Attn: City Manager

County Administrative Officer
County of Sutter
1160 Civic Center Blvd., Ste. A
Yuba City, CA 95993

United States Fish and Wildlife Service
Office of the Regional Director
Portland, OR 97232

with a copy to:

Field Supervisor
U.S. Fish and Wildlife Service
3310 El Camino Avenue, Suite 130
Sacramento, CA 95821-6340

California Department of Fish and Game Office of the Director
1416 9th Street, 12th floor
Sacramento, CA 95814

with copies to:

General Counsel
California Department of Fish and Game
1416 9th Street, 12th floor
Sacramento, CA 95814

and to:

Regional Manager
California Department of Fish and Game
1701 Nimbus Road, Suite A
Rancho Cordova, CA 95670

The Natomas Basin Conservancy
1750 Creekside Oaks Dr., Suite 290
Sacramento, CA 95833
Attn: Executive Manager

Any Party may give notice to the others specifying a different address for notice purposes.

8.5 Captions. The headings of the various sections hereof are for convenience only, and shall not affect the meaning of any provisions of this Agreement.

8.6 Counterparts. This Agreement may be executed in multiple counterparts, all of which shall constitute but one and the same instrument.

8.7 Governing Law. This Agreement shall be governed by and construed in accordance with the ESA, the CESA, and other applicable state and federal laws. In particular, nothing in this Agreement is intended to limit the authority of USFWS to fulfill its responsibilities under the ESA or CDFG under CESA or other applicable law, including but not limited to seeking penalties against CITY, SUTTER or TNBC. Moreover nothing in this agreement is intended to limit the legal responsibilities of USFWS as an agency of the federal government or CDFG as an agency of the State of California.

8.8 Complete Agreement. This Agreement, together with the NBHCP, constitutes the full and complete agreement between the Parties concerning the subject matter hereof and supersedes any prior or contemporaneous agreements or understandings, whether oral or written, all of which shall be deemed to have been merged herein, it being the intention of the Parties that this be a completely integrated agreement. Specifically, this Agreement shall supercede the Implementation Agreement executed in December, 1997.

8.9 Federal Section 7 Consultations. Nothing in this Agreement is intended to eliminate or modify the obligation of a federal agency to consult with the USFWS pursuant to section 7(a) of the ESA (16 U.S.C. Section 1536(a)). To the maximum extent appropriate, in any consultation

under said provision involving CITY or SUTTER or a prospective or other Urban Development Permittee with regard to Covered Species, the USFWS shall ensure that the biological opinion issued in connection with the proposed public or private Project which is the subject of the consultation is consistent with the biological opinion issued in connection with the NBHCP, provided that the proposed public or private Project is consistent with the NBHCP. Any biological measures included under the terms and conditions of the Section 7 biological opinion shall, to the maximum extent appropriate, be consistent with the Mitigation Requirement imposed by CITY or SUTTER under the NBHCP as implemented by this Agreement, provided that, unless otherwise required by law, the USFWS shall not impose additional mitigation measures on the project proponent in excess of those that have been or will be required by the CITY or SUTTER pursuant to the NBHCP, this Agreement and the Permits.

8.10 Conflict with NBHCP. The NBHCP and each of its terms are intended to be, and by this reference are, incorporated herein. In the event of any contradiction, conflict or inconsistency between the terms of this Agreement and the NBHCP, the terms of this Agreement shall control. In all other cases, the terms of this Agreement and of the NBHCP shall be interpreted to be supplementary to each other. Where interpretation is required, this Agreement shall be interpreted as a vehicle for implementation of the NBHCP.

8.11 Other Permittees. The failure of other Potential Permittees identified in the NBHCP to obtain Permits shall not preclude this Agreement from going into effect within the geographical boundaries of each Permittee , or on lands Acquired by the NBC, nor preclude the issuance of the Permits to such other Potential Permittees or to subsequent signatories of this Agreement.

8.12 Federal Appropriations. USFWS's commitment to provide technical assistance under the NBHCP and to implement this Agreement, including the assurances provided herein, are subject to the requirements of the Anti-Deficiency Act and the availability of appropriated funds. Nothing in this agreement will be construed by the parties to require the obligation, appropriation, or expenditure of any money from the U.S. Treasury. The parties acknowledge that the USFWS will not be required under this Agreement to expend any federal agency's appropriated funds unless and until an authorized official of that agency affirmatively acts to commit to such expenditures as evidenced in writing.

8.13 State Appropriations. Implementation of this Agreement and the NBHCP and the assurances provided herein, is subject to the availability of appropriated funds. Nothing in this agreement will be construed by the parties to require the obligation, appropriation, or expenditure of any money from the Treasury of the State of California. The parties acknowledge that CDFG will not be required under this Agreement to expend any State of California agency's appropriated funds unless and until an authorized official of that agency affirmatively acts to commit to such expenditures as evidenced in writing.

8.14 References to Regulations. Any reference in this Agreement, the NBHCP, or the Permits to any regulation or rule of USFWS or CDFG shall be deemed to be a reference to such regulation or rule in existence at the time the action is taken.

8.15 Applicable Laws. All activities undertaken pursuant to this Agreement, the NBHCP or the Permit must be in compliance with all applicable state and federal laws and regulations.

8.16 No Partnership. Neither this Agreement nor the NBHCP shall make or be deemed to make any party to this Agreement the agent for or the partner of any other party.

8.17 Elected Officials Not to Benefit. No member of or delegate to Congress shall be entitled to any share or part of this Agreement, or to any benefit that may arise from it.

IN WITNESS WHEREOF, the Parties have executed this Agreement to be effective as of the date first set forth above.

U.S. FISH AND WILDLIFE SERVICE,
An Agency of the Department of the Interior
of the United States of America

By: David G. Paullin JUN 27 2003

Name: DAVID G. PAULLIN

Title: Acting DEPUTY MANAGER
CALIFORNIA/NEVADA OPERATIONS OFFICE

CALIFORNIA DEPARTMENT OF FISH AND GAME,
A Subdivision of the Resources Agency
of the State of California

By: Sandra Morey

Name: Sandra Morey

Title: Chief, Habitat Conservation Planning Branch

CITY OF SACRAMENTO,
A Municipal Corporation

By: _____
Robert P. Thomas
City Manager

Approved as to Form:

_____
City Attorney

COUNTY OF SUTTER,
A Political Subdivision of the State of California

By: _____

County Administrative Officer

Approved as to Form: _____
County Counsel

NATOMAS BASIN CONSERVANCY,
A Non-Profit Corporation

By: _____

Name: JOHN R. ROBERTS

Title: EXECUTIVE DIRECTOR

[add signatories]

EXHIBIT A: DEFINITIONS

NBHCP Definitions

Terms used in the NBHCP and Implementation Agreement shall have the same meaning as those same terms have under the ESA and CESA, except as set forth below. Capitalized terms used but not defined herein, but which are defined in the Plan, shall have the meanings specified in the Plan.

1. Adaptive Management. The term "Adaptive Management" means a method for examining alternative strategies for meeting measurable goals and objectives, and then, if necessary adjusting future conservation management actions according to what is learned to achieve those goals and objectives.

2. Amendment. The term "Amendment" shall refer to significant changes to the NBHCP, Implementation Agreement and/or Incidental Take Permit for circumstances as described in Chapter VI, Section 3(b) of the NBHCP. Amendments include activities which are more significant than and different from revisions (see also "Revisions").

3. Area B (Out of Basin Mitigation Area). Area B shall refer to lands identified on Figure 20 of the HCP in which TNBC may pursue acquisition of Mitigation Lands under the specific terms described in Chapter IV, Section 2.b of the HCP, with approval of USFWS and CDFG. TNBC shall account for all acreage acquired in Area B to ensure that the total amount of such lands does not exceed 20 percent of the total Mitigation Lands. The additional requirements for acquisition of mitigation lands in Area B (out of basin) apply only to Area B and do not apply to any acquisitions of mitigation lands located within the Natomas Basin or the outer "ring" of the Natomas Basin defined as the land bounding the Natomas Basin and extending to the edge of the water immediately outside the Natomas Basin levees.

   (Note: During the final NBHCP approval process by the City Council of the City of Sacramento and the Board of Supervisors of Sutter County, authorization to purchase Mitigation Lands to offset the impacts of development was limited to the Natomas Basin and the "outer" ring around the levees of the Natomas Basin. No authorization to purchase lands to mitigate impacts of Authorized Development in Area B (out of basin) was granted by the City Council and the Board of Supervisors.)

4. Authorized Development. The term "Authorized Development" means that development for which incidental take is authorized for the City of Sacramento and Sutter County under this NBHCP. Authorized Development is limited to a total of 15,517 acres of Planned Development (as further defined below in Section III.A) under the NBHCP. Included within the City's 8,050 acre portion of the Authorized Development are 28 acres of infrastructure development associated with the Metro Air Park (MAP) project in Sacramento County. Included within Sutter County's 7,467 acres of Authorized Development is 16.5 acres of proposed drainage channel improvements located within Sacramento County. Incidental take resulting from the 1,983 acre MAP project, including the 28 acres located in the City of Sacramento, is covered by separate incidental take permits issued by the Wildlife Agencies. The 15,517 acres of Authorized Development related incidental take within the City and Sutter County combined with the 1,983 acres of development related take within Sacramento County for the MAP project represent a total of 17,500 acres of potential urban development in the Natomas Basin which has been analyzed in the NBHCP as Planned Development, as further defined below. Any development within the City of Sacramento

beyond the 8,050 acres to be covered under its incidental take permits, within Sutter County, beyond the 7,467 acres to be covered under its incidental take permits, or within Sacramento County beyond the MAP project, will not be covered under the respective incidental take permits and will trigger a reevaluation of impacts to and mitigation for biological and other resources in the Natomas Basin and amendment of the NBHCP and the incidental take permits or development of a new HCP and issuance of new incidental take permits to address such impacts and mitigation as appropriate.

5. Biological Monitoring. The term "Biological Monitoring" means the mandatory element of all HCPs that is designed and implemented to provide the information necessary to assess compliance and project impacts, and verify progress toward the biological goals and objectives for the Plan's Covered Species and habitats.

6. Biological Monitoring Plan. Refers to specific monitoring requirements to be conducted in the Natomas Basin as specified in Chapter VI, Section E, Subsection 2, and includes both the overall NBHCP Biological Effectiveness Monitoring Program and the Site Specific Biological Monitoring Programs.

7. Changed Circumstances. This term "Changed circumstances" is defined in Title 50 of the Code of Federal Regulations, Section 17.3 as changes in circumstances affecting a species or geographic area covered by the NBHCP that can reasonably be anticipated by Plan Participants and the USFWS, and that can be planned for (e.g., the listing of a new species, or a fire or other natural catastrophic event in areas prone to such events.)" Changed circumstances addressed in NBHCP are outlined in Chapter VI, Section K of the HCP.

8. Compliance Monitoring. The term "Compliance Monitoring" means an itemized, task specific method of verifying that the Permittee is carrying out the terms of the NBHCP, Permit and IA.

9. Conservation Measures. The term "Conservation Measures" means that accepting and conveying developer mitigation fees, and possibly land dedications, as required under the NBHCP, the Land Use Agencies shall implement a variety of measures that will avoid, minimize or mitigate the take of Covered Species.

10. Covered Activities. The term "Covered Activities" means the Land Use Agencies Covered Activities and the TNBC Covered Activities.

11. Covered Activities, Land Use Agencies. The term "Land Use Agencies Covered Activities" refers to those specific activities identified at Chapter I, Section N.(1) of the NBHCP for which each Land Use Permittee shall be provided coverage under the federal Section 10(a)(1)(B) permits, and the State Section 2081 Permits. Covered Activities generally means the conversion from vacant land or agricultural uses to residential, commercial, and industrial uses, including related public and private infrastructure development and improvements by the City or Sutter County.

12. Covered Activities, TNBC. The term "TNBC Covered Activities" means those activities conducted by TNBC on behalf of the City, Sutter County and other Permittees who may obtain take authorization pursuant to the NBHCP or an HCP based on the NBHCP, within TNBC's Permit Area. These activities include acquisition, habitat creation, restoration,

preservation, enhancement, management and monitoring activities within Conserved Habitat Areas. TNBC's Covered Activities are described at Chapter I, Section N (3) of the NBHCP.

13. Covered Activities, Water Agencies. The term "Water Agencies Covered Activity" refers to those specific activities identified in Chapter I, Section N (2) of the NBHCP for which each Water Agency Permittee shall be provided coverage under the federal Section 10(a)(1)(B) permits, and the State Section 2081 Permits. Such Covered Activities generally include physical maintenance and operation of the Water Agencies' existing facilities located within the Plan Area, including channel maintenance, vegetation control (where no herbicides are utilized), and construction or improvement of facilities where there is no increase to the footprint of the existing facility.

14. Covered Species. The term "Covered Species" means the Federally Protected Species, State Protected Species and the Other Species identified within Table I-1 hereto.

15. ESA and CESA. The term "ESA" means the Federal Endangered Species Act of 1973, as amended. The term "CESA" means the California Endangered Species Act, as amended.

16. Exempt Area. The term refers to areas within the Natomas Basin, within the City of Sacramento which are already approved for development or already developed and as shown on Exhibit B of the Implementation Agreement.

17. Federally Protected Species. The term "Federally Protected Species" means those plants and animals listed by the United States ("U.S.") under the provisions of ESA and shown as Covered Species on Table I-1 hereto that are found, or may be found, in the Permit Areas, as well as those other Covered Species listed on Table I-1 that the USFWS may list in the future.

18. Five Point Policy. The term "Five Point Policy" refers to an addendum to the HCP Handbook published by the Fish and Wildlife Service and the National Marine Service on June 1, 2000. The five point policy addendum provides clarifying guidance for conducting the incidental take permit program and for those applying for an incidental take permit under section 10(a)(1)(B) of the Endangered Species Act (ESA).

19. Habitat Values. The term "Habitat Values" means the capability of a land or water area or associated areas, where indigenous plant(s) or animal(s), individually or collectively, may occur and upon which the Covered Species are dependent, in whole or in part, to provide for some or all of their maintenance, growth and reproduction.

20. Implementation Annual Meeting. The term refers to the annual public meeting held jointly with TNBC, other Permittees, USFWS and CDFG to report on the progress of the HCP Conservation Strategy as described in Chapter VI. G of the NBHCP.

21. Implementation Annual Report. The term refers to the annual report prepared by the TNBC describing the compliance and effectiveness monitoring processes and findings and the status of the progress in implementing the NBHCP in accordance with the requirements of Chapter VI, Section G of the NBHCP.

22. Incidental Take. The term "Incidental Take" means any taking of Covered Species that is incidental to, and not the purpose of, the carrying out of otherwise lawful activity.

23. Incidental Take Permits. The terms “Incidental Take Permits,” “ITPs” and “Permits” mean the individual permits issued to each Permittee subject to Section 10(a)(1)(B) of the Endangered Species Act and Section 2081 of the California Endangered Species Act.

24. Independent Mid-Point Review. This term refers to the required review and evaluation of the effectiveness of the HCP by each of the land use agencies at a defined mid-point in the approval of Authorized Development and as more specifically defined in Chapter VI, Section J of the NBHCP.

25. Land Use Agencies. The term “Land Use Agencies” means the City of Sacramento and Sutter County. If and when Sacramento County submits and receives approval of its own ITP, Sacramento County would be considered a Land Use Agency as defined herein.

26. MAP (Metro Air Park) Habitat Conservation Plan (MAP HCP). This term refers to the approved Habitat Conservation Plan for the Metro Air Park Project located in the unincorporated portion of the Natomas Basin within Sacramento County, specifically, “Habitat Conservation Plan for the Metro Air Park Project in the Natomas Basin, Sacramento County, California, Prepared by Metro Air Park Property Owner’s Association, Dated 2001.”

27. Mitigation Fees. As defined in Chapter VI, the term "Mitigation Fees" means the one time, up-front fees levied upon an Authorized Development site (in gross acres) that is used to pay for the Mitigation Land acquisition, enhancement, management, monitoring, and other activities required under the NBHCP. The Mitigation Fees must be paid prior to the issuance of an Urban Development Permit by the Land Use Permittee. The components of the Mitigation Fee include: Land Acquisition, Restoration/Enhancement/Monitoring, Administration O&M, O&M Endowment Fund, Supplemental Endowment Fund, and Fee Collection Administration as defined in Chapter VI.

28. Mitigation Lands. The term “Mitigation Lands” means the reserve lands acquired through collection and use of Mitigation Fees from Authorized Development, and in some cases land which has been accepted for dedication from Authorized Development, which will be set aside and managed at a ratio of one-half (½) acre of land protected or preserved for every one (1) acre of land converted to Authorized Development. The NBHCP Operating Conservation Program will result in 8,750 acres of Mitigation Lands to be established and managed by TNBC.

29. Mitigation Ratio. The term “Mitigation Ratio” means mitigation for the conversion of land in the respective Permit Areas to Authorized Development at a ratio of one-half (½) acre of land protected or preserved for every one (1) acre of land converted to Authorized Development.

30. Mitigation Requirement. The term “Mitigation Requirement” means the mitigation requirement for each public and private project is determined by applying the Mitigation Ratio to the land area converted to Authorized Development as calculated in accordance with the requirements set forth in Chapter VI, Section 1.

31. Natomas Basin. "Natomas Basin" or "Basin" means that geographical area depicted in Figure 2, Natomas Basin and Affected Jurisdictions.

32. Natomas Basin Habitat Conservation Plan. The terms “Natomas Basin Habitat Conservation Plan,” “NBHCP” and “the Plan” mean the year 2002 version of the Natomas Basin Habitat Conservation Plan prepared for the City of Sacramento, Sutter County, The Natomas Basin Conservancy (TNBC), RD 1000 and Natomas Mutual.

33. Natomas Basin Habitat Conservation Plan, 1997. The terms “1997 NBHCP” and “1997 Plan” mean the previously approved City of Sacramento Natomas Basin HCP that was the original basis for this 2002 NBHCP.

34. No Surprises Rule. The term “No Surprises Rule” refers the terms and conditions specified in the February 28, 1998, the U.S. Fish and Wildlife final rule codifying its “No Surprises” policy into federal regulation (63 FR 8859). The “No Surprises” rule states, in part, that: “In negotiating unforeseen circumstances, the [Service] will not require the commitment of additional land, water or financial compensation or other natural resources beyond the level otherwise agreed upon for the species covered by the conservation plan without the consent of the Permittee. If additional conservation and mitigation measures are deemed necessary to respond to unforeseen circumstances, the [Service] may require additional measures of the Permittee where the conservation plan is being properly implemented, but only if such measures are limited to modifications within conserved habitat areas, if any, or to the Conservation Plan’s Operating Conservation Program for the affected species, and maintain the original terms of the Conservation Plan to the maximum extent possible. Additional conservation and mitigation measures will not involve the commitment of additional land, water or financial compensation or restrictions on the use of land, water, or other natural resources otherwise available for development or use under the original terms of the conservation plan, without the consent of the Permittee.” (50 C.F.R. Sections 17.22(b)(5)(iii) and 17.32(b)(5)(iii).) The No Surprises Rules is discussed in Chapter VI, Section K of the NBHCP.

35. Operating Conservation Program. The term “Operating Conservation Program” means the totality of the conservation and management measures provided for under the NBHCP to avoid, minimize, mitigate and monitor the impacts of take of the Covered Species as described in Chapters IV through VI of the Plan. The Operating Conservation Program includes totals the Permittees reporting obligations under the Permits and responses to Changed Circumstances described in Chapter VI.

36. Overall Program Review. This term refers to a required program review of the effectiveness of the Operating Conservation Program to be initiated at the point Urban Development Permits covering a total of 9,000 acres of development in the Natomas Basin have been issued by the Land Use Permittees and by Sacramento County for the Metro Air Park. The areas to be covered by the Overall Program Review are specified and described in Chapter VI, Section I of the NBHCP.

37. Permit Area, City of Sacramento. The term “Permit Area” as applied to the City of Sacramento means that area designated on Figure 2 of the NBHCP Implementation Agreement that totals 8,050 acres located within the City of Sacramento city limits and in

certain locations (i.e., the Panhandle Annexation Area) within the unincorporated areas of Sacramento County. Incidental take authority for the City of Sacramento is limited to this Permit Area.

38. Permit Area, County of Sutter. The term “Permit Area” as applied to Sutter County means that area designated on Figure 2 of the NBHCP Implementation Agreement that totals 7,467 acres located within the unincorporated areas of Sutter County, and approximately 16.5 acres located within unincorporated Sacramento County. Incidental take authority for Sutter County is limited to this Permit Area.

39. Permit Area, Natomas Mutual. The term “Permit Area” as applied to Natomas Mutual means canals, ditches, waterways, ponds and open water areas, as well as roads, right-of-ways, facilities, maintenance yards, pumps, pipelines, and water detention facilities, under the direct jurisdiction of Natomas Mutual and inside the inner toe of levees surrounding the Natomas Basin, but not including the Sacramento River levees. Incidental take authority for Natomas Mutual is limited to this Permit Area.

40. Permit Area, RD 1000. The term “Permit Area” as applied to RD 1000 means canals, ditches, waterways, ponds and open water areas, as well as roads, right-of-ways, facilities, maintenance yards, pumps, pipelines, and water detention facilities, under the direct jurisdiction of RD 1000 and inside the inner toe of levees surrounding the Natomas Basin, but not including the Sacramento River levees. Incidental take authority for RD 1000 is limited to this Permit Area.

41. Permit Area, TNBC. The term “Permit Area” as applied to The Natomas Basin Conservancy (TNBC) consists of all lands within the Natomas Basin (the Plan Area), as well as the land bounding the Natomas Basin and extending to the edge of water immediately outside the Natomas Basin levees and Area B as depicted on Figure 20, Out of Basin Mitigation Areas.

42. Permittees. The term "Permittees" means the City of Sacramento, Sutter County, RD 1000, Natomas Mutual and The Natomas Basin Conservancy.

43. Plan Area. The term “Plan Area” means the entire 53,537 acres of land within the inside toe of levee of the Natomas Basin levees. The Plan Area refers to the portion of the Natomas Basin that is bounded on the west by the Sacramento River, on the north by the Natomas Cross Canal, on the east by Steelhead Creek (formerly known as Natomas East Main Drain Canal), and on the south by the Garden Highway.

44. Planned Development. The term “Planned Development” means the Authorized Development plus the development of the 1,983 acre Metro Air Park, which is subject to the Metro Air Park Habitat Conservation Plan (“MAP Authorized Development”)

45. Plan Operator. The term “Plan Operator” means The Natomas Basin Conservancy, the entity responsible for implementing the NBHCP.

46. Plan Participants. The term “Plan Participants” means parties actively involved in implementing the NBHCP, including the Wildlife Agencies (USFWS and CDFG), the Permittees (City of Sacramento, Sutter County, Natomas Mutual and RD 1000), and the Plan Operator (TNBC).

47. Potential Permittees. The term “Potential Permittees” refers to additional entities within the Natomas Basin that may decide to commit to the terms of the NBHCP and the Implementation Agreement and, through the issuance of Permits by the Wildlife Agencies, join as full Permittees at a future date.

48. Protected Species. The term "Protected Species" means those plants and animals listed under the State CESA and the Federal ESA.

49. Qualified Biologist. The term “qualified biologist” shall refer to a biologist which meets the training and experience requirements necessary to conduct assessments or surveys for specific species, and who has been approved by the Wildlife Agencies to conduct those assessments or surveys.

50. Reintroduction. The term “reintroduction” as used in the NBHCP refers to relocating individuals (or seeds or cysts, etc) of a Covered Species: (1). Either from one TNBC Reserve Site to another TNBC Reserve Site or from one location on a TNBC Reserve Site to a new location within the same TNBC Reserve Site; or (2) the relocation of an individual of a Covered Species from a site which will be impacted by Authorized Development to a TNBC Reserve Site to avoid, minimize or mitigate the impacts to Covered Species. The term “reintroduction” as used in the Natomas Basin HCP refers to the movement of animals or plants within the Basin and does not refer to the intentional introduction or recolonization of Covered Species from outside the Basin to inside the Basin.

51. Revisions. Refers to minor changes to the NBHCP as specified in Chapter VI, Section 3.a of the NBHCP. Revisions to the NBHCP are changes to the Plan provided for under the Operating Conservation Program, including Adaptive Management changes and Mitigation Fee adjustments. These revisions would not result in operations under the NBHCP that are significantly different from those analyzed in connection with the NBHCP as approved, result in adverse impacts on the environment that are new or significantly different from those analyzed in connection with the NBHCP as approved.

52. Section 10(a)(1)(B) Permits. The terms "Section 10(a)(1)(B) Permits" or "Permits" as used in this Plan means the permits issued by the USFWS under Section 10 (a)(1)(B) of the ESA which authorize the incidental take of a Covered Species which may occur as a result of urban development activities, including public facilities projects, within the City of Sacramento and Sutter County, or as a result of the operation and/or maintenance, including the construction and improvements with no significant increase to the existing footprint, of flood control or water supply activities, water ditches, canals, pumphouses, maintenance facilities, or other ancillary facilities within the Natomas Basin, or as a result of habitat management, enhancement, or restoration activities on reserve lands. "Permit" may also be used in this Plan to collectively refer to the Section 10(a)(1)(B) Permits, and the Section 2081 Permits.

53. Section 2081 Permits. The terms "Section 2081 Permits” or “Permits” means the permits for the incidental take of threatened and endangered species, listed under the CESA, issued by the CDFG under Section 2081(b) and/or 2081.1 of the California Fish and Game Code, or any successor section to authorize the incidental take of a Covered Species which may occur as a result of urban development activities, including public facilities projects, within

the City of Sacramento and Sutter County, or as a result of the operation and/or maintenance, including the construction and improvements with no significant increase to the existing footprint, of flood control or water supply activities, water ditches, canals, pumphouses, maintenance facilities, or other ancillary facilities within the Natomas Basin, or as a result of habitat management, enhancement, or restoration activities on reserve lands. "Permits" may also be used in this Agreement to refer collectively to the Section 10(a)(1)(B) Permits and/or the Section 2081(b) or 2081.1 Permits.

54. Site Specific Management Plan. The terms “Site Specific Management Plan” and “SSMP” mean those plans that TNBC is required to complete for each reserve unit that it acquires. SSMP’s shall include operations plans that address on-site habitat restoration, enhancement, maintenance and management activities that will be presented to the NBHCP TAC for approval on a three year basis.

55. State Protected Species. The term ‘State Protected Species” means those plants and animals listed by the State of California (“State”) under the provisions of CESA and shown as Covered Species on Table I-1 hereto that are found, or may found, in the permit areas.

56. Swainson’s Hawk Zone. This zone is defined as the lands which are not currently developed (excluding the 250 acres of land designated “Urban” on the City of Sacramento General Plan and the North Natomas Community Plan located within the City of Sacramento) and which are located within the Natomas Basin and within one mile east of the toe of the inside levee of the Sacramento River and extending from the Natomas Cross Canal on the north and Interstate 80 on the south. See also Figure 13 of the NBHCP.

57. System of Reserves. The term “system of reserves” means Mitigation Lands generally and includes all habitat conserved and managed for the Covered Species, including rice fields by TNBC.

58. Take or Taking. With regard to any activities subject to ESA, the terms “Take” or “Taking” shall have the same meaning as provided in the ESA. With regard to any activities subject to CESA, the terms “Take” or “Taking” shall have the same meaning as provided in CESA.

59. Technical Advisory Committee. The terms “Technical Advisory Committee” and “TAC” mean the advisory group of technical experts selected by the Permittees and the Wildlife Agencies to assist TNBC Board with directing the implementation of the NBHCP.

60. The Natomas Basin Conservancy. The terms “The Natomas Basin Conservancy,” “the Conservancy” or “TNBC” shall mean the independent entity established for the purpose of implementing the Natomas Basin Habitat Conservation Plan on behalf of the City, Sutter County and other Potential Permittees. The TNBC is also a Permittee for purposes of implementation of the reserve system.

61. TNBC Mitigation Land or Reserve Area. The term “TNBC Reserve Area” or “TNBC Mitigation Land” shall mean those areas where TNBC is authorized to acquire and manage wildlife reserves subject to the provisions of the NBHCP. Such areas shall include all lands within the Natomas Basin, as well as the land bounding the Natomas Basin and extending to the edge of water immediately outside the Natomas Basin levees and Area B as depicted

on Figure 20, Out of Basin Mitigation Areas. The TNBC Reserve Area and the TNBC Permit Area are coterminous.

62. Unforeseen Circumstances. The term "Unforeseen circumstances" is defined at 50 C.F.R. 17.3 as changes in circumstances affecting a species or geographic area covered by a conservation plan that could not reasonably have been anticipated by plan developers and the USFWS at the time of the NBHCP's negotiation and development, and that result in a substantial and adverse change in the status of the Covered Species. Unforeseen circumstances are discussed in Chapter VI, Section K of the NBHCP.

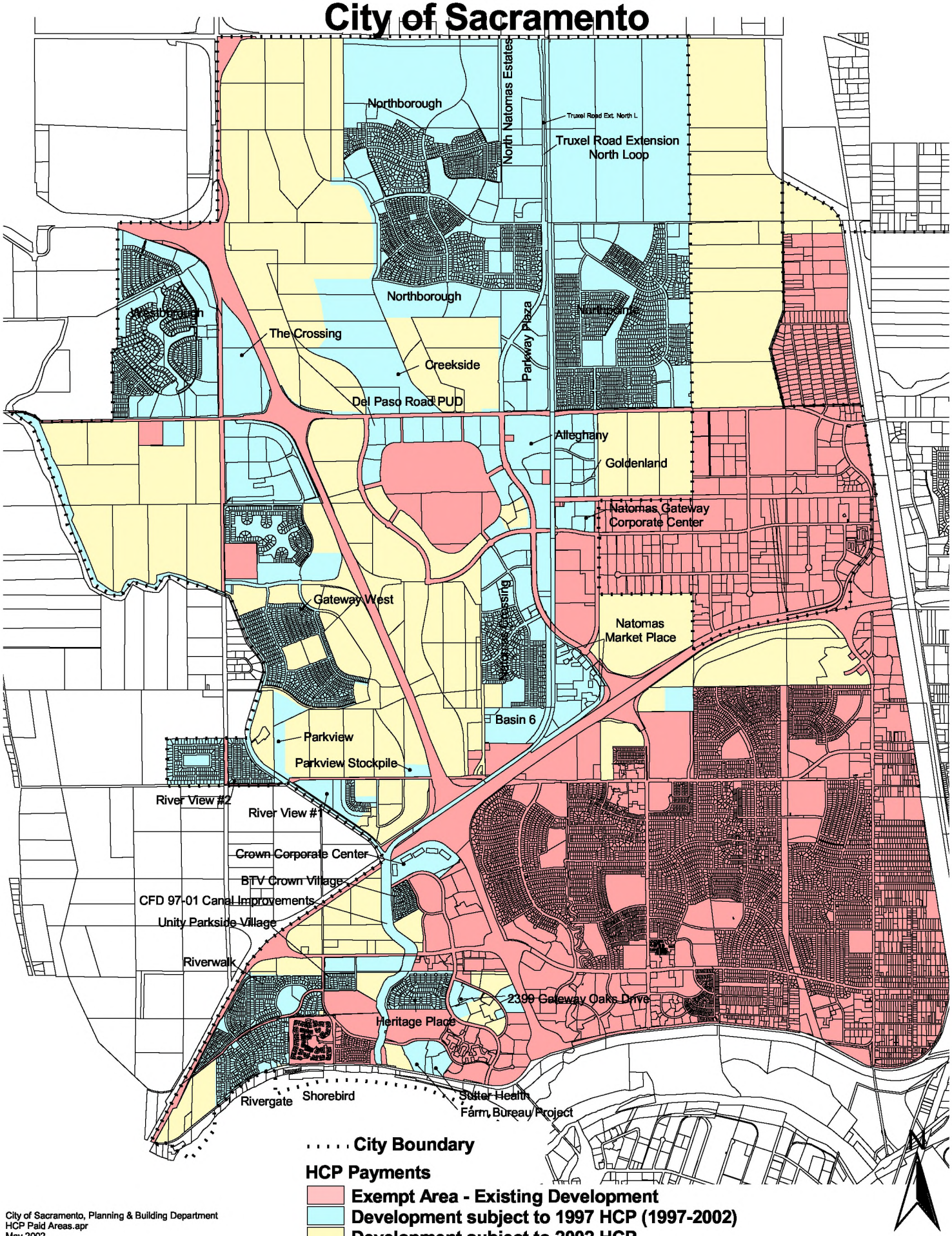
63. Urban Development Permit and Urban Development Permittee. The term "Urban Development Permit" shall mean the final authorization granted by the Land Use Agencies prior to disturbance of undeveloped land in conjunction with a public or private development project. An Urban Development Permit may also be used to refer to a grading permit or notice to proceed. An "Urban Development Permittee" refers to the individual, agency or company applying for approval, or receiving approval of an Urban Development Permit from the Land Use Agencies.

64. Water Agencies. The term "Water Agencies" means RD 1000 and Natomas Mutual. Natomas Mutual is a private company and not a governmental agency.

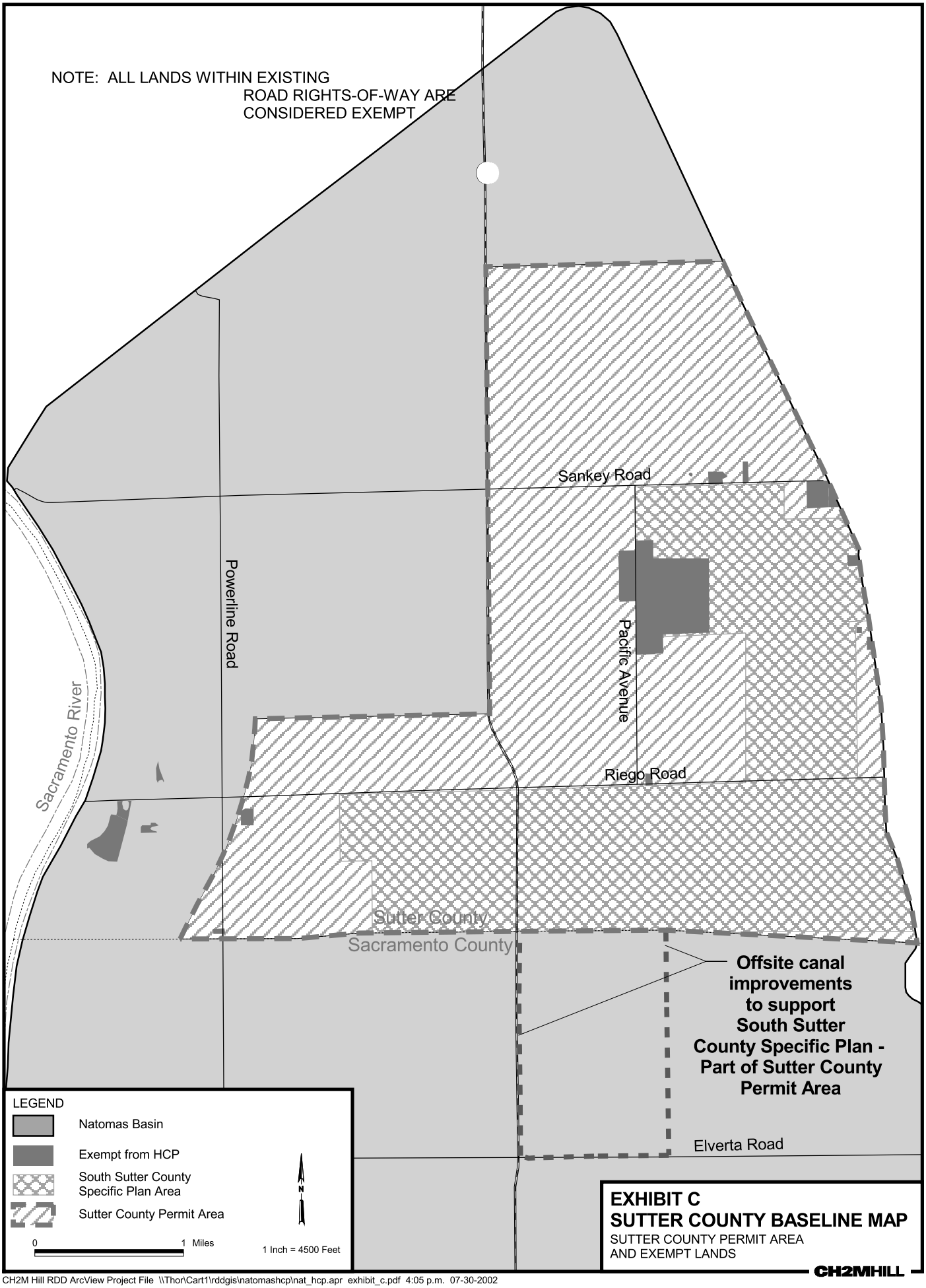
65. Wildlife Agencies. The term "Wildlife Agencies" means the U.S. Fish and Wildlife Service and the California Department of Fish and Game.

ATTACHMENT 3

Baseline Map - Exhibit B
City of Sacramento



City of Sacramento, Planning & Building Department
HCP Paid Areas.apr
May 2002



CH2M Hill RDD ArcView Project File \\Thor\Cart1\rddgis\natomashcp\nat_hcp.apr exhibit_c.pdf 4:05 p.m. 07-30-2002

Exhibit D -List of Covered Species in Permit Area

TABLE I - 1
LISTED, CANDIDATE, AND OTHER SPECIES ADDRESSED IN THE NBHCP AND/OR COVERED BY ITS ASSOCIATED PERMITS

#	Species	Federal Status	State Status	Habitat Notes
1	Aleutian Canada goose *Branta canadensis leucopareia*	SC		Grazes in marshes and stubble fields, roosts on the water
2	bank swallow *Riparia riparia*		T	Nests in river banks, forages for insects over open water, croplands, and grasslands
3	burrowing owl *Athene cunicularia*		SSC	Prefers open, dry grassland and desert habitats
4	loggerhead shrike *Lanius ludovicianus*	SC	SSC	Prefers open habitats with scattered shrubs, trees, fences, and posts. Will use cropland.
5	Swainson's hawk *Buteo swainsoni*		T	Breeds in riparian forest; known nesting sites in trees along Sacramento River in Natomas Basin. Forages for small mammals in grasslands and croplands.
6	tricolored blackbird *Agelaius tricolor*	SC	SSC	Nests in marshes with bulrush, blackberry or cattails; three known occurrences in Natomas Basin. Forages on the ground in grasslands and croplands.
7	white-faced ibis *Plegadis chihi*	SC	SSC	Forages in flooded rice fields
8	giant garter snake *Thamnophis gigas*	T	T	Forages in marshes, low gradient open waterways and flooded rice fields, hibernates in canal berms and other uplands; several known occurrences in Natomas Basin
9	northwestern pond turtle *Clemmys marmorata marmorata*	SC	SSC	Lives in permanent bodies of water; requires floating vegetation, logs, rocks or banks for basking. Hibernates and lays eggs is uplands.
10	California tiger salamander *Ambystoma californiense*	C	SSC	Winters in ground squirrel burrows or other holes; breeds in vernal pools, stockponds , and other seasonal wetlands.
11	western spadefoot toad *Scaphiopus hammondii*	SC	SSC	Primary habitat is grasslands; breeds in shallow temporary pools
12	valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T		Lives and reproduces on elderberry shrubs found along rivers and canals.
13	midvalley fairy shrimp *Branchinecta mesovallensis n. sp.*			Vernal pool obligate often found in small pools; likely to occur in Plan Area
14	vernal pool fairy shrimp *Branchinecta lynchi*	T		Vernal pool obligate; widely distributed in Sacramento County
15	vernal pool tadpole shrimp *Lepidurus packardi*	E		Vernal pool obligate; widely distributed in Sacramento County
16	Boggs Lake hedge-hyssop *Gratiaola heterosepala*		E	Low-terrace species found in shallow water margins of vernal pools
17	Colusa Grass *Neostapfia colusana*	T		Occurs in large deep pools with substrates of adobe mud but also in smaller pools; known in Yolo County

#	Species	Federal Status	State Status	Habitat Notes
18	delta tule pea *Lathyrus jepsonii* ssp.*jepsonii*	SC		Perennial twining vine occurs in both riparian and marsh habitats
19	legenere *Legenere limosa*	SC		Found in wet places or vernal pools below 400 feet in elevation
20	Sacramento Orcutt grass Orcuttia viscida	E	E	Found in relatively large, deep vernal pools in eastern Sacramento County
21	Sanford's arrowhead Sagittaria sanfordii	SC		Tuberose perennial likely to occur in drainage or irrigation ditches
22	slender Orcutt grass *Orcuttia tenuis*	T	E	Found in relatively large, deep vernal pools in eastern Sacramento County

Key to Abbreviations

Federal

E = Listed as endangered
T = Listed as threatened
C = Candidate for federal listing, data sufficient
SC = Species of Concern--informal category, formerly called candidate 2 species (data for listing insufficient)

State

E = Listed as Endangered
T = Listed as Threatened
R = Listed as Rare
SSC = Species of Special Concern

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W2605
Sacramento, California 95825-1846

IN REPLY REFER TO:
1-1-03-F-0225

June 24, 2003

Memorandum

To: Regional Director, Fish and Wildlife Service, Region 1, Portland Oregon

From: Field Office Supervisor, Sacramento Fish and Wildlife Office, Sacramento, California

Subject: Intra-Service Biological and Conference Opinion on Issuance of a Section 10(a)(1)(B) Incidental Take Permit to the City of Sacramento and Sutter County for Urban Development in the Natomas Basin, Sacramento and Sutter Counties, California.

This document transmits the biological/conference opinion of the U.S. Fish and Wildlife Service (Service), Sacramento Fish and Wildlife Office (SFWO), regarding the issuance of incidental take permits (ITP) to the City of Sacramento (City)(Applicant), Sutter County (Sutter) (Applicants or Proposed Permittees), and the Natomas Basin Conservancy (Conservancy) (Applicant) for implementation of the Natomas Basin Habitat Conservation Plan (NBHCP) pursuant to section 10(a)(1)(B) and section 10(a)(2) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq*.)(Act), and in accordance with section 7 of the Act and their implementing regulations (50 CFR §402). The Service proposes to issue the ITPs to the City, Sutter, and the Conservancy for a period of 50 years.

The Applicants are requesting coverage under the ITPs for a total of twenty-two species (Covered Species). The ITPs would cover incidental take for one endangered animal species [vernal pool tadpole shrimp (*Lepidurus packardi*)], and three threatened animal species [giant garter snake (*Thamnophis gigas*)(snake), valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)(beetle), and vernal pool fairy shrimp (*Branchinecta lynchi*)]. The ITPs would also authorize the incidental take of one animal species formerly listed as threatened [Aleutian Canada goose (*Branta canadensis leucopareia*)(goose)], which was de-listed on March 20, 2001, one proposed species [California tiger salamander (*Ambystoma californiense*)(salamander)], and nine currently unlisted animal species - Swainson's hawk (*Buteo swainsoni*)(hawk), white-faced ibis (*Plegadis chihi*)(ibis), bank swallow (*Riparia*

riparia)(swallow), tricolored blackbird (*Agelaius tricolor*)(blackbird), northwestern pond turtle (*Clemmys marmorata marmorata*) (turtle), loggerhead shrike (*Lanius ludovicianus*)(shrike), burrowing owl (*Athene cunicularia*)(owl), western spadefoot toad (*Spea hammondii*)(toad), and midvalley fairy shrimp (*Branchinecta mesovallensis*)-, should they become listed in the future during the term of the permits. The permits would become effective to authorize take of the currently unlisted Covered animal Species concurrent with their listing under the Act. One endangered plant species [Sacramento Orcutt grass (*Orcuttia viscida*)], two threatened plant species [Colusa grass (*Neostapfia colusana*) and slender Orcutt grass (*Orcuttia tenuis*)] and four currently unlisted plants [Boggs Lake hedge-hyssop (*Gratiola heterosepala*), delta tule pea (*Lathyrus jepsonii* var. *jepsonii*), legenere (*Legenere limosa*), and Sanford's arrowhead (*Sagittaria sanfordii*)] would also be considered Covered Species and included on the Permits. Although take of plant species is not prohibited under the Act and therefore cannot be authorized under an incidental take permit, the plant species would be included on the permits in recognition of the conservation benefits provided to the species under the NBHCP. Assurances provided under the "No Surprises" rule at 50 C.F.R. 17.3, 17.22(b)(5) and 17.32(b)(5) would extend to all Covered Species.

The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, or possessing of migratory birds. The MBTA identifies a variety of prohibited actions including the taking of individual birds, young, feathers, eggs, nests, etc. Actions conducted under the NBHCP and NBHCP Implementation Agreement (NBHCP IA) will comply with the provisions of the MBTA with strict avoidance measures for actions affecting MBTA-Covered Species such as the goose, hawk, ibis, swallow, blackbird, shrike, and owl. There are currently no MBTA Covered Species that are listed under the Act and subject to a special purpose permit at this time. Should any of the MBTA Covered Species become listed under the Act during the life of the Permits, the incidental take permits would also constitute an MBTA special purpose permit for that species for a three year term as specified under 50 C.F.R. 13 and 50 C.F.R. 21 for MBTA special purpose permits subject to renewal by the City and Sutter County.

This biological opinion is based on information provided in the following documents: (1) the July 2002, draft NBHCP; (2) the August 2002, draft Environmental Impact Report/ Environmental Impact Statement (EIR/EIS) and supporting technical analyses and reports; (3) the July 2002, draft NBHCP IA; (4) the *Site Specific Management Plans for the Natomas Basin Conservancy's Mitigation Lands*; (5) the April 2003, Final NBHCP, NBHCP IA, and EIR/EIS; (6) the November 1997, NBHCP; (7) the Natomas Basin Conservancy's Implementation Annual Reports; (8) the February 2000, lawsuit *(National Wildlife Federation, et al. v. Babbitt,* S-99-274 (E.D.Cal.) [*NWF v. Babbitt*]) filed against the Service's issuance of an Incidental Take Permit to the City for the 1997 NBHCP; (9) the August 15, 2000, Memorandum of Opinion and Order for *NWF v. Babbitt*; (10) the January 26, 2001, judgement declaring the City's ITP for the 1997 NBHCP invalid; (11) the May 10, 2001, Settlement Agreement for *NWF v. Babbitt*; (12) the May 13, 2003, resolutions adopted by the City (Resolution Numbers 2003- 289 and 290) and Sutter (Resolution Number 03-30) approving the NBHCP; (13) the June 10, 2003, resolution (Resolution Number 03-039) approved by Sutter making three changes to the NBHCP; (14) the

June 2003, Errata to the NBHCP; and (15) various other published and unpublished agency and academic literature and information in the Service's files.

CONSULTATION HISTORY

In 1994, the Sacramento Area Flood Control Agency (SAFCA) proposed a flood control project for the Natomas Basin (Basin) that required a Section 404 Clean Water Act permit from the U.S. Army Corps of Engineers (Corps). In order to comply with its responsibilities under the Act, the Corps consulted with the Service. In its March 11, 1994, biological opinion (Service File # 1-1-94-F-0013) for the project, the Service determined that the project would remove an obstacle to urbanization in the Basin and that such development would result in the take of federally-listed species. The Corps issued a Section 404 Permit for SAFCA's flood control project, conditional on the preparation of a habitat conservation plan (HCP) for the Basin. Following the Corps' action, the local land use agencies (City, Sutter, and Sacramento County), with additional participation by the water agencies (Reclamation District Number 1000 [RD 1000] and Natomas Central Mutual Water Company [Natomas Mutual]), began preparing an HCP. In 1997, the City submitted its application to the Service for an incidental take permit to authorize take of 26 Covered Species within its portion of the Natomas Basin based on the 1997 basin-wide Natomas Basin HCP. The other land use agencies did not apply for incidental take permits based on the NBHCP at that time.

The Service issued an ITP to the City in December 1997 based on the final NBHCP. Environmental review of the City's 1997 HCP under the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) consisted of an Environmental Assessment/Finding of No Significant Impact prepared by the Service (Service, 1997a) and an Initial Study/Negative Declaration prepared by the City (City of Sacramento, 1996), respectively. In April 1998, the City began collecting habitat mitigation fees and issuing urban development permits under the 1997 NBHCP. These fees were transferred to the Conservancy, which was created by the City in October 1994 to serve as the Plan Operator.

The Conservancy is a private, not-for-profit public benefit corporation that acquires and manages the system of habitat reserves created under the 1997 NBHCP. In addition, it will acquire and manage the system of habitat reserves created under the proposed NBHCP, if approved. The Conservancy's efforts are guided by a Board of Directors, with members of the Board appointed by agencies receiving Permits under the NBHCP. The Conservancy's Board of Directors was appointed by the City's City Council in December 1998. The Board is assisted in its efforts by the Technical Advisory Committee (TAC), a group of experts representing the Service, California Department of Fish and Game (CDFG), and the Permittees. Habitat mitigation fees and mitigation lands have been/will be collected by the Permittee(s) and transferred to the Conservancy.

Sutter and Sacramento County informally submitted separate HCPs to the Service in October 1998. The Service suspended review of their HCPs because a lawsuit, discussed below, was

filed challenging the City's HCP and ITP. As of June 2003, Sacramento County has not submitted an HCP for unincorporated lands in the Basin.

Although Sacramento County is not one of the NBHCP's applicants, the Metro Air Park Property Owners Association (MAPPOA), a group of landowners, submitted a separate HCP designed to be compatible with the 1997 NBHCP for the Metro Air Park (MAP) in July 1999. MAP is a special planning area adjacent to Sacramento International Airport (Airport) in Sacramento County which has been approved by the County for industrial and commercial development. Metro Air Park comprises 1,983 acres of the 17,500 acres of planned urban development described in the NBHCP. The Service issued an ITP to MAPPOA on February 21, 2002.

RD 1000 and Natomas Mutual (Water Agencies) also participated in basin-wide habitat conservation planning efforts. On September 8, 1998, the Water Agencies submitted an incidental take permit application and draft implementation agreement based on the 1997 City of Sacramento implementation agreement. They also proposed to use the November 1997 NBHCP with additional revisions suggested by the Water Agencies. In November 2000, the Water Agencies submitted a revised HCP and IA to the Service and CDFG. In early 2001, they re-joined the City, Sutter, and the Conservancy in developing the draft revised NBHCP. The Water Agencies identified general conservation measures for operations, maintenance, and minor construction activities. A revised NOP/NOI noticing the involvement of the Water Agencies in the HCP process was published in local newspapers and in the *Federal Register* on August 18, 2001. Discussions among the Water Agencies, the other permit applicants and the Wildlife Agencies continued throughout 2001 and early 2002 regarding Water Agencies proposed conservation measures.

The Water Agencies provided additional detail regarding their covered activities, including a request for coverage for use of pesticides (e.g., aquatic herbicides, rodenticides) in accordance with label instructions, to the Service and CDFG. In late January and February 2002, the Service determined that it would take a substantial length of time to prepare and process adequate scientific information necessary to analyze the biological effects of each chemical on the Covered Species. Thus, the Land Use Agencies recommended that the NBHCP exclude chemical coverage for the Water Agencies but that the Water Agencies continue to be included in the NBHCP for the other covered activities (e.g., mechanical activities such as mowing and nonchemical channel maintenance activities). In February 2002, the Boards of Directors of both Water Agencies directed their staff and counsel to remain involved in the NBHCP and to seek 100 percent pesticide coverage within the NBHCP. The Water Agencies continue to be represented in the NBHCP as potential permittees in the event they chose at a future date to apply for ITPs for the activities (excluding pesticides) covered by the 2003 NBHCP and evaluated in its associated EIR/EIS.

In late May 2002, the Land Use Agencies contacted the Water Agencies to determine if RD 1000 would continue to serve as a lead agency for the EIR. On May 31, 2002, the Water Agencies

stated that they would not serve as a co-lead agency on the EIR because pesticide coverage was not addressed in the NBHCP and its associated EIR/EIS.

On June 5, 2002, the Water Agencies presented information to the Service on nine pesticides for which they had requested coverage. Given the Water Agencies decision in March 2002 to pursue 100 percent pesticide coverage, and because of the substantial period of time that would be required to analyze the impacts of various pesticides and rodenticides on the Covered Species proposed by the Water Agencies in their June 5, 2002, letter, these activities are not analyzed in the EIR/EIS for the proposed project. The EIR/EIS does analyze other covered activities requested by the Water Agencies prior to December 2001 (i.e., the activities presented in the NBHCP). Applications for incidental take permits were filed by the City, Sutter, and the Conservancy on August 1, 2002.

On August 26, 2002, the Service published a notice in the **Federal Register** (67 FR 54819) announcing the agency's receipt of applications for ITPs from the City, Sutter, and the Conservancy based on the NBHCP and the availability of a draft EIR/EIS for the applications. Comments were received from the public through December 5, 2002. On April 28, 2003, the Service announced the availability of the Final EIR/EIS and NBHCP in the **Federal Register** (68 FR 22410). The U.S. Environmental Protection Agency followed suit on May 2, 2003 (68 FR 23457).

On May 13, 2003, the City approved the Final NBHCP (Resolution Number 2003-290) and Final EIR (Resolution Number 2003-289), with three changes to the NBHCP and associated documents that will improve protections for Covered Species. Changes include:

1. No mitigation lands will be acquired in Area B. All NBHCP mitigation lands must be acquired in the Natomas Basin;

2. The City may exercise its discretion to require developer/land owners to dedicate mitigation land in lieu of the land acquisition component of the mitigation fees prior to issuance of an Urban Development Permit; and

3. Land owners within the Sutter's Permit Area will be notified annually if they have a Swainson's nest tree on their property. The notice will identify the nest tree and alert the owner to the specific mitigation measures prohibiting the owner from removing the nest tree. This measure requires the City to inform land owners of the NBHCP's avoidance, minimization, and mitigation measures regarding the removal of Swainson's Hawk nest trees (see Section V.A.5.b of the NBHCP).

Sutter approved the Final NBHCP (Resolution Number 03-030) on May 13, 2003. On June 10, 2003, Sutter approved a second resolution (Resolution Number 03-039) to modify the NBHCP and associated documents in order to establish consistency between Sutter's obligations and those of the City. Changes included in the second ordinance include:

1. No mitigation lands will be acquired in Area B. All NBHCP mitigation lands must be acquired in the Natomas Basin;

2. Sutter may exercise its discretion to require developer/land owners to dedicate mitigation land in lieu of the land acquisition component of the mitigation fees prior to issuance of an Urban Development Permit; and

3. Land owners within the Sutter's Permit Area will be notified annually if they have a Swainson's nest tree on their property. The notice will identify the nest tree and alert the owner to the specific mitigation measures prohibiting the owner from removing the nest tree. This measure requires Sutter to inform land owners of the NBHCP's avoidance, minimization, and mitigation measures regarding the removal of Swainson's Hawk nest trees (see Section V.A.5.b of the NBHCP).

Court Opinion

As mentioned above, the City received incidental take authorization from the Service in December 1997 based on the 1997 NBHCP. In February 2000, the National Wildlife Federation and other plaintiffs filed suit against the Service's issuance of the ITP to the City (*National Wildlife Federation, et al. v. Babbitt,* S-99-274 (E.D.Cal.) (*NWF v. Babbitt*). The lawsuit alleged issuance of the ITP violated Sections 7 and 10 of the Act. In addition, the plaintiffs asserted that the Service violated NEPA by preparing an Environmental Assessment rather than an EIS and had violated the Administrative Procedures Act.

On August 15, 2000, Judge David F. Levi issued a Memorandum of Opinion and Order. The Court held that the 1997 NBHCP in most respects satisfied the substantive requirements of the Act as set forth in Section 10(a)(2)(a). The Court also held that, with one exception, relative to whether the Plan "minimizes and mitigates" expected impacts to the maximum extent, the Findings and the Biological Opinion were adequate with respect to the 1997 NBHCP as a whole. The Court also rejected the plaintiff's claims that biological uncertainties associated with, among other things, the NBHCP's adaptive management provisions undermined the legal adequacy of the Plan as a whole and found that the Service's decisions were based upon the best available scientific and commercial evidence.

The Judge's Order found four deficiencies with respect to issuance of the City's Section 10(a)(1)(B) Incidental Take Permit: (1) the record did not support the Service's findings in support of the NBHCP and the Section 10(a)(1)(B) ITP that the NBHCP would minimize and mitigate impacts on Covered Species to the "maximum extent practicable"; (2) the record did not support the "No Jeopardy" findings contained in the Biological Opinion as it applied to issuance of the Section 10(a)(1)(B) ITP to the City; (3) the record did not support the Service's finding that the City would ensure adequate funding for the NBHCP as it applied to issuance of the Section 10(a)(1)(B) ITP; and (4) the Service's decision to not prepare an EIS for the NBHCP and Section 10(a)(1)(B) ITP was arbitrary and capricious.

Pursuant to a Settlement Agreement executed by the parties in the lawsuit (effective May 10, 2001), the Order was modified to allow incidental take protection for limited land development within the City, with the provision of specific mitigation requirements. Following the court's decision, the City, Sutter County and the Conservancy, initiated preparation of a revised NBHCP. That effort culminated in the 2003 NBHCP.

The issuance of ITPs to the City, Sutter, and the Conservancy, in conjunction with implementation of the revised NBHCP, is the subject of this biological opinion.

BIOLOGICAL OPINION

Description of the Proposed Action

Introduction

The NBHCP is a multi-jurisdictional, multi-species, 50-year plan intended to protect and conserve 22 "Covered Species" and other biological resources within the Natomas Basin in Sacramento and Sutter Counties. It is the conservation plan designed to support applications for federal ITPs under Section 10(a)(1)(B) of the Act, as well as applications for ITPs under State law pursuant to Section 2081(b) of the California Fish and Game Code. The NBHCP relies on total development in the Basin being limited to 17,500 acres (including the Metro Air Park development in Sacramento County ("MAP")). Its basic mitigation strategy is to protect and manage in perpetuity 0.5 acre of habitat for every one acre of development in the Natomas Basin allowed under adopted land use plans (Authorized Development). This is accomplished through payment of a mitigation fee by developers and land owners prior to issuance of urban development permits from the City, Sutter, or Sacramento County. Fees are required for development, regardless of the habitat quality of the land being developed. The NBHCP is described in greater detail below.

This NBHCP builds on the 1997 NBHCP, which was the basis for issuance of an ITP to the City of Sacramento. The 1997 NBHCP was updated and modified to address the deficiencies cited by the court in *NWF v. Babbitt*. The revised NBHCP also reflects participation by Sutter and the Conservancy, with possible participation by Natomas Mutual and RD 1000.

The purpose of the NBHCP is to promote biological conservation in conjunction with economic and urban development within the areas covered by the ITPs (Permit Areas). The NBHCP establishes a multi-species conservation program to minimize and mitigate the expected loss of habitat values and incidental take[1] of Covered Species that could result from urban development

[1]"Incidental take" as used in this opinion in reference to the Covered Species refers solely to covered animal species. Plant species are "covered" by the permits in recognition of the conservation measures incorporated into the NBHCP for them and, like covered animal species, receive assurances under the Service's "No Surprises" rule.

and certain activities associated with the Conservancy's management of its system of reserves established under the NBHCP. The intent of the NBHCP is to minimize incidental take of the Covered Species in the Permit Areas and to provide avoidance, minimization, and mitigation measures for the impacts of Covered Activities on the Covered Species and their habitat.

The NBHCP applies to the 53,537-acre area interior to the toes of the levees surrounding the Natomas Basin, located in the northern portion of Sacramento County and the southern portion of Sutter County (Figure 1). The Basin is bounded on the west by the Sacramento River levee, on the north by the Natomas Cross canal, on the east by the Natomas East Main Drainage Canal, and on the south by the American River levee (Figure 2). The Basin contains incorporated and unincorporated areas within the jurisdictions of the City, Sacramento County, and Sutter. The Sacramento International Airport is located in the Basin. The southern portion of the Basin is urbanized, but most of the Basin is used for agriculture. Certain conservation measures proposed by the applicants would apply outside the Basin. For example, measures proposed to minimize Swainson's hawk nest disturbance include all hawk nests within ½ mile of development; not just those nests located interior to the toes of the levees of the Basin.

The NBHCP serves as the operating conservation plan (OCP) for three proposed ITPs from the Service, pursuant to Section 10(a)(1)(B) of the Act. The three proposed permittees are: (1) the City; (2) Sutter; and (3) the Conservancy. The ITPs would cover 22 species. Such authorization is needed because the City and Sutter have approved land use plans which designate areas of the Basin which may provide for urban development. Urban development will impact Covered Species and the habitat which supports those species. Additionally, the Conservancy is seeking take authorization related to the acquisition, restoration, and management of a system of habitat reserves on behalf of the City and Sutter.

Overall biological goals and objectives of the NBHCP include:

1. Establish and manage in perpetuity a biologically sound and interconnected habitat reserve system that mitigates impacts on Covered Species resulting from Covered Activities and provides habitat for existing, and new viable populations of Covered Species.

2. Implement an adaptive management program that responds to changing circumstances affecting Covered Species and their habitats.

3. Maintain and operate flood control, irrigation and drainage facilities in a manner that minimizes take of Covered Species and promotes vegetative cover that enhances habitat values for Covered Species, consistent with the Water Agencies' legal obligations.

4. Preserve open space and habitat that may also benefit local, non-listed and transitory wildlife species not identified within the NBHCP.

5. Ensure that direct impacts of Authorized Development upon Covered Species are avoided or minimized to the maximum extent practicable.

6. Minimize conflicts between wildlife and human activities, including conflicts resulting from airplane traffic, roads and automobile traffic, predation by domestic animals, and harassment by people.

7. Ensure connectivity between Conservancy reserves to minimize habitat fragmentation and species isolation. Connections between reserves will generally take the form of common property boundaries between reserves, waterways (primarily irrigation and drainage channels) passing between reserves and/or an interlinking network of water supply channels or canals.

8. Within individual Conservancy reserves, provide a mosaic of habitats that support both wetland and upland species, and that are configured to support species that utilize both types of habitat. The Conservancy will develop each monitoring plan and will submit the plan for review by NBHCP TAC and approval by the Wildlife Agencies prior to implementation.

9. Implement monitoring programs with qualitative and/or quantitative monitoring methods to evaluate management objectives and strategies for the reserve system.

10. Increase the diversity and abundance of Covered Species on reserve lands.

11. Revise the reserve design and management based on the most current biological data.

In addition to the overall biological goals and objectives, the following wetland species habitat goals and objectives have been proposed:

1. Acquire, enhance and create a mosaic of wetland habitats with adjacent uplands and connecting corridors to provide breeding, wintering, foraging, and cover areas for wetland species in the Plan Area.

2. Provide habitat to maintain, attract and sustain viable populations of the Covered Species. The habitat areas should be configured to encompass natural species migration areas, minimize species isolation, and prevent future habitat fragmentation.

3. Document population trends of Covered Species through monitoring.

In addition to the overall biological goals and objectives, the following upland species habitat goals and objectives have been proposed:

1. Acquire, enhance and create a mosaic of upland habitat types for breeding, foraging, and cover for species dependent on upland habitats.

2. Ensure reserve land connectivity with travel corridors for upland-dependent species. The habitat areas should encompass grasslands, agricultural croplands, riparian habitats, and shelter and nesting habitat areas (fence rows, clusters of shrubs and small trees), as well as wetland areas to provide a year-round source of water for upland species. The upland areas should be configured to enhance natural species migration, minimize species isolation, and prevent future habitat fragmentation.

The City is seeking take coverage for impacts to Covered Species associated with a total of 8,050 acres of authorized development located within the City's proposed Permit Area (Figure 2). Approximately ten acres of the total 8,050 acres covered by the City's ITP are for drainage improvements to widen the West Drain outside of the City limits, in Sacramento County. The ten-acre area has already been disturbed in compliance with the 1997 HCP. The proposed ITP would extend take coverage for Covered Species within the City's Permit Area and would cover urban development, public projects and associated infrastructure.

Sutter's proposed ITP would authorize incidental take of Covered Species associated with urban development, public projects and associated infrastructure on 7,467 acres of land within Sutter's Industrial/Commercial Reserve area, which is located in the southeast portion of Sutter County within the Basin (Figure 2). Sutter County's authorized development would be located within the proposed Sutter Permit Area, except for infrastructure improvements in northern Sacramento County. There is currently one proposed Sutter County public facility project: drainage channel improvements to support the South Sutter County Specific Plan area. The proposed drainage improvements are located on land in Sacramento County outside the Sutter County Industrial/Commercial Reserve and involve expanding two existing RD 1000 drainage channels (East Drainage Canal and the Montna Drain) to accommodate additional storm water flows. These channels are located within Sacramento County immediately south of the Sutter-Sacramento County boundary (Figures 2 and 3). To the extent that these channels and their associated levees and access roads are expanded beyond the footprint of the existing facilities, Sutter will consider the expansion of these facilities as urban development subject to the provisions of the NBHCP. Such increases in the footprint of the drainage channels are considered part of Sutter's 7,467 acres of authorized development.

The ITP that the Conservancy is seeking is to cover activities related to the acquisition, establishment and management of the system of habitat reserves that will be created throughout the Natomas Basin, including the land bounding the Natomas Basin and extending to the edge of the water (i.e., Natomas Cross Canal, Natomas East Main Drain, and American River) immediately outside the Natomas Basin levees, and Area B (Figure 4). However, because the City and Sutter will not acquire NBHCP mitigation lands in Area B, the Conservancy will not acquire NBHCP mitigation lands in Area B and any permit issued to the Conservancy would be restricted to lands within the Natomas Basin. Within its Permit Area, the Conservancy is seeking incidental take coverage for managing reserves; preservation, creation, restoration, and enhancement activities; and monitoring the HCP's success in meeting its biological goals.

The City and Sutter will each be required to mitigate the impacts of their own Covered Activities. Therefore, because they have separate permits and are mitigating their impacts separately, if either one of the permits is revoked, other than the Permit issued to the Conservancy, the other Permits would remain in effect. This is consistent with the design of the NBHCP as a mitigation tool which can be used by the various Permittees to obtain the necessary ITPs needed to conduct otherwise lawful activities within each entity's respective jurisdictional boundaries. Although the mitigation strategy provided for under the NBHCP would mitigate for effects resulting from the Land Use Agencies' Covered Activities, because the percentage of uplands to wetlands differs between their respective Permit Areas, the NBHCP allows for the mitigation strategy provided for under the NBHCP to be reevaluated in the event either the City's or Sutter's Permits are terminated or revoked. The mitigation strategy would be reevaluated to ensure that the configuration of Conservancy reserves provided for under the NBHCP continues to adequately mitigate for the impacts of authorized development in the remaining jurisdiction(s) participating in the NBHCP. In the event that the Service determines pursuant to Section 7.6.1 of the NBHCP IA that the Conservancy has violated the terms of the NBHCP, the Permits or the NBHCP IA, such violation would be considered a failure by City and Sutter to implement their obligations of the Operating Conservation Program under the NBHCP. In the event the Service or CDFG make the determination set forth in Section 3.1.11(a) of the NBHCP IA, the City and Sutter's Permits would not be revoked or suspended, provided the City and/or Sutter implement corrective measures, within the period specified by the Service and/or CDFG, to remedy Conservancy's violation. Among the corrective measures the Service may require are: (1) replacing the Conservancy with another conservation entity qualified to serve as a Plan Operator; (2) transferring the Mitigation Lands to CDFG in accordance with Section 3.2.12 of this NBHCP IA; (3) implementation by the Conservancy of measures specified by the Service and/or CDFG as necessary to remediate the violation unless the Service or CDFG determine that continuation of the Permits would appreciably reduce the likelihood of the survival and recovery of a Covered Species in the wild or the Service or CDFG determine that the violation renders the City or Sutter unable to implement successfully the NBHCP; or (4) implementation by the City and/or Sutter of measures necessary to remediate the violation. Should the Service or CDFG determine that the City or Sutter has violated their separate obligations under the NBHCP, the Permits or this Agreement, such violation would not be attributed to the Conservancy nor would the Conservancy's Permits be affected, so long as the Conservancy continues to properly implement its obligations under the NBHCP with respect to the Mitigation Lands, including its obligations as the Plan Operator.

The effectiveness of the NBHCP's OCP to adequately minimize and mitigate the effects of take of the Covered Species due to authorized development depends on the City and Sutter confining development to their respective permit areas and limiting their combined total development to 15,517 acres. The OCP and the NBHCP's effects analysis account for a combined total of 17,500 acres of Planned Development occurring in the Basin (i.e., 15,517 acres within the City and Sutter County's Permit Areas and 1,983 acres of Metro Air Park development in Sacramento County). Because the NBHCP's OCP is based upon the City limiting total development to 8,050 acres within the City's Permit Area, approval by the City of future urban development beyond the 8,050 acres or outside of its Permit Area would constitute a significant departure from the

NBHCP's OCP and would trigger a reevaluation of the NBHCP, a new effects analysis, potential amendments and/or revisions to the NBHCP and ITPs, a separate conservation strategy and the need to obtain a new ITP by the Permittee for that additional development, and/or possible suspension or revocation of the City's ITP in the event the City were to violate such limitations without having completed the required reevaluation, amendments or revisions, or obtained a new permit. Similarly, approval by Sutter of development within the Basin beyond the authorized 7,467 acres or outside of the Sutter Permit Area would constitute a significant departure from the NBHCP's OCP and would trigger a reevaluation of the NBHCP, a new effects analysis, potential amendments and/or revisions to the NBHCP and ITP, a separate conservation strategy and the need to obtain a new ITP by the permittee for that additional development, and/or possible suspension or revocation of the Sutter's ITP in the event Sutter were to violate such limitations without having completed the required reevaluation, amendments or revisions, or obtained a new permit. Any additional urban development within the Basin that occurs outside of the City's and Sutter's Permit Areas, with the exception of the MAP development, also would constitute a significant departure from the NBHCP's OCP and would trigger a new effects analysis, a new conservation strategy, and require the issuance of a new ITP to the party proposing that additional urban development. So long as the City and Sutter limit urban development to their respective Permit Areas and continue to meet their respective obligations under the NBHCP, the OCP and associated Permits would remain valid for each Permittee's Covered Activities.

In February 2002, the Service and CDFG issued ITPs to MAPPOA for the MAP project. The MAP Permit covers 1,983 acres[2] of development in Sacramento County within the NBHCP Area. The effects of that biological opinion are incorporated into the effects analysis of this biological opinion. The MAP HCP and its IA provide for automatic revision of the MAP HCP to incorporate applicable provisions of the revised NBHCP upon approval of the NBHCP by Wildlife Agencies. Extension of applicable NBHCP provisions to MAP will be treated as a revision of the Plan and will not require a permit amendment.

Covered Species

Twenty-two species of plants and animals are addressed by the NBHCP (Table 1). Of those, seven are currently federally-listed as either threatened or endangered. They are: (1) vernal pool tadpole shrimp (endangered); (2) giant garter snake (threatened); (3) valley elderberry longhorn beetle (threatened); (4) vernal pool fairy shrimp (threatened); (5) Sacramento Orcutt grass (endangered); (6) Colusa grass (threatened); and (7) slender Orcutt grass (threatened). The Aleutian Canada goose was formerly listed as a federally-threatened species. Species addressed by the NBHCP that are not or have not been previously federally-listed include: (1) bank swallow; (2) burrowing owl; (3) loggerhead shrike; (4) Swainson's hawk; (5) tricolored blackbird; (6) white-faced ibis; (7) northwestern pond turtle; (8) California tiger salamander;

[2]The MAP Permit covers a total of 2,011 acres of development, including offsite improvements. Twenty-eight acres are located within the City's proposed Permit Area. Therefore, the net impacts attributed to MAP include 1,983 acres.

(9) western spadefoot toad; (10) midvalley fairy shrimp; (11) Boggs Lake hedge-hyssop; (12) delta tule pea; (13) legenere; and (14) Sanford's arrowhead.

Action Area Description

Action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate areas involved in the action (50 CFR 402.02). The proposed action's action area is located in the southern portion of the American Basin and covers the 53,537-acre Natomas Basin (Sacramento County = 36,656 acres, Sutter County = 16,881 acres). It is bounded on the north by the Natomas Cross Canal, on the west by the Sacramento River, on the south by the American River, and on the east by the Natomas East Main Drainage Canal (Figure 2). The Natomas Basin comprises the action area because it encompasses the proposed Permit Areas where the proposed action's effects on Covered Species will occur.

The Natomas Basin is currently divided into three major areas relative to the movement of obligate wetland and aquatic species: a northwestern zone situated north of Interstate 5 and west of Highways 70 and 99, a southwestern zone situated south of Interstate 5 and west of Highways 70 and 99, and an eastern zone located east of the Highways 70 and 99 (Brode and Hansen 1992) (see Figure 5). These roadways are effective barriers to the movements of aquatic species such as the snake. Hydrologic connections are incomplete at best, often consisting of lengthy culverts with little freeboard. These culverts, although not ideal, likely provide the only hydrologic connectivity between the Basin's three geographic areas. The western edge of the northwestern and southwestern zones is bordered by the Sacramento River, likely itself a barrier to the snake and other wetland dependent terrestrial species. The eastern zone is bordered on the east by the Natomas East Main Drainage Canal (a.k.a. Steelhead Creek) and further east, by increasingly less-suitable (upland and higher-gradient stream) habitat for the snake.

Prior to modern reclamation efforts, drainage off the western slopes of the Sierra Nevada Range produced regular flooding and created the Basin as an area of highly fertile, alluvial soils. This early condition was in the form of the large American Lakes, a large expanse of riparian scrub-shrub, and a large expanse of dry farmed open plain. Since, 1914 land reclamation and reclamation facilities, canals, levees, and pumping stations have caused over 80 percent of the Basin to be converted to agricultural production. A high proportion of the Natomas Basin's soils are underlain by impervious clay, which creates poor drainage conditions. These poor drainage conditions favor irrigated rice farming, which became prevalent in the 1900s.

The predominant crops presently produced in the Natomas Basin are rice, corn, sugar beets, grain, tomatoes, and pasture lands. The drainage pattern of the Basin has been altered so that runoff is pumped into the surrounding canals and the Sacramento River at several places. Even with pumping, portions of the Basin are subject to shallow flooding from rainfall that cannot be conveyed quickly enough to external drainage systems.

Natural and uncultivated vegetation types are interspersed throughout the agricultural areas of the Natomas Basin. Natural vegetation is found primarily along irrigation canals, drainage

ditches, pastures, and uncultivated fields. Borders of canals and ditches often have narrow strips of emergent vegetation or wooded riparian areas. Operated by Natomas Mutual and RD 1000, the presence of these water conveyance systems among the mosaic of agricultural fields and riparian areas provide nesting and feeding habitat and migration corridors for a variety of wildlife species inhabiting the Basin.

Implementation of the Proposed NBHCP

Funding

Funding for the acquisition, restoration and management of habitat reserves in perpetuity will be financed through the collection of mitigation fees for authorized development (in acres), as described in Chapter VI of the NBHCP. The number of acres of the authorized development site will be described in the Urban development permit (i.e., a grading permit, notice to proceed, or authorization to commence grading). The Urban development permit will delineate the boundary identifying the parcels or portions thereof to be disturbed by the authorized development project. A mitigation fee will be paid the developer of a particular development project to fund a half acre of mitigation land acquisition and associated habitat enhancement, management, endowment, administration, monitoring, etc. for each gross acre of authorized development. Lands developed prior to the 1997 NBHCP are not covered by the proposed permits or subject to the mitigation fee. The NBHCP Implementation Agreement (IA) for the City and Sutter include detailed maps (see section 4.3 and Exhibits B and C of the NBHCP IA) showing which land parcels are subject to the fee and which parcels are exempt from the fee due to prior development.

Open space remaining within the City's Permit Area such as schools, parks, etc. will count as areas requiring mitigation, unless the Service and CDFG approve the use of such areas as suitable for mitigation and such land is transferred in fee to the Conservancy or is encumbered by a conservation easement in favor of the Conservancy. Any open space land within the developed areas that is counted as mitigation land because the Service and CDFG approved it as mitigation land would be purchased for the Conservancy through the North Natomas Financing Plan - Land Acquisition Program (i.e., development impact fees will be increased to fund acquisition of the buffer area)(Land Acquisition Program). Fees in the Land Acquisition Program are separate from the NBHCP mitigation fee. The Land Acquisition Program funds public land (i.e., community centers, fire station sites, agricultural buffers, freeway buffer land, etc.) in the community plan area. The remaining components of the NBHCP mitigation fee (minus the land acquisition component) will be paid by the party (land owner, developer, etc.) proposing the land as mitigation. The Conservancy is not responsible for paying mitigation fees for enhancement and restoration activities on any of its reserve lands. Sutter has not designated any open space within its Permit Area and therefore, has not established a mechanism for acquiring open space as areas as mitigation.

Individual landowners may donate land to the Conservancy in lieu of payment of some or all of the acquisition component of the mitigation fee. Additionally, the City and Sutter may exercise

their discretion through resolutions approved by City Council (May 13, 2003, resolution number 2003-290) and Sutter Board of Supervisors (June 10, 2003, resolution number 03-039) to require developer/landowners to dedicate Mitigation Land in lieu of payment of the Land Acquisition Component of the Mitigation Fee prior to issuance of an Urban Development Permit. In such cases, the Conservancy, Service and CDFG will determine which lands are acceptable, considering location, proximity to urban uses and roads, and current condition. All land proposed to be transferred in lieu of payment of the land acquisition component of the mitigation fee must be approved by the Wildlife Agencies prior to acceptance by the Conservancy. The project proponent would be responsible for payment of the other components of the mitigation fee.

The Mitigation Fee is composed of the Land Acquisition Fee, Restoration and Enhancement Fee, Administration and Operations & Maintenance, Operations and Maintenance Endowment Fund, and Supplemental Endowment fund. The Land Acquisition Fee Component provides funding for habitat Mitigation Lands acquired by the Conservancy. The costs associated with land acquisition are the costs to acquire the land and transaction costs including legal costs. The fund also provides for a contingency in case land costs spike in any given year prior to updating the fee. Once all land is acquired in order to meet mitigation requirements, this fund will no longer be necessary. The Restoration and Enhancement Fee Component provides funding for restoring and enhancing Mitigation Lands acquired by the Conservancy. For example, the creation of managed marsh would be provided for by the revenues generated in the Restoration and Enhancement Fund. Once all land is acquired and subsequent restoration and enhancement occurs, this fund will no longer be necessary. The Administration and Operations & Maintenance Fund provides for the on-going operation and maintenance of the Mitigation Lands, including the costs to administer the funds collected from the Mitigation Fees. Revenues for this fund are comprised of Mitigation Fees (until all grading permits are issued), farming income, and hunting revenues. This fund is projected to exist in perpetuity. After year 45, as the finance model is currently structured, the Administration and Operations & Maintenance revenues are supplemented by interest earnings from the Operations & Maintenance Endowment Fund. The Operations & Maintenance Endowment Fund is structured as an endowment, such that fee revenue is accumulated as principal that will earn interest income over time. Under the most recent finance model, interest income would be utilized to subsidize funding for the Administration and Operations and Maintenance account after year 45. The Supplemental Endowment Fund was established to accumulate revenue to allow the Conservancy to purchase up to 200 acres of land in advance of all fees being paid or to supplement annual purchases in the case that land prices spike dramatically in any given year. A catch-up fee ordinance enacted by the City on April 3, 2001, (Ord. No. 2001-013) and to be enacted by Sutter will include this fee component. Additional information regarding funding for the NBHCP's conservation strategy is located in Chapter VI of the NBHCP.

The mitigation fee will be reviewed at least annually on or before March 1 of each calendar year the NBHCP is in effect. The mitigation fee shall be adjusted as necessary by the Land Use Agency Permittees to account for inflation or deflation using the Consumer Price Index (CPI) or another suitable index. The mitigation fee also will be reviewed at least annually on or before

March 1 of each calendar year the NBHCP is in effect and adjusted as necessary to reflect actual operation and land costs in the Basin. Fee adjustments will typically originate with a recommendation from the Conservancy to the Land Use Permittees, although any party may recommend such an adjustment. All adjustments to the mitigation fee within a particular local jurisdiction or jurisdictions must be approved by that affected jurisdiction or jurisdictions. Adjustments to the mitigation fee to account for inflation or deflation, or as necessary to maintain the 0.5-to-1 mitigation ratio and to meet ongoing management and monitoring costs, are provided for as part of the Plan's OCP and therefore, do not require amendment of the NBHCP or Permits.

The Conservancy will acquire and manage mitigation lands using the fees collected based on the number of acres approved for authorized development by both Land Use Agency Permittees. The failure of either jurisdiction to raise the mitigation fee in a timely manner and in an amount sufficient to fully implement the NBHCP could potentially compromise the ability of the Conservancy to carry out its responsibilities under the NBHCP. In that event, any shortfall in acquisition of mitigation lands or shortfall in funds available to cover the management and other plan implementation costs, shall be attributed solely to the Land Use Agency Permittee which has failed to adjust its mitigation fee as necessary to fully implement the NBHCP and may result in suspension or revocation of that jurisdiction's permits. However, because the NBHCP requires that a 200 acre cushion of mitigation lands be maintained prior to issuance of urban development permits by the City or Sutter for new authorized development, failure of either the City or Sutter to raise fees to a level adequate to fully fund the plan should never result in a deficit of mitigation lands (see "Phasing of Mitigation Land with Respect to Development" below). Should either the City's or Sutter's permits be terminated or revoked for failure to meet its funding or other obligations under the permits, each would remain obligated pursuant to 50 C.F.R. 17.22(b)(8) and 17.32(b)(8) to complete its mitigation obligations with respect to all authorized development approved by the jurisdiction prior to the revocation or other termination of its permits.

The mitigation fee is based, in part, on the funds necessary to assure the establishment of reserve blocks with 25 percent managed marsh habitat (described below). The Mitigation Fee may also be adjusted periodically at the request of the Service, CDFG or the Conservancy to account for NBHCP revisions, including revisions that: (1) increase up to a total of 75 percent, the percentage of Mitigation Lands converted to managed marsh, or (2) result from ongoing monitoring program results in the Plan Area, determined at the Mid-Point and Overall Program Reviews, or any future Service Giant Garter Snake Recovery Plan or CDFG Swainson's Hawk Recovery Plan (see Section VI.H of the NBHCP), or (3) based upon peer-reviewed scientific information provided such adjustments meet the requirements of Sections VI.E., Section VI.F. and Section VI.H of the NBHCP. The fee may also be increased as necessary to maintain land acquisitions at the 0.5-to-1 mitigation ratio and implement associated management (including restoration and enhancement), including changes identified through the Plan's adaptive management program, as appropriate to ensure the effectiveness of the OCP. Because the mitigation fee consists of individual components (e.g., land acquisition, restoration/ enhancement/monitoring, etc.), the fee may need to be raised with respect to specific fee

components periodically found to be deficient over the term of the permits. In other words, all components of the mitigation fee are subject to fee increases as necessary to ensure that the requirements of each individual component of the NBHCP are met. The Land Use Agencies have committed to adjust the fee as necessary for all additional monetary obligations that may be required to fully implement the land acquisition, ongoing or permanent management (including restoration and enhancement), monitoring, database maintenance, adaptive management, recovery plans, changed circumstances and any other requirements of the NBHCP and NBHCP IA, subject to the limitations described in Sections VI.E, VI.F, VI.H, and VI.K.1 of the NBHCP. Such fee increases are provided for under the Plan's OCP and therefore, do not trigger amendment of the Plan or Permits.

Phasing of Mitigation with Respect to Development

In order to help assure that adequate funding exists for implementation of the NBHCP, the Conservancy will establish and maintain a 200-acre cushion of mitigation lands prior to the approval of any new authorized development by the City of Sutter County. In order to accomplish this, no Urban Development Permits for Authorized Development shall be issued by the City or Sutter after September 30 of each calendar year until the Conservancy notifies the City and Sutter that it has acquired Mitigation Lands which equal the number of acres necessary to meet the mitigation requirement attached to all prior Urban Development Permits issued by the City and Sutter plus an additional 200 acres of Mitigation Land. Furthermore, no new Urban Development Permits will be issued the next calendar year until after the Conservancy notifies the City and Sutter that it has acquired Mitigation Lands which equal the number of acres necessary to meet the mitigation requirement attached to all prior Urban Development Permits issued by the City and Sutter plus an additional 200 acres of Mitigation Land.

Accounting of Mitigation Land

Each Land Use Agency shall collect the mitigation fee prior to issuance of an urban development permit (i.e., grading permit or notice to proceed) and promptly transfer the fees to the Conservancy, identifying by name, location and acreage, each project for which fees have been collected. The Conservancy shall record collection of fees from Land Use Agencies in chronological order, crediting the oldest project to have paid all required components of the mitigation fee with the mitigation lands the Conservancy acquired. Compliance with phasing of mitigation with respect to development must be satisfied with respect to the entire NBHCP Plan Area and not for individual Land Use Agency's Permit Areas. No Urban Development Permits for Authorized Development shall be issued after September 30 of each calendar year until the Conservancy has acquired Mitigation Lands which equal the number of acres necessary to cover the mitigation obligation attached to all prior Authorized Development under the NBHCP plus an additional 200 acres of Mitigation Lands. If the Conservancy falls behind on acquiring mitigation land (i.e., does not maintain the required 200-acre cushion, see above), then the Conservancy must notify all Land Use Agencies and the Conservancy may not accept additional mitigation fees until acquisition of mitigation land is in compliance with Section VI.C of the NBHCP. In addition, the Land Use Agencies shall not allow any development project to proceed

under the ITPs where the Conservancy has not accepted mitigation fees or mitigation lands for that development project. Development of lands for which mitigation fees have been accepted by the Conservancy, and which has met all other requirements of the NBHCP would be allowed to proceed under the ITPs.

The NBHCP requires that at least 25 percent of habitat mitigation lands be established as managed marsh. Therefore, the Conservancy will specify the acreage, location, and type of reserve land (i.e., rice land versus marsh), and the percentage of each with respect to the total lands acquired to date in its annual report. The 25% managed marsh requirement applies to the entire Natomas Basin collectively (i.e., to all Land Use Agency jurisdictions and Permit Areas), not to each Permit Area individually.

The Final NBHCP has been revised to eliminate a provision which would have allowed up to 20% of the mitigation lands to be acquired in Area B under certain conditions. However, as stated earlier, both the City and Sutter have decided (Sutter Resolution Number 03-039, City Resolution Number 2003-289) to not allow mitigation lands to be acquired in Area B; therefore, no mitigation lands may be acquired in Area B, and the NBHCP has been updated to reflect that modification.

The MAPHCP states that MAP will utilize the Conservancy for acquisition and management of habitat reserves. MAP will rely on the County of Sacramento to collect mitigation fees, and the County of Sacramento will convey these fees to the Conservancy. Additionally, the Conservancy will include information on MAP's urban development and associated habitat mitigation within its annual report. Fees collected by the Conservancy on behalf of Planned Development in the MAPHCP Permit Area shall be credited along with fees collected by both Land Use Permittees in chronological order, with the first project among MAP or either Land Use Permittee to have paid the mitigation fee credited with the habitat mitigation lands acquired by the Conservancy and credited to MAP's mitigation obligation.

As stated above, project proponents may elect to transfer mitigation lands in lieu of the mitigation land acquisition fee component of the mitigation fee or may be required to do so by the City and Sutter. In such cases, once the Conservancy, Service, and CDFG have approved transfer of the lands, and the other non-land acquisition portion of the mitigation fee has been paid by the project proponent, the project may proceed. The Conservancy will keep a record of the name, location, and acreage of the project and the mitigation lands transferred to the Conservancy on behalf of the project and include the information in its annual report.

Monitoring under the NBHCP

Two related but separate types of monitoring programs will be required under the NBHCP. First, Compliance Monitoring will document Permittee activities and ensure that NBHCP Permittees complete obligations as specified within the NBHCP. These obligations vary between Permittees, based upon their specific obligations. Second, a Biological Effectiveness Monitoring Plan will be implemented to measure the biological success of the NBHCP

Operating Conservation Program. The Biological Effectiveness Monitoring Plan will provide the biological data necessary to guide and direct the NBHCP OCP. Monitoring shall be performed for the duration of the Permit and in perpetuity per the terms of the Plan.

Compliance Monitoring

Compliance monitoring is verifying that the Permittees are carrying out the terms of the NBHCP, the NBHCP IA and the associated ITPs. The Conservancy will be the primary entity responsible for compiling, retaining, and making available to the Wildlife Agencies data on compliance with the provisions and obligations contained within the NBHCP and the associated NBHCP IA. The Land Use Agencies shall conduct compliance monitoring and report to the Conservancy on their compliance and the compliance of third parties operating under their control and their Permits with regard to their obligations under the NBHCP, including implementation of the NBHCP take avoidance, minimization, and mitigation measures. Compliance Monitoring will include the status of the implementation of the NBHCP terms and conditions (e.g., financial responsibilities and obligations, management responsibilities, and other aspects of the ITPs, NBHCP and NBHCP IA). At each Implementation Annual Meeting, the Conservancy will report to the other Permittees and Wildlife Agencies on the progress of the HCP conservation strategy. The Permittees' compliance with the NBHCP obligations will be reported within the Conservancy's annual report. Additional detail regarding Compliance Monitoring is located in Chapter VI of the NBHCP.

Biological Effectiveness Monitoring

Biological Effectiveness Monitoring will evaluate the effects of authorized development and other Covered Activities and will determine whether the effectiveness of the NBHCP's OCP is consistent with the assumptions and predictions made when the NBHCP was developed and approved. In other words, Biological Effectiveness Monitoring will evaluate if the NBHCP is achieving its biological goals and objectives. The Conservancy will be responsible for completing the Biological Effectiveness Monitoring and will publish the results in its annual report. In order to ensure consistent application of monitoring techniques both upon Conservancy reserves and throughout the Natomas Basin, the Conservancy shall prepare a comprehensive Biological Effectiveness Monitoring Plan (see Section VI.E.2 of the NBHCP for detailed information regarding the Biological Effectiveness Monitoring Plan).

In order to measure the effectiveness of meeting the biological goals and objectives, the Biological Effectiveness Monitoring Plan shall be designed to track population trends of the Covered Species and to evaluate the effectiveness of the mitigation land design, restoration and management in providing habitat and supporting the Covered Species. The monitoring plan shall track population trends on Conservancy reserves as well as at selected non-reserve sites within the Natomas Basin. Non-reserve sites will serve as controls to determine success of mitigation land design and management in supporting and increasing the abundance of Covered Species. Monitoring of non-reserve sites also may provide information to guide future acquisitions and to determine presence and/or use of corridors between reserves. Selection of

non-reserve sites to be monitored will be determined during preparation of the monitoring plan and may differ for the various Covered Species, depending on the management and information needs for those species.
The Biological Effectiveness Monitoring Plan is divided into two primary components: (1) a Basin-wide Biological Effectiveness Monitoring Program designed to evaluate the overall success of Covered Species within the Natomas Basin; and (2) Site Specific Biological Monitoring Programs designed to evaluate the success of Covered Species within Conservancy reserves. The Basin-wide Biological Effectiveness Monitoring Program will include limited monitoring of Covered Species at locations outside of Conservancy reserves, as well as periodic evaluations of Covered Species within the reserves. Site Specific Biological Monitoring Programs will be developed for each block of contiguous Conservancy reserves. The Site Specific Biological Monitoring Programs will be developed in conjunction with, and included within, the Site Specific Management Plans (SSMP) (discussed below) developed for each reserve. In combination, the Basin-wide Biological Effectiveness Monitoring Program and the Site Specific Biological Monitoring Programs constitute the Biological Effectiveness Monitoring Plan. Additional detail regarding Biological Effectiveness Monitoring is located in Chapter VI of the NBHCP.

The Conservancy, in consultation with the Technical Advisory Committee (TAC) and qualified species experts, will design or coordinate the design of Biological Effectiveness Monitoring Programs, both Basin-wide and Site Specific. The TAC is a group of experts representing the Wild life Agencies (CDFG and Service) and Permittees who provides advice and guidance to the Conservancy.

Management objectives for the reserve system, as described in detail in Sections I.C and VI.E.2-VI.E.4 of the NBHCP, will be used to determine whether qualitative or quantitative monitoring methods will be employed and what level of confidence in the results is required. All Biological Effectiveness Monitoring Programs will include thresholds, at which mitigation land management must be modified through the adaptive management process to assure success of the OCP. Preliminary management thresholds are provided in Section VI.F.1 of the NBHCP. Revised management thresholds will be incorporated within two years of issuance of the proposed Permits as part of the Biological Monitoring Programs. The NBHCP does not identify the specific activities to be conducted within the Biological Effectiveness Monitoring Programs. However, it does provide detailed direction for developing suitable Biological Effectiveness Monitoring Programs (see Section VI.E of the NBHCP). For example, the NBHCP Biological Effectiveness Monitoring Program shall include, but is not limited to, the following components and guidelines for monitoring activities:

1. Annual surveys of the Conservancy Permit Area (including Conservancy reserves and selected nonreserve area accessible to the Conservancy) to determine the status of the Swainson's hawk, including presence, density, and reproductive success.

2. Annual assessment of the status of giant garter snake populations within the Natomas Basin. Annual updates of information of locations of giant garter snakes within the Basin as well as other Covered Species.

3. Density and distribution sampling of Covered Species on Conservancy reserve lands every five years. The first five year sampling of Covered Species shall be completed within one year of issuance of Permits under the NBHCP, and subsequently every five years thereafter. Once a Covered Species is found to occupy a Conservancy reserve, yearly monitoring of that Covered Species on the reserve it occupies and any adjacent reserves, as appropriate, will be implemented.

4. The NBHCP Biological Monitoring Program shall specify the number of control locations within the Basin but outside of NBHCP Mitigation Lands that shall be monitored. These sites shall be monitored every year for Swainson's hawk and giant garter snake, and every five years to satisfy monitoring of species throughout the Conservancy's Permit Area other than Swainson's hawk and giant garter snake. Such sites shall be limited to a set of locations that, to the extent that such sites exist in the Basin and are physically accessible, collectively provide suitable habitat to support all Covered Species and shall allow the following:

    a. Determination of the comparative success of Covered Species on non-reserve sites versus on reserve sites.

    b. General documentation of Covered Species presence.

    c. Determination of whether the Mitigation Lands are supporting the general populations of Covered Species found within the Basin.

5. Annual assessment and identification of canals and ditches which provide snake habitat connectivity within and between reserves. This assessment shall be coordinated with the Water Agencies and the Wildlife Agencies. Additionally, the Wildlife Agencies and the Land Use Agencies will notify the Conservancy of any known applications under the Act or Section 404 of the Clean Water Act affecting canals.

6. Evaluations of the Operating Conservation Program and its progress toward its intended biological goals.

7. The Monitoring Program shall provide specific details on the following subjects:

    a. Monitoring methodologies and protocols to be implemented.

    b. Timing of monitoring efforts, including frequency and duration of monitoring efforts.

c. Locations of monitoring, and methodology used to select locations.

d. Personnel required.

e. Effort required and methods of documenting and determining monitoring effort.

f. Methods of analyses of monitoring data.

g. Information expected to be gained from monitoring.

h. Thresholds at which management must be modified to assure success of the conservation plan.

8. The Biological Effectiveness Monitoring Program shall establish a standardized format for annual monitoring and five-year monitoring conducted on behalf of the Conservancy.

Additional detail is provided for the formulation of site-specific management plans.

The Biological Effectiveness Monitoring Programs may require periodic revisions as new methods become available or if monitoring methods are not yielding the expected information. Therefore, the Biological Effectiveness Monitoring Programs and their effectiveness in measuring the success of the NBHCP's OCP will be reviewed at each Midpoint Review (discussed below). In addition, the Biological Effectiveness Monitoring Programs may be reviewed and changed in accordance with the NBHCP's Adaptive Management provisions (see Section VI.F of the NBHCP). In summary, the Conservancy will revise the Biological Effectiveness Monitoring Programs whenever review indicates revision is necessary to effectively monitor success in achieving the NBHCP's biological goals and objectives.

Adaptive Management

Adaptive management is a process that allows the NBHCP's OCP to be adjusted during the life of the Plan to ensure that the most up-to-date information is being utilized, and that the Plan's biological goals and objectives are being achieved. The strategy will define the feedback process and incorporate feedback loops that link implementation and monitoring to a decision-making process. Incorporating new monitoring information is necessary to effect changes in management to achieve the Plan's biological goals and objectives. As identified in the NBHCP, and as is common for a regional plan of long duration and covering multiple species, uncertainties regarding the NBHCP's OCP exist. Adaptive management will allow the OCP to respond to these uncertainties. For the purposes of the NBHCP, the following three adaptive management approaches will be used:

1. Regularly scheduled periodic evaluations of the NBHCP monitoring data, other new scientific information or future recovery plan recommendations by the Conservancy and/or the TAC and a determination linking the information to the Plan's success in implementation and achieving the biological goals and objectives

2. Identifying significant measurable threshold limits (discussed above) for each of the adaptive management objectives that will trigger proposals and solutions requiring a management change. And

3. Conducting a review at the Independent Mid-Point Reviews for Land Use Agencies (discussed below) and the Overall Program Review at 9,000 acres of development (discussed below).

These approaches will be used to evaluate the effectiveness of the established habitats on reserve lands and to implement adjustments to the OCP, as necessary, in order to achieve the biological goals and objectives of the Plan.

The Conservancy will use the annual reporting process to review the compliance and effectiveness monitoring in the adaptive management process. The Conservancy's report will include a summary of findings with specific management recommendations and direction, if applicable.

Adaptive management revisions will be made consistent with the NBHCP's *Amendments and Revision* section (see Section VI.F of the NBHCP). Changes to the NBHCP that are substantial in scope, and are beyond the scope of the adaptive management Program will require the amendment of the ITPs, and additional review and approval under the Act, California Endangered Species Act (CESA), CEQA and NEPA. A more thorough discussion is provided in the "Enforcement, Amendments and HCP Requirements" section below. The Conservancy shall keep a complete administrative record of all NBHCP revisions resulting from the Plan's adaptive management program.

The Conservancy will serve as the database manager for the NBHCP and shall be the central data repository of all scientific data collected through the NBHCP for the life of the permits. In this role, the Conservancy will be responsible for maintenance, management, analysis and distribution of data collected through NBHCP monitoring efforts, as well as serving as a repository for related work conducted by other entities within the Basin. In addition to monitoring data collected by the Conservancy and the other NBHCP Permittees, the database will include documents and reports on new species occurrence records from environmental documents, California Natural Diversity Database (CNDDB) entries and other sources as provided to the Conservancy. The Conservancy shall maintain the database in a form that allows the determination of success of the NBHCP in achieving the biological goals and objectives of the OCP. At a minimum, the database will document in tabular form in a standard spreadsheet program the following data: the numbers and specific locations of each species occurrence within each contiguous block of mitigation land; basinwide data documented on Swainson's hawk and giant garter snake such as population densities, reproductive successes, etc. collected through annual surveys, 5-year surveys, and other observational data; and, Covered Species data for each identified monitoring control site located outside of the mitigation lands. Exact data needs of the Biological Effectiveness Monitoring Program required to evaluate the success of the operating conservation plan in meeting the NBHCP biological goals and objectives will be decided by the Conservancy in consultation with the Service, CDFG, and the TAC. Maps identifying monitoring sites and the specific locations of species occurrences shall be maintained to document the locations of monitoring efforts and the locations for data collected through the NBHCP monitoring efforts. Mapping of monitoring data shall be of adequate detail to evaluate the success of restoration efforts within Conservancy reserves and shall allow comparison of year-to-year monitoring results and five-year monitoring results. Additionally, the Conservancy shall retain mapped information identifying the locations of all mitigation lands and all data reported by the Land Use Agency Permittees related to the location of development authorized under the NBHCP, thereby documenting development lands for which NBHCP fees and other mitigation measures have been satisfied.

Annual Report

The Conservancy shall compile and submit an annual report to the Service and CDFG detailing authorized development activities, habitat acquisition, management, and compliance and effectiveness monitoring activities throughout the Plan Area for the preceding year. The report will be due 120 calendar days from the last day of each calendar year, or portion of a calendar year, during which the Permit is in effect. Each Permittee will be responsible for providing the Conservancy with information in their possession necessary for compiling the annual report.

Program Adaptation for Recovery Plans

The NBHCP's adaptive management provisions allow for revisions to management strategies to incorporate new or modified management strategies, such as those which may be included in recovery plans or in response to monitoring results in the Plan Area or to new scientific information. The NBHCP will incorporate recommendations made pursuant to future recovery

plans where such changes are supported by monitoring results from the Plan Area or new scientific information and when such recommendations:

1. Relate to the physical management of mitigation lands.

2. Would improve the effectiveness of the NBHCP's OCP by identifying relevant new information, approaches, techniques, or species protection needs.

3. Can be implemented within the NBHCP Plan Area.

4. Fit within the overall intent, framework, are consistent with the NBHCP's biological goals and objectives and would not exceed the established mitigation ratio of the Plan. And

5. Will not substantially sacrifice habitat values for Covered Species that are not addressed by the Recovery Plan.

The greatest potential shift in conservation strategies anticipated to result from a future snake recovery plan is a transition from rice cultivation to managed marsh. The NBHCP establishes an initial habitat enhancement obligation for the snake (see snake conservation measures below) and allows adjustments to be made based on the adopted final snake recovery plan, monitoring conducted in the Plan Area, or in response to new scientific information. Any modifications to the NBHCP necessitated by a future snake recovery plan or by other future recovery plans approved for listed Covered Species, are considered a part of the Plan's adaptive management program and will not trigger an amendment to the Permits.

Results of any future CDFG Swainson's Hawk Recovery Plan may also suggest or result in the need for NBHCP modifications to management practices upon mitigation lands. Any changes to the NBHCP resulting from a Swainson's Hawk Recovery Plan are considered a part of the Plan's adaptive management program and will not trigger an amendment to the Permits.

NBHCP Overall Program Review at 9,000 acres of Development

The NBHCP establishes a comprehensive overall program review designed to evaluate the performance and effectiveness of the Plan, to be conducted when and if authorized development within the Basin allowed by the ITPs for the City, Sutter and MAP reaches a total of 9,000 acres (the "Overall Program Review"). This Overall Program Review will be triggered at the point urban development permits covering a total of 9,000 acres of development in the Natomas Basin have been issued by the Land Use Permittees and by Sacramento County for the Metro Air Park. During the review, up to, but not more than, an additional 3,000 acres of additional urban development may be approved. In other words, no more than a total of 12,000 acres of urban development shall be approved prior to completion of the Overall Program Review.

The Overall Program Review shall specifically address the following factors: (1) status and

population trends of the snake, hawk, and all other Covered Species within the NBHCP area, especially with respect to those biological factors that are directly affected by Covered Activities under the Plan; (2) status and effectiveness of the Plan's habitat reserve system, including its buffer and setback requirements; (3) the Plan's success in meeting the 2,500-acre and 400-acre minimum habitat block size requirements; (4) the status and effectiveness of the Plan's funding mechanisms; (5) the relative status and distribution of developed lands and reserve lands within each of the Land Use Agency jurisdictions (the City, Sutter, and MAP); (6) the success of the 25% managed marsh/50% rice/25% upland reserve system for supporting the Covered Species, and (7) compliance of the Water Agencies (RD1000 and Natomas Mutual) with approved canal and ditch maintenance practices (not covered under the ITPs).

The review shall be conducted through consultation among all affected Permittees, the Conservancy, the Service, and the CDFG, which shall be known collectively as the NBHCP Review Board. The Conservancy shall inform the other parties, in writing, when the 9,000-acre trigger for the overall program review has been reached and shall initiate and coordinate the review.

Results of the review shall consist of a written report presenting the conclusions of the Review Board. These conclusions shall address each of the factors described above. The report shall also present recommendations consisting of the following or of a combination thereof: (1) a recommendation that the NBHCP is functioning as intended and that no revisions to the Plan's measures, in addition to those originally set forth, are necessary; (2) a recommendation that the NBHCP is significantly in need of correction and the specific corrective measures that are needed; and (3) a recommendation as to whether such corrections should be treated as an NBHCP revision under the Plan's adaptive management provisions, or whether the corrections exceed the scope or intent of the adaptive management process and should be treated as an amendment of the Plan's associated Section 10(a)(1)(B) and Section 2081 Permits. Upon completion of the review, the Service and CDFG shall, depending on the results, either document in writing that the NBHCP is functioning as intended and that no Plan revisions or Permit amendments are necessary, or assist the Permittees in revising the NBHCP and, if necessary, amending their respective Permits, as needed. The Review Board's report shall be made available to the public for review and comment before written findings are made by the Service and CDFG. If it is determined that substantial revisions to the NBHCP need to be made through amendment of the Permits, all statutory and regulatory requirements including those regarding public notice and review under the Act, NEPA and CEQA shall be completed.

If the findings of an adopted final snake recovery plan and Overall Program Review, monitoring results from the Plan Area, or new scientific data indicate, the managed marsh component of mitigation lands may be increased to 75% within sites acquired subsequent to such review, results, determination or Recovery Plan adoption. Such increase would only be made following written notice from the Service, supported by documentation and technical analysis, demonstrating the need for an increased percentage of managed marsh.

Independent Mid-Point Reviews for Land Use Agencies

In addition to the NBHCP Overall Program Review, both the City and Sutter will conduct Independent Mid-Point Reviews as development occurs within each Land Use Agency's Permit Area. Thus, up to three program reviews (one overall and two independent reviews) may be completed, depending on the timing of development within the City and Sutter. The Independent Mid-Point Reviews conducted by the City of Sacramento and Sutter County shall address each of the factors noted for the 9,000 acre overall program review above, as well as the expanded evaluation of progress on the 2,500 acre preserve, and minimum preserve size (discussed below).

If the findings of any of the Independent Mid-Point Reviews, ongoing monitoring results from the Plan Area, new scientific data or an adopted final snake recovery plan so dictate, the managed marsh component of mitigation lands may be increased to 75% within sites acquired subsequent to such review, results, determination or Recovery Plan adoption. Such an increase would only be made following written notice from the Service, supported by documentation and technical analysis, documenting the need for an increased percentage of managed marsh.

The City's independent Mid-Point Review will begin once urban development permits for 4,000 acres of authorized development have been approved within the City's Permit Area and the review will be completed before the City has approved urban development permits for 5,500 acres of development under the NBHCP. As of December 31, 2003 the City had approved 4,324.1 acres of development within their Permit Area (City 2003a). On June 19, 2003, the City notified the Service that it would commence its Independent Mid-Point Review upon approval of the proposed ITP by the Service (if approved) and that it would complete the review before it issues a total of 5,500 acres of Urban Development Permits (City 2003b). Sutter will begin its Independent Mid-Point Review once Sutter has approved urban development permits for 3,500 acres of authorized development permits and will complete the Independent Mid-Point Review before Sutter approves urban development permits for 5,000 acres of development under the NBHCP.

Should the timing of the City of Sacramento's Independent Mid-Point Review, Sutter's Independent Mid-Point Review and/or the overall 9,000 acre program review coincide, then the affected Land Use Permittee(s) may request the program reviews be combined under a single evaluation. Such request shall be made to the Service and CDFG and may be granted at the discretion of the Service and CDFG. Any revisions to the NBHCP made as a result of either Independent Mid-Point Review shall apply to both Land Use Agencies (and MAPPOA), unless the change affects only a particular Permittee.

Unforeseen Circumstances/"No Surprises"/Changed Circumstances

"Unforeseen circumstances" is defined as changes in circumstances affecting a species or geographic area covered by a conservation plan that could not reasonably have been anticipated by plan developers and the Service at the time of the NBHCP's negotiation and development, and that result in a substantial and adverse change in the status of the Covered Species (50 C.F.R. 17.3).

The “No Surprises” Rule states, in part, that when negotiating unforeseen circumstances, the Service will not require the commitment of additional land, water or financial compensation or other natural resources beyond the level otherwise agreed upon for the species covered by the conservation plan without the consent of the Permittee (63 FR 8859).

The assurances contained in the No Surprises rule apply only “where the conservation plan is being properly implemented, and apply only with respect to species adequately covered by the conservation plan.” For purposes of the No Surprises assurances, the term “operating conservation program” shall mean the specific conservation, mitigation, and management measures provided under the NBHCP to minimize and mitigate the impacts of incidental take of the Covered Species.

The NBHCP’s adaptive management provisions allow the NBHCP to be revised as a result of new recovery plans, new research into the Covered Species, and ongoing monitoring programs in the Plan Area. As a result, revisions may be made to the NBHCP's OCP, including reserve land management and enhancement, and monitoring of the Covered Species pursuant to the Plan’s adaptive management provisions, that may result in additional mitigation and costs, provided such revisions meet the requirements of Sections VI.E and VI.F of the NBHCP. Because such revisions and changes are provided for under the Plan, they are not subject to the restrictions on additional mitigation contained in the No Surprises Rule. The following elements of the plan are not subject to revision as part of the NBHCP’s adaptive management provisions or as a result of the overall or individual jurisdiction reviews: (1) the 0.5-to-1 mitigation ratio; (2) the 75% limit on the amount of reserve lands to be converted to managed marsh; and (3) any other change not currently described in or provided for under the adaptive management program, changed circumstances, or other elements of the NBHCP’s OCP that would increase the Plan's costs or restrictions on land otherwise available, including any such changes resulting from the 9,000-acre review Overall Review process or Independent Mid-Point Reviews.

Another category of circumstances under the federal "No Surprises" rule is "changed circumstances." This term is defined under the rule as "changes in circumstances affecting a species or geographic area covered by a conservation plan that can reasonably be anticipated by plan developers and the Service and that can be planned for (e.g., the listing of a new species, or a fire or other natural catastrophic event in areas prone to such events)" (50 C.F.R. 17.3). A number of possible changed circumstances are addressed in Chapter VI of the NBHCP. Examples include, but are not limited to: (1) listing of new species; (2) availability of new scientific information; (3) approval of new recovery plans; (4) problems in implementing the NBHCP; (5) fire or flood; (6) invasive species; (7) changes in water availability; and (8) non-participation by a Land Use Agency in the NBHCP.

Enforcement, Amendments, and HCP Requirements

The Service may suspend the ITP of a Permittee if that Permittee fails to implement the NBHCP in accordance with the terms and conditions of the ITP and as provided for under applicable regulations. Suspension or revocation of a Section 10(a)(1)(B) permit, in whole or in part, by the Service shall be in accordance with 50 CFR 13.27-29 and the NBHCP IA.

If one of the Land Use Agencies fails to obtain its Permits or has its Permits revoked for failure to comply with the NBHCP, the essential effect to the implementation of the NBHCP is that less authorized development is covered by the NBHCP. With regard to funding adequacy, the reduction in authorized development would result in a similar reduction in acres of mitigation land to be acquired, restored, managed, enhanced and administered as reserve lands in perpetuity. Therefore, the Conservancy would have to continue to implement the NBHCP as it applies to the reduced authorized development and the Covered Activities within the participating Land Use Permittees' Permit Areas. The NBHCP provides for adjustments to the mitigation fee to fund the acquisition, restoration, creation, enhancement and management of reserves on a 0.5 to 1.0 mitigation basis.

There are two types of changes which may be made to the NBHCP and/or the NBHCP Permits and/or its associated documents: (1) revisions; and (2) amendments. Any revisions or amendments shall be in accordance with all applicable legal requirements, including but not limited to the Act, NEPA, CESA, CEQA, and any other applicable state and federal laws and regulations. The Conservancy shall process all amendments and revisions to the NBHCP, circulating proposed changes to all parties and, if appropriate, approving the amendment or revision by action of the Conservancy's Board.

Revisions to the NBHCP are changes to the Plan provided for under the OCP, including adaptive management changes and mitigation fee adjustments. These revisions would not result in operations under the NBHCP that are significantly different from those analyzed in connection with the NBHCP as approved, or result in adverse impacts on the environment that are new or significantly different from those analyzed in connection with the NBHCP as approved. Revisions to the NBHCP may include, but are not limited to: (1) updating construction "windows" for the NBHCP Covered Species; (2) correction of any maps or exhibits to correct errors in mapping or to reflect previously approved changes in the ITPs or NBHCP; (3) establishing and amending preconstruction survey methodologies, including modifying timing of NBHCP preconstruction survey methodologies; (4) modifying existing or establishing new incidental take avoidance measures; (5) modifying reporting protocols for annual report s; (6) minor changes to survey, monitoring or reporting protocols; (7) revising reserve enhancement and management techniques; (8) establishing new reserve design criteria; (9) revising reserve enhancement or management practices in conjunction with SSMPs; (10) approving recreational or income-generating uses for the NBHCP reserves that are consistent with the biological goals and objectives of the NBHCP's OCP; (11) making annual adjustments to the NBHCP mitigation fee to keep pace with inflation, or as necessary to fully implement the NBHCP's OCP, including its adaptive management provisions and responses to changed

circumstances; (12) changes to the membership of the TAC which retains representation from the Wildlife Agencies; and (13) any other modifications to the NBHCP that are consistent with the biological goals of the NBHCP that the Service and CDFG have analyzed and agreed to and will not result in operations under the NBHCP that are significantly different from those analyzed in connection with the NBHCP, will not result in adverse impacts on the environment that are new or significantly different from those analyzed in connection with the NBHCP, or result in take not analyzed in connection with the NBHCP.

The party proposing a revision to the NBHCP shall circulate to the Conservancy, and the members of the TAC, the proposed revision along with an explanation of why the revision is necessary or desirable; and a description of why the party believes the effects of the proposed revision are more beneficial than or are not significantly different from those described in the NBHCP as originally adopted. The Conservancy shall be responsible for circulating all proposed revisions to the other Permittees for review, as appropriate. If the Conservancy, and the Service and CDFG representatives to the TAC agree to the proposed revision, and no other Permittee objects within the period prescribed by the Conservancy, the Conservancy shall process the revisions to the NBHCP, including, if appropriate, approving the revision by action of the Conservancy's Board. All adjustments to the mitigation fee shall also require approval by the City and Sutter prior to becoming effective within their respective jurisdictions.

If the Service or CDFG representative to the TAC objects that the proposed revision should be processed as an amendment to the NBHCP, the Conservancy may choose to submit the proposed revision to the Service and CDFG for review. If this happens, the Service and CDFG shall each respond in writing to a proposed revision within 60 calendar days of receipt of the request, provided that sufficient supporting documentation is included with the request. The responses shall either concur with the proposed revision or require that the proposed revision by processed as an amendment to the Plan and ITPs. If either the Service or CDFG require the proposed revision to be processed as an amendment, the agency shall include in their written response an explanation for its determination. If approved by the Service and CDFG, the revision shall become effective upon the Conservancy's receipt of the Service's and/or CDFG's approval.

Amendments to the NBHCP will require amendment of Section 10(a)(1)(B) Permits and /or the Section 2081(b) Permits, and may require amendment of the Implementation Agreement. Amendments may include any of the following types of changes to the NBHCP:

1. Proposed revisions required to be treated as Amendments.

2. The listing of a new species within the Plan Area which is not an NBHCP Covered Species but which may be affected by NBHCP Covered Activities and for which a Permittee seeks coverage under the Plan and ITPs.

3. Significant changes to the NBHCP which were not addressed in the NBHCP including, but not limited to:

a. Changes to the method for calculating compensation for incidental take, which would increase the levels of incidental take permitted for the NBHCP.

b. Changes to the mitigation fee, except as otherwise provided for in the NBHCP.

4. Changes to the Covered Activities which were not addressed in the NBHCP as originally adopted, and which otherwise do not meet the Revision provisions above.

5. Extending the term of the NBHCP Permits past the 50-year term.

6. Extension of the NBHCP Permit Area boundaries to allow development under the NBHCP within the City's or Sutter's portion of the Swainson's Hawk Zone beyond the City's designated 252 acres.

7. A proposal to increase the total authorized development permitted under the NBHCP beyond 15,517 acres (17,500 acres including MAP).

Following receipt of a complete application package for a proposed amendment to a Section 10(a)(1)(B) Permit, the Service shall publish a notice of the proposed amendment to the Section 10 (a) Permit in the Federal Register as required by the Act. The Service shall use its reasonable efforts to process the proposed amendment within 180 calendar days of publication, except where longer periods are required by law. The amendment of a Section 10(a) Permit shall be treated as an original permit application. Such applications typically will require submittal of a revised habitat conservation plan, a completed permit application form with appropriate fees, a revised Implementation Agreement, and preparation of an environmental review document prepared in accordance with NEPA.

Conservation Program of the Proposed NBHCP

Introduction

The NBHCP includes several tiers of conservation measures including: (1) creation of a system of habitat reserves as mitigation for the impacts of take of the Covered Species; (2) reserve restoration, enhancement and management measures to support each habitat type and Covered Species; (3) take avoidance and minimization measures to be implemented by the Land Use Agencies and the Conservancy for each species; and (4) an extensive compliance and effectiveness monitoring program to evaluate whether the plan is being implemented as approved and its biological goals and objectives are being met.

Overview of the Habitat Reserve System

The NBHCP includes the acquisition and creation of habitat reserves at a ratio 0.5 to 1. For each acre of land developed within the Plan Area, 0.5 acres of habitat will be restored/enhanced, and protected and managed. The 0.5:1 ratio is constant, regardless of habitat value of the lands lost to development. Therefore, a total of 8,750 acres of habitat will be protected if all of the 17,500 acres of land described in the NBHCP are developed. In addition to mitigation lands provided from the 0.5:1 mitigation ratio, 200 acres of uplands to be managed exclusively for the Swainson's hawk are being provided to mitigate for the loss of Swainson's hawk nest tree and foraging habitat as a result of the MAP project.

The NBHCP requires that habitat reserves include a variety of habitat types to support the various needs of the Covered Species. The initial requirement is for the reserve system to be comprised of 50% managed rice, 25% managed marsh habitat, and 25% upland habitat (Table 2). The NBHCP includes adaptive management provisions. If the Service determines that the 50% rice / 25% managed marsh habitat /25% upland habitat ratio does not adequately protect the snake, then the Service may require that the ratio be changed up to a total of 75% managed marsh habitat / 25% upland habitat in specific circumstances. In order to change the ratio, the Service must provide justification in the form of a written analysis based upon scientific evidence, monitoring results, or a snake recovery plan (when adopted) and meet the NBHCP's requirements. The analysis must illustrate that additional managed marsh is required to support the continuation of the snake in the Basin. The revised ratio would apply to reserves acquired and developed following issuance of the revised ratio. In other words, the revised ratio would not be retroactive.

The NBHCP also allows changing the habitat ratios (i.e., 25% marsh, 50% rice, 25% uplands) if it is determined insufficient Swainson's' foraging habitat is available. Such modifications would be applied prospectively to future Conservancy acquisitions and would not affect existing, improved Conservancy reserves (see NBHCP, Section IV.C.1.e).

As of December 4, 2002, the Conservancy had acquired approximately 2,803 acres. Of that acreage, the Conservancy planned to manage approximately 716 acres (25.5 percent) as marsh, 1,404 acres (50.0 percent) as rice, and 682.8 acres (24.4 percent) as uplands.

General Reserve System Policies

Buffers within the reserve lands. Buffers shall be established so that they are inside the reserve system (i.e., the buffers shall be part of, not outside of reserve lands) and shall count as mitigation land. Buffers between improved wetlands and surrounding land uses will extend from the outside edge of the reserve (i.e., levee toe or maintenance road) to the boundary edge of the improved wetland area. The width of the buffer and the management/uses of the buffer area shall be established at the time a Site Specific Management Plan (SSMP) is prepared for the particular reserve site. Typically, buffers will consist of native or ruderal vegetation and will vary between 9 and 23 m (30 and 75 ft.) in width, based on the compatibility of adjacent land uses. When

agricultural uses are incorporated within a reserve site, such agricultural uses (with appropriate production practices to protect wildlife) may serve as the buffer area. Other uses that may be appropriate within the buffer area include Conservancy access roads. Most buffer areas will provide suitable upland for species. For example, uplands bordering managed marsh reserves would serve as upland habitat for the snake, turtle, or other aquatic species whose habitat requirements include associated uplands. These uplands will also provide value to upland species such as the hawk.

The Conservancy may include buffers measuring less than 9.1 m (30 ft.) in width on reserve lands. In these instances, the decreased buffer widths must be specified in SSMPs, reviewed by the TAC, and approved by the Service and CDFG. Reduction of buffers may occur only where: (1) there is clear evidence that the buffer is unnecessary (e.g., the reserve site is adjacent to another reserve or similar natural habitat); (2) it is determined that buffers are not the best use of reserve land; and (3) the lack of buffers will not create conflicts with adjacent property owners (e.g., issues of vector control or other nuisance). Decisions about the need for buffers and buffer widths shall be included in the SSMPs for habitat reserves.

Connectivity. One of the primary goals of the NBHCP is to ensure connectivity between individual reserves, and connectivity between reserves and surrounding agricultural lands. Connections can be provided along land, through water and through air to enable the necessary mobility of species within their ranges. One primary means of connection between water areas will be the drainage/irrigation canals within the Basin. The primary opportunity for connectivity between reserves is the system of channels maintained and operated by RD 1000 and Natomas Mutual.

The success of the snake in the Basin is dependent, in part, upon the maintenance of some of RD 1000's and Natomas Mutual's channels. Although the NBHCP anticipates that some of RD 1000's and Natomas Mutual's canals will be closed during the life of the ITPs, it also relies on the persistence of other canals to ensure the viability of some Covered Species in the Basin (see giant garter snake effects discussion below). Once Conservancy reserves have been acquired and key connectivity corridors identified, changes in water delivery and drainage operations affecting key channels must be considered by the Conservancy and appropriate actions taken to ensure connectivity is maintained between reserves. One of the mechanisms identified in the NBHCP to ensure viability of the reserve system is through moving reserve components. Other options, which may be used, if necessary, to maintain integrity of existing reserves, include memorandums of agreement, easements, and outright purchases of land, which would be designed to ensure connectivity for the snake between Conservancy reserves.

The NBHCP's Biological Monitoring Program (see NBHCP, Chapter VI) requires that an annual assessment be conducted to determine if connectivity exists within and between reserves. If it is determined that connectivity is being compromised, the Conservancy may use the above methods to reestablish connectivity. If this connectivity is not reestablished, the Wildlife Agencies may determine that the Conservancy is out of compliance with the terms and conditions of its Permits. Because the Conservancy is the Plan Operator, the consequence of this

may be that the City and/or Sutter are out of compliance with the terms and conditions of their Permits, which may lead to suspension or revocation of their Permits.

2,500-Acre/400-Acre minimum habitat block size requirements. The Conservancy will consolidate reserve acquisitions throughout the life of the Permits in order to build larger blocks of habitat reserve lands. Minimum requirements for reserve sizes are discussed below. The connectivity promoted through the required configurations of Conservancy acquisitions should reduce fragmentation and isolation of habitat reserves, thereby increasing the long-term viability of wildlife populations within the Basin.

In order to ensure adequately sized reserves that will support long-term viability of Covered Species, the NBHCP requires that by the end of the 50-year Permits, at least one habitat block within the reserve system will be a minimum of 2,500 acres. The remaining reserve lands must be in habitat blocks that are at least 400 acres in size. However, the Conservancy may acquire properties smaller than 400 acres in size in instances where the TAC determines that the biological resources merit such acquisitions. The basis for the 400-acre minimum block size and 2,500 acre reserve block size is: (1) large blocks minimize the "perimeter effect;" (2) large blocks promote biodiversity by allowing multiple species and niches to occupy the site; and (3) the 400 acre reserve size is considered in the NBHCP the minimum size necessary to allow the persistence of Covered Species.

Setbacks adjacent to reserve lands. Setback zones shall be considered by the Conservancy prior to the acquisition of reserve lands. The purpose of the setback requirement is to minimize the impacts between reserve lands and existing development or lands that are designated for urban development by one of the Land Use Agencies. The setback zone functions as a limitation on where reserve lands can be located. However, the reserve land setback zone does not affect the ability of each of the Land Use Agencies to approve development within the setback zone and adjacent to the boundaries of reserve lands. The setback criteria requires that mitigation lands acquired by the Conservancy or for which conservation easements are obtained shall, at the time of acquisition, be situated at least 244 m (800 ft.) from existing urban lands or lands that are designated for urban uses in an adopted general plan within the City or Sutter Permit Areas. Lands that are located within either the City or Sutter's Permit Area shall not be acquired or accepted as Conservancy Mitigation Lands without the prior review and approval by the decision making body of the Land Use Agency Permittee within which the proposed Mitigation Land is located, as well as Wildlife Agency approval. The NBHCP allows exceptions to the setback width requirement if: (1) the TAC, including its Service and CDFG representatives, concur unanimously in a decision to reduce the setback distance; or (2) if not unanimous, the Service and CDFG concur in writing that a reduction in the setback distance is necessary or appropriate.

Lands in the 800 foot setback zone between urban development and reserve areas will probably be in agriculture or another open-space or non-urban use. However, such lands will likely not be under the control of the Conservancy and will not count as mitigation land. The NBHCP specifically states that the setback standard is not intended to impose an obligation on the

Conservancy or the owners of the setback lands to manage those setback lands in any particular fashion.

Reserve Site Acquisition Criteria

Overall acquisition criteria. The Conservancy proposes to apply the following criteria when evaluating potential reserve acquisitions (see Section IV.C.2 of the NBHCP).

1. Habitat types within Conservancy reserves will generally be as follows: 25 percent managed marsh; 50 percent rice production; and, 25 percent upland habitat. These percentages apply on a Basin-wide basis and percentages within individual reserves may vary from the percentages described above.

2. Land must have legal water rights to an adequate water supply to serve the anticipated uses (wetland or upland) of the proposed reserve. This would normally mean rights to water from the Natomas Mutual (or its equivalent supplier if outside the Basin), but may solely include groundwater if a groundwater well or wells exist on the property and that such the well(s) can meet acceptable water quantity and quality needs.

3. Land must be capable of supporting appropriate agricultural cultivation in conjunction with either wetland or upland habitat reserve.

4. Land must be capable of either supporting or being improved to support various Covered Species associated with the anticipated type of habitat (wetland or upland) proposed for the potential reserve.

5. Upland- or wetland-specific criteria, as described in the following sections, must be applied as determined appropriate by the Conservancy and the TAC.

6. Land must be adequately removed from incompatible urban development or uses.

7. Habitat reserves will be established by the Conservancy in consultation with the TAC. Prior to purchase, all lands being considered for acquisition will be submitted to the Service and CDFG for review and concurrence. Such concurrence will be required before any land acquisitions are completed. However, formal Service and CDFG concurrence may be waived if: (a) the TAC, including the Service and CDFG representatives, unanimously concur with the proposed acquisition and if documentation of such concurrence is placed into the Conservancy's administrative record; or (b) the Conservancy's Board of Directors approves an action pursuant to this section in a regular, noticed meeting of the Board. In the latter example, following approval of the Conservancy's Board of Directors, the acquisition will be approved, unless the Service and CDFG deny the acquisition within 60 days of being notified in writing of the acquisition by the Conservancy.

Additional criteria for wetland and upland reserves are as follows:

Additional acquisition criteria specific to wetland habitat areas. The Conservancy proposes to use the following guidelines to identify lands for wetland reserve area (see Section IV.C.3 of the NBHCP):

1. Land has existing or potential wetland habitat values that currently support or can support, with necessary enhancement and restoration, the snake and other wetland associated Covered Species.

2. Land contains soils that can support rice farming or the type of managed marsh wetlands proposed in the NBHCP.

3. Blocks of reserve lands must be hydrologically connected to other blocks through irrigation and drainage systems or other systems to ensure connectivity and opportunity for travel by snakes between sections of the reserve system. To the extent practicable, reserve lands will also be near or adjacent to other protected habitat lands in order to increase the overall effectiveness and size of protected lands in the Basin for Covered Species.

4. Lands selected to provide for the NBHCP wetland habitat system shall be situated outside areas known to regularly receive deep flood waters (e.g., the Yolo and Sutter Bypasses). They shall also be situated so that they do not directly receive runoff from paved surfaces or inflow from urban storm water drainage systems.

Additional acquisition criteria specific to upland areas (see Section IV.C.4 of the NBHCP). The NBHCP's primary strategy to mitigate impacts to the hawk is to avoid development in the Swainson's Hawk Zone and to acquire upland habitat as mitigation lands inside the Swainson's Hawk Zone. The Swainson's Hawk Zone is an area of the Basin one mile in width that borders the Sacramento River. In order to maintain and promote hawk habitat values, Sutter will not obtain coverage under the NBHCP and ITPs, or grant urban development permit approvals for development on land within the Swainson's Hawk Zone. The City has limited its Permit Area within the Swainson's Hawk Zone to approximately 252 acres located within the North Natomas Community Plan that was designated for urban development in 1994 and will not grant development approvals within the Swainson's Hawk Zone beyond the previously designated 252 acres. Should either the City or Sutter seek to expand NBHCP coverage for development within the Swainson's Hawk Zone beyond that described above, granting of such coverage would require an amendment to the NBHCP and ITPs and would be subject to review and approval by the Service and CDFG in accordance with all applicable statutory and regulatory requirements.

In addition to lands located in the Swainson's Hawk Zone, land outside the zone can be made attractive for the hawk through appropriate habitat design, as specified in Sections IV.C.1.e, IV.C.4, and V.B.4 of the NBHCP and in consultation with the Conservancy's TAC. The goal of these strategies is to maintain optimum nesting and foraging habitat for the hawks nesting in the

zone by providing an abundant and available prey source. In order to optimize the use of the entire Basin by the hawk, the NBHCP also includes maintenance of nesting and foraging habitat for hawks nesting elsewhere in the Basin, as well as acquisition of reserve lands that benefit the other upland-associated species. Upland reserve acquisition criteria include (see Section IV.C.4 of the NBHCP):

1. The land contains known or potential hawk nest trees, or includes or is adjacent to suitable foraging habitat (e.g., agricultural croplands and grasslands).

2. The land is comprised of agricultural croplands or grasslands that, based on crop type or surveys, is expected to have a suitable hawk prey base and, preferably, have historically been used by hawks (as determined by the CNDDB or CDFG data and reports).

3. The land is or can be used to grow crops conducive to hawk foraging, including alfalfa and other hay crops, lightly grazed pasture, fallow fields, or summer harvested row crops. Cotton and other late harvest crops may not be grown.

4. If possible, the land contains appropriate areas for the establishment of riparian woodland habitat, or isolated groves in agricultural fields, for future use by the hawk. Trees which may be planted include valley oaks (*Quercus lobata*), cottonwoods (*Populus fremontii*), willows (*Salix goodingii*), sycamores (*Platanus* sp.), and California walnut (*Juglans californica*).

5. Contiguity of upland reserve sites will be maximized. The hawk conservation objectives in Chapter I of the NBHCP direct the Conservancy to focus acquisition of upland reserves in the Swainson's Hawk Zone. That objective, together with this provision, is intended to ensure that hawk habitat protected in reserves will not be excessively fragmented, either inside or outside of the Swainson's Hawk Zone, and that habitat contiguity will be a primary criteria under which upland reserve sites will be selected. However, the value of edge habitat with wetlands will be considered in reserve design.

6. The land supports or has the potential to support other Covered Species which utilize upland habitat.

Generally, priority for acquiring upland habitat is as follows (in descending priority order): (1) sites located within the Swainson's Hawk Zone; (2) sites that, in the judgement of the Conservancy and the TAC, would provide specific, important benefits to other upland-associated Covered Species (e.g., tricolored blackbird nesting colonies); (3) sites supporting hawk nests or foraging habitat outside the Swainson's Hawk Zone; (4) sites that would provide a good potential for enhancement of upland habitat values; and (5) any other site that would result in a benefit to any upland Covered Species.

Habitat Reserve Restoration and/or Enhancement Conservation Strategies

Preparation of Site Specific Management Plans for Each Reserve. The Conservancy will improve and manage reserves in a manner that will, to the maximum extent practicable, benefit all Covered Species. This shall be accomplished through preparation and implementation of SSMPs. The TAC will participate in the review of the management plans, and shall ensure that the management guidelines are incorporated into each management plan. The Wildlife Agencies (Service and CDFG) will approve all SSMPs. Each SSMP will specify: (1) management policies not otherwise prescribed by the NBHCP; (2) specific management activities, including establishment of suitable monitoring programs; (3) restoration and enhancement needs; and (4) reserve water management. The following design and management criteria shall be considered during the preparation, review and approval of SSMPs for Conservancy reserves:

1. Identification of Covered Species present/habitat requirements determination. An existing Conditions Biological Assessment of newly acquired Conservancy reserves will be conducted to determine the specific Covered Species the parcel currently supports or could potentially support. The results of this survey will be included in the SSMP for the subject Mitigation Land. The habitat type present or desired (e.g., wetlands or uplands) will also be a critical determination in establishing management policies. Management policies and activities will be oriented toward the species and habitats indicated or selected, and specific management policies established will be consistent with the needs of those species or habitats. Land parcels that are unsuitable for or are not expected to support any of the Covered Species will be eliminated from consideration through use of the mitigation site selection criteria described in Sections IV.C.2, C.3.b, and C.4.b of the NBHCP.

2. Access. The Conservancy will protect the Covered Species and their habitat by limiting and regulating public assess to Conservancy reserves. Reserves shall be patrolled to control prohibited and incompatible activities, including, but not limited to, dumping, off-road vehicle activity and trespass.

3. Appropriateness of hunting. Management plans will identify the level of hunting allowed, if any, and will include parcel-specific restrictions to protect the Covered Species during any hunting activities. No take of Covered Species as result of hunting will be covered under the permits.

4. Controlled/prohibited activities. Activities that would potentially conflict with mitigation goals or would endanger habitat resources will be described and controlled or prohibited as necessary. Examples of activities that will typically be prohibited include dumping, vandalism, unauthorized hunting and fishing, collection of plants or animals, and off-road vehicle use.

5. Avoidance of conflicts with the Sacramento International Airport. It is imperative that reserve lands in the vicinity of the Airport be managed to avoid the potential for aircraft/bird collisions and other potential conflicts with Airport operations. Reserve management plans will therefore be developed with these issues in mind. Draft

management plans for reserve lands in the vicinity of the Airport will be submitted to the Airport Facilities Manager to provide a reasonable opportunity for review and comment prior to approval by the Conservancy, Service, and CDFG.

6. Take avoidance. The Conservancy will implement take avoidance measures to minimize potential take that may occur during habitat creation, restoration, preservation, enhancement and management activities on reserve lands. To accomplish this, the Conservancy shall, where applicable, ensure that all take avoidance measures described in Chapter V of the NBHCP are implemented during preservation, restoration, creation, enhancement, management, and use of reserve lands. The Conservancy shall include all take avoidance and minimization measures it deems necessary and appropriate in SSMPs.

7. Habitat enhancements. Water bodies within habitat reserve units shall vary in size, depth and edge planting to provide varied habitat opportunities. Plantings of native trees, including valley oak, cottonwood, and willow shall generally be incorporated within each habitat reserve unit as determined feasible by the Conservancy and the TAC. Additional restoration activities that may be implemented on reserve lands include, but are not limited to, the following: (1) restoring natural drainage patterns/erosion control; (2) exotic/invasive plant control; and (3) domestic/feral animal control.

Habitat Management Conservation Strategies.

General Management Strategies: Consistent with the SSMP prepared for each reserve, management activities can include: (1) control of water supply and availability; (2) suitable agricultural practices (e.g., rice growing for the snake and production of other crops for the hawk); (3) grazing or mowing programs to eliminate weeds or control vegetation; (4) exotic species control; (5) erosion control; (6) enhancement of native plant communities; (7) habitat enhancement activities for the Covered Species (e.g., construction of artificial burrows for the owl; (8) predator control; (9) enhanced ditch and drain management for the ditches owned by the Conservancy on reserve lands; and (10) coordination of any research conducted within reserves with outside species experts and other individuals or groups. Management activities deemed beneficial for some Covered Species will be conducted so that they have a minimal adverse affect on other Covered Species.

Wetland Habitat Management Conservation Strategies: The following strategies are included in the NBHCP regarding conservation practices on wetland preserves:

1. Protection from flooding. The drainage regime for managed wetlands and rice fields in the reserve system will be designed to ensure that snake retreats are not inundated when water is drained from ditches, fields, canals or wetland areas. It is also desirable to locate upland habitats inside the wetland reserve system to avoid flooding of winter retreats.

2. Managed marsh design/management. Managed marsh wetlands, together with associated uplands, rice fields, and water conveyance ditches and canals, are expected to

form a mosaic of diverse wetland habitats in the wetland portion of the reserve system that will support giant garter snakes and other wetland associated species. Embedded within an agricultural landscape dominated by rice farming, managed marsh wetlands based on such biological principles should support the snake as well as many other Covered Species (e.g., white-faced ibis, tricolored blackbird, and northwestern pond turtle). Marsh design and management shall be developed by qualified restoration biologists as part of the SSMP development process. The SSMP will consider, but is not limited to: (1) summer dry-down of seasonal marsh; (2) availability of summer water either as pockets of deeper water that persist in the seasonal marsh or as permanent marsh, located near or adjacent to vegetated banks or suitable upland habitat; (3) open water channels in marsh habitat to provide movement corridors and foraging edge; (4) availability of abundant emergent vegetation and near shore habitat; (5) a good food supply; and (6) availability of diverse habitat elements.

3. Water regime. Seasonal managed marshes will be flooded by mid-April (if not flooded during the winter) so that water and prey are available when the snake emerges from winter retreats. Water will be maintained within the managed marsh through the period when rice fields dry down (approximately mid-August). This irrigation regime is intended to provide alternative habitat to the snake as rice fields are drained and concentrate prey species from rice fields into canals and managed marshes. It is considered advantageous to include within the NBHCP's wetland reserve system some areas of permanent marshes and sloughs interspersed with the seasonal marshes, rice fields, and uplands. This will increase the overall habitat diversity of the reserves for the snake as well as other Covered Species.

4. Upland component of managed marsh. While a portion of the terrestrial component of the managed marsh system will be designed to meet the buffer requirements of the NBHCP, the rest will be designed and managed to meet the needs of the snake and upland Covered Species. The typical proportion of upland habitats within the reserve system will be approximately 20 to 30 percent. Upland areas provide basking and resting sites, escape cover and winter retreats for the snake, as well as foraging and nesting areas for other Covered Species (e.g., loggerhead shrike, tricolored blackbird, burrowing owl, and hawk). Upland areas intended to provide upland habitat for the snake under the NBHCP may consist of dryland pasture, grasslands, levees, and any other land use approved by the TAC.

5. Water conveyance structures/edge. Marsh design should include edge habitat to provide foraging and movement corridors for the snake and other Covered Species. Edge can be created by providing open water channels within marsh to provide open water/emergent vegetation interface. Upland/aquatic habitat interface may also provide edge habitat where sufficient vegetation is present to provide cover for the snake.

6. Vegetation/cover. Vegetation in a managed marsh should support a diversity of wildlife. Plant species that currently occur in the emergent marsh habitat found in the Basin will

be included in the NBHCP's managed marsh wetlands. These include cattails (*Typha latifolia)*, tules (*Scirpus acutus),* rushes (*Juncus* sp.*)*, river bulrush (*S. fluvialtilis*), sedges (*Carex* spp.*, Cyperus* spp.*),* and vervain (*Verbena hastata).* Marsh edges and "islands" will be well-vegetated with plants that discourage the movement of the snake's predators (e.g., herons, egrets, rats, and domestic animals). Plant species such as wildrose (*Rosa* spp.) and thimbleberry (*Rubus parviflorus*) are relatively impenetrable to many predator species but not to the snake and serve as basking sites for the snake. The snake utilizes a variety of sites for escape cover and winter retreats, including small mammal burrows, thick vegetation such as wildrose and thimbleberry, and areas of jumbled rock such as rip rap, chunks of rock, or broken concrete. Management of wetland reserves under the NBHCP shall therefore include protection and/or construction of such types of snake cover and retreats as deemed appropriate by the TAC.

7. Access. Road kills are believed to be a significant snake mortality factor, especially for males (see Chapter II of the NBHCP). Consequently, new roads within reserve lands will be constructed to the minimum extent necessary to provide for the adequate maintenance of the marshes and other reserve lands. If roads already exist in an area acquired as a reserve, access to these roads will be restricted as necessary to protect the reserves from unnecessary disturbance, and as described in the SSMPs.

8. Water control structures. Managed marshes require a controlled source of good quality water at suitable depths, usually less than 0.9 m (3 ft.) (water depth is important to the establishment of appropriate vegetation). Management and enhancement of a managed marsh can be maximized through water control. A variety of water manipulation approaches will be utilized, including levees, stoplog and screwgate water control structures to regulate water flows and depths, and dewatering systems.

9. Mosquito control. Mosquito control programs operate throughout Natomas Basin. Generally, conventional mosquito control methods are compatible with garter snake habitat. Use of mosquito fish and low intensity pesticide applications would not directly threaten garter snakes or their habitat, and mosquito fish may actually serve as garter snake prey. However, mosquito control programs are more focused near urban areas, and the more intensive control methods there could harm giant garter snakes. If necessary, the Conservancy should work directly with Mosquito Abatement Districts to determine suitable methods to resolve mosquito problems near urban areas in a manner consistent with the management of giant garter snake wetland habitats established under the NBHCP. The Site Specific Management Plans prepared for each wetland site shall identify appropriate types of mosquito control and shall also be coordinated as necessary with the Mosquito Abatement Districts. Pesticide use is not a covered activity under the NBHCP and therefore, any mosquito control activities using pesticides would have to be constructed in a manner that does not result in take of Covered Species.

10. Other factors. Managed marshes must be kept clear of winter storm runoff coming directly from urban areas. In addition, preserves cannot be used for any additional

purposes such as flood control or directly receive storm water or other off-site drainage from urban development. Water quality must also be maintained in order to maintain wildlife productivity and preclude the outbreak of wildlife diseases.

Management of reserve rice lands for the snake. The NBHCP recognizes that continued rice farming in the Basin supports the snake and that maintaining rice farming on a significant portion of Conservancy reserve lands is an integral component of the overall conservation strategy. With respect to the selection of rice fields for inclusion in the reserve system and their subsequent management, the following criteria shall be applied:

1. Rice fields will generally be selected in areas that are either within or have connectivity to known snake populations or known occupied snake habitat.

2. Rice fields located in areas designated to receive winter flood waters will be avoided (e.g., the Yolo and Sutter Bypasses).

3. Rice fields in the reserve system will be managed to maximize snake compatibility. This includes maintenance of rice checks, berms, and other water control structures in as natural a state as practicable, maintenance of snake prey species (e.g., mosquito fish) in or near the rice fields through appropriate management, and other measures as appropriate. Management will also, to the extent compatible with snake conservation, be compatible with the needs of commercial rice production. Specific measures for managing rice fields will be determined by the Conservancy in consultation with the TAC and in the SSMPs.

Upland reserve management and conservation strategies. The upland habitat conservation strategy is intended to provide for the long-term protection of existing and potential upland habitat in the Basin that currently supports or could support the hawk and other upland Covered Species. In most cases, upland reserves established and managed for the hawk will also benefit other upland-associated Covered Species (e.g., the loggerhead shrike and burrowing owl). Consequently, selection of upland reserve sites will usually focus on the needs of the hawk, except in cases where, in the judgement of the Conservancy and the TAC, specific or important needs of other upland-associated species can be met at sites not selected primarily for hawks.

General Avoidance, Mitigation And Minimization Measures

Land Use Agencies' Conservation Measures. The Land Use Agencies have proposed to use the following conservation measures:

1. Pre-Construction Surveys. Not less than 30 days or more than six months prior to commencement of construction activities on a specific authorized development site in the NBHCP Area, a pre-construction survey of the site shall be conducted to determine the status and presence of, and likely impacts to, all Covered Species on the site. However, if the sole period for reliable detection of that species is between May 1 and December

31, pre-construction surveys for an individual species may be completed up to one year in advance. The applicant seeking to develop land will be responsible for contracting with Wildlife Agency-approved biological consultants to carry out the pre-construction surveys, and as necessary, to implement specific take minimization, and other conservation measures set forth in the NBHCP and approved by the Service and CDFG. The results of the pre-construction surveys and recommended take minimization measures shall be documented in a report and submitted to the Land Use Agency, Service, CDFG and the Conservancy. Based upon the survey results, the Land Use Agencies will identify applicable take avoidance and other site-specific conservation measures, consistent with the NBHCP, required to be carried out on the site. The approved pre-construction survey documents and list of conservation measures will be submitted by the developer of the authorized development project to the applicable Land Use Agency to demonstrate compliance with the NBHCP. Reconnaissance-level surveys should be conducted prior to species specific surveys to determine what habitats are present on a specific development site and what, if any, more intensive survey activities should be conducted to accurately determine the status of the Covered Species on the site. It shall be the obligation of the developer/landowner to complete such surveys and the Land Use Agency's responsibility to ensure the surveys are properly completed prior to disturbance of habitat. Surveys shall be conducted by Wildlife Agency-approved biologists (e.g., persons with suitable biological, botanical, or related expertise). Note: negative species-specific survey results generally do not obviate the requirement to implement minimization measures prescribed in the revised NBHCP where a pre-construction survey indicates that habitat for a particular listed species exists onsite.

2. Preservation of the area adjacent to Fisherman's Lake. According to the City's North Natomas Community Plan, there is a buffer area along Fisherman's Lake from Del Paso Road to El Centro Road on the City side of Fisherman's Lake, a portion of the West Drain. The exact width of the buffer area has not yet been determined but it will be at least 250 feet (from the City limits), based upon a June 2002, amendment to the North Natomas Financing Plan (C. Shearly, pers. Comm.). The east side of Fisherman's Lake is in the City and the west side is in the unincorporated portion of Sacramento County. Pursuant to the Settlement Agreement, the City has agreed to initiate a North Natomas Community Plan amendment to potentially widen the agricultural buffer along the City side of Fisherman's lake to 244 m (800 ft.).

   Fisherman's Lake, and the immediately adjacent areas are, and will continue to be, owned and managed by RD 1000. The City is creating a buffer along the east side of Fisherman's Lake and has amended the North Natomas Financing Plan to include the buffer area along Fisherman's Lake in the Land Acquisition Program. In the case of acquiring the buffer, the development impact fee is a public land acquisition program fee charged to all developers to fund the acquisition of public lands (i.e., land for community centers, fire stations, etc.). The Fisherman's Lake buffer is part of the public land acquisition program (C. Shearly, pers. comm.). The buffer area will likely be managed by the Conservancy.

3. General Measures to Minimize Take. In order to generally minimize the impacts of development on Covered Species, the City and Sutter shall impose the following requirements on authorized development when approving urban development permits within the Basin:

   a. Tree preservation. Valley oaks and other large trees should be preserved whenever possible. Stands of riparian trees used by hawks and other animals for nesting, particularly adjacent to Fisherman's Lake, will be preserved and restored.

   b. Native plants. The wildlife value of landscaped parks, buffers, and developed areas will be improved by planting trees and shrubs which are native to the Basin.

   c. Protect raptor nests. The raptor nesting season will be avoided when scheduling construction near nests. Specific avoidance criteria are set forth in the species-specific measures (discussed below).

   d. Protected plant/animal species, also referred to as "Special Status Species". Surveys for Covered Species will be conducted during the appropriate season.

Species-Specific Conservation Measures

Avoidance, Minimization, and Mitigation Measures for the Threatened Vernal Pool Fairy Shrimp, Endangered Vernal Pool Tadpole Shrimp, Threatened Colusa grass, Endangered Sacramento Orcutt grass, Threatened slender Orcutt grass, Midvalley Fairy Shrimp, Legenere, and Bogg's Lake Hedge-Hyssop.

Ten species associated with vernal pools or other seasonal wetlands are proposed for coverage under the NBHCP's ITPs, including three shrimp species, five plant species, and two amphibians. Only two of the ten vernal pool species covered by the NBHCP (vernal pool tadpole shrimp and vernal pool fairy shrimp) have been confirmed within the Basin.

Undisturbed areas of vernal pools within the Basin are few and relatively small. The primary purpose of including the vernal pool associated species within the NBHCP is to provide protection to the Conservancy with regard to the management of future wildlife reserves. The complex of wetland/upland habitat to be developed by the Conservancy may provide enhanced opportunities for the establishment and proliferation of vernal pool species. In the event vernal pool species do benefit from the Conservancy's efforts, it will be necessary to provide coverage to the Conservancy for activities that could result in incidental take of them. However, the Land Use Agencies (except MAPPOA) are also seeking coverage because suitable habitat for these species likely exists in their Permit Areas (except MAP).

The Land Use Agencies will employ the following measures to reduce take of the vernal pool fairy shrimp, vernal pool tadpole shrimp, and midvalley fairy shrimp, and to minimize and mitigate for the loss of Colusa grass, Sacramento Orcutt grass, slender Orcutt grass, legenere, and Bogg's Lake hedge-hyssop:

1. Prior to approval of an urban development permit, the involved Land Use Agency will require Wildlife Agency-approved pre-construction surveys. If the surveys determine that Covered vernal pool species are present, the Land Use Agency will require the developer to consult with the Service to determine appropriate measures to avoid and minimize take/loss of individuals. Procedures for reviewing projects that could affect vernal pools and vernal pool species are discussed below.

    a. General biological survey and information required. In the event a biological reconnaissance survey or the pre-construction survey identifies that vernal pool resources are on-site, a vernal pool species-specific biological assessment must be provided by the developer to the Land Use Agency to determine the type and abundance of species present. The species-specific biological assessment must address covered vernal pool plants (i.e., Sacramento Orcutt grass, slender Orcutt grass, Colusa grass, legenere, and Bogg's lake hedge-hyssop), crustaceans (i.e., vernal pool tadpole shrimp, vernal pool fairy shrimp, and midvalley fairy shrimp), and amphibians (i.e., California tiger salamander and western spadefoot toad). The vernal pool plant survey must be a Service-approved plant survey prepared by a Service-approved qualified field biologist and will list the methods of field analysis, condition of habitat, size and acreage of direct and indirect impact (as defined by seasonal inundation and hydric soils and other appropriate characteristics), and species present. The vernal pool crustacean survey will be in accordance with the Service's *Interim Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods* (April 19, 1996) or the most recent Service-approved survey guidelines for vernal pool species (see Appendix L of the NBHCP). The biological assessment must be submitted with the Urban Development Permit application and prior to approval of an Urban Development Permit by the Land Use Agency. If it is determined that wetland and/or vernal pool resources would be disturbed by a project, then take of vernal pool-associated Covered Species would be covered under the NBHCP, subject to the following limitation and guidelines:

        i. Where site investigations indicate vernal pool species may occur, the developer will notify the Land Use Agency regarding the potential for impacts to vernal pool species. Such notification will include biological data (see Section (a) above regarding biological information required) adequate to allow the Land Use Agency, and the Service and CDFG to determine the potential for impacts to vernal pool species resulting from the proposed development.

ii. Following notification by the Land Use Agency, the Service and CDFG will identify specific measures required to avoid, minimize and mitigate impacts to vernal pool species to be implemented prior to disturbance and in accordance with adopted standards or established guidelines (e.g., the Service's programmatic biological opinion for vernal pool species attached as Appendix G to the NBHCP). In some cases, the Service and CDFG may require complete avoidance of vernal pool species, such as where Covered Species such as slender Orcutt grass, Sacramento Orcutt grass, Colusa grass and/or vernal pool tadpole shrimp are found to be present. Such measures will be identified by the Service and CDFG within 30 days or as soon as possible thereafter of notification and submittal of biological data to the Wildlife Agencies by the Land Use Agency.

iii. The requirement by the Service to preserve a vernal pool within development would be based on identification of an intact vernal pool with minimal disturbance where the presence of one or more of the following species is recorded: slender Orcutt grass, Sacramento Orcutt grass, Colusa grass, or vernal pool tadpole shrimp. Prior to requiring on-site preservation of a vernal pool area, the Service will consider the suitability of the vernal pool as Conservancy Mitigation Lands. The Service will not require the vernal pool to be preserved unless it is appropriate as Conservancy mitigation lands. Such vernal pool areas, including any required buffer land dedication, will apply toward the Land Acquisition Fee component of the development project's NBHCP mitigation obligation.

b. Mitigation Strategies. Vernal pool resources (i.e., vernal pool fairy shrimp, vernal pool tadpole shrimp, midvalley fairy shrimp, Sacramento Orcutt grass, slender Orcutt grass, Colusa grass, legenere, and Bogg's Lake hedge-hyssop) identified through site specific investigations will be mitigated in one of three general approaches as described below. Strategies to minimize and mitigate the take of the California tiger salamander and western spadefoot toad will be conducted according to Sections V.A.5 and V.B.4 of the NBHCP.

i. Avoidance and preservation on-site as a means to minimize impacts. In the event the Service requires on-site preservation in accordance with Section a.3 of the NBHCP, on-site mitigation will be required. In the event the Service does not require on-site mitigation, a developer or private land owner may still propose to dedicate fee title or conservation easement for that portion of the property with vernal pool resources and an associated 250-foot buffer surrounding the vernal pool resource to the Conservancy. Acceptance of the offer to dedicate will be subject to review and approval by the Land Use Agency, the Conservancy's Board and the

Wildlife Agencies. The Conservancy's Board of Directors and the Wildlife Agencies will consider the location, connections, species present, condition of the proposed site to be dedicated, and may decide to accept the dedication in lieu of payment of the Land Acquisition Fee portion of the NBHCP Mitigation Fee for the affected acreage. The Conservancy's Board of Directors may accept or decline the offer based on the balance of habitat needs and the biological goals of the NBHCP. If the dedication is accepted, a reduction in the Land Acquisition Fee portion of the habitat Mitigation Fee will be granted the developer for the portion (calculated on an acreage basis) of the site permanently preserved by easement or dedication. However, habitat Mitigation Fees must be paid on the remaining developable acreage on the site, and all fees other than Land Acquisition Fees will be paid for all acres on the site. Additional conditions to preserve the biological integrity of the site (such as reasonable drainage conditions) may be imposed by the Land Use Agency in consultation with the Conservancy and the Conservancy's TAC. In the event the developer does not support on-site preservation or the Conservancy does not accept the offer to dedicate, then one of the following mitigation approaches will be employed.

ii. Construction period avoidance and relocation of vernal pool resources. No grading, development or modification of the vernal pool site or the buffer area extending 76.2 m (250 ft.) around the perimeter of the vernal pool site may occur during the vernal pool "wet" season, as determined by the Service. Protective fencing will be established around the perimeter of the vernal pool site and the buffer area during the vernal pool wet season. In consultation with Conservancy and the TAC, soils and cysts from the vernal pool may be relocated as soon as practicable during the dry season to a suitable Conservancy reserve or other reserve site, provided the relocation/recreation site is approved by Conservancy, TAC and the Service. If it is not practicable to relocate vernal pool resources, and/or the Conservancy and the TAC determine that the Conservancy does not have a suitable reserve site for relocation of resources, then the applicant will follow the mitigation approach outlined in Section (iii) below.

iii. Payment into a Service approved conservation bank. In the event all of the above approaches are not appropriate for the site, the Land Use Agency will require the developer to purchase credits from a Service-approved mitigation bank in accordance with the standards set forth in Table 3. The Service will determine the type and amount of credits to be purchased based on the impacts associated with the development.

In order to ensure that vernal pools and their associated species are adequately protected on reserve lands, the Conservancy will consult with the TAC and vernal pool crustacean experts

periodically during implementation of the NBHCP to determine what, if any, additional conservation opportunities for vernal pool fairy shrimp, vernal pool tadpole shrimp, midvalley fairy shrimp, Colusa grass, slender Orcutt grass, Sacramento Orcutt grass, Boggs Lake hedge-hyssop, and legenere might exist within the proposed reserve system. Any conservation measures identified through this process will be incorporated, as appropriate, into the NBHCP's conservation program through its adaptive management provisions.

Threatened Giant Garter Snake Avoidance and Minimization Measures. The Land Use Agencies have proposed to employ or ensure that the following measures are followed to minimize and avoid the effects of the proposed action on the snake:

1. Within the Basin, all construction activity involving disturbance of habitat, such as site preparation and initial grading, will be restricted to the snake's active period (May 1 - September 30).

2. Pre-construction surveys for the snake, as well as other Covered Species, will be completed for all development projects by a qualified biologist who has been approved by the Service. If snake habitat is found within a specific site, the following additional measures will be implemented to minimize disturbance of habitat and harassment of the snake, unless that project is specifically exempted by the Service:

    a. Between April 15 and September 30, all irrigation ditches, canals, or other aquatic habitat will be completely dewatered, with no puddled water remaining, for at least 15 consecutive days prior to the excavation or filling in of the dewatered habitat. The dewatered habitat will be observed to ensure that it does not continue to support snake prey, which could attract snakes to the project site. If a site cannot be completely dewatered, snake prey items will be removed using netting or other salvage methods.

    b. No more than 24-hours prior to the start of construction activities (site preparation and/or grading), the project area will be surveyed for snakes. If construction activities stop on the project site for a period of two weeks or more, a new snake survey will be completed no more than 24-hours prior to the re-start of construction activities.

    c. Clearing will be confined to the minimal area necessary to facilitate construction activities. Giant garter snake habitat within or adjacent to the project as will be flagged as Environmentally Sensitive Areas and designated as avoided. This area will be avoided by all construction personnel.

    d. Construction personnel completing site preparation and grading operations will receive Service-approved environmental awareness training. This training instructs workers on how to identify the snake and its habitats and what to do if a

snake is encountered during construction activities. An on-site biological monitor will be designated during the training.

e. If a live snake is found during construction activities, the Service and the project's biological monitor will be immediately notified. The biological monitor, or his/her assignee, will halt construction in the vicinity of the snake. The snake will be monitored and allowed to leave the area on its own. The monitor will remain in the area for the remainder of the work day to make sure the snake is not harmed or, if it leaves the site, does not return. Escape routes for the snake should be determined in advance of construction and snakes should always be allowed to leave on their own. If a snake does not leave on its own within one working day, further consultation with the Service will be conducted.

f. Upon locating dead, injured or sick Covered Species, the Permittees or their designated agents will notify, within one working day, the Service's Division of Law Enforcement (2800 Cottage Way, Sacramento CA 95825) or the Sacramento Fish and Wildlife Office (2800 Cottage Way, Room W-2605, Sacramento, CA 95825, telephone 916 414-6600). Written notification to both offices will be made within three calendar days and will include the date, time, and location of the finding of a specimen and any other pertinent information.

g. Fill or construction debris may be used by the snake as an over-wintering site. Therefore, upon completion of construction activities, any temporary fill and/or construction debris will be removed from the site. If the material is located near undisturbed snake habitat and will be removed between October 1 and April 30, it will be inspected by a Wildlife Agency-approved biologist to ensure that snakes are not using it as hibernaculae.

h. No plastic, monofilament, jute, or similar erosion control matting that could entangle snakes will be placed on the project site when working within 200 feet of snake aquatic or rice habitat. Possible substitutes include coconut coir matting, tackified hydroseeding compounds, or other materials approved by the Wildlife Agencies.

i. Fences will be constructed along the shared boundary of urban development and the North Drainage Canal and the East Drainage Canal within Sutter's Permit Area, subject to the following guidelines:

1. A minimum of 30.5 m (100 ft.) will be provided from fence-to-fence and access to the canals will be limited by gates.

2. A snake deterrent will be placed along the fences on the North Drainage Canal and the East Drainage Canal (i.e., fence construction that restricts snake movement or an appropriate vegetative barrier either inside or

outside of the boundary fence). The design of the deterrent will be subject to approval by the Wildlife Agencies.

3. The specific fence/snake barrier design adjacent to a given development will be determined within Sutter County's review of the proposed development and the fence/barrier will be installed immediately after site grading is completed.

i. At the time of urban development along the North and East Drainage Canals, Sutter will consult with the Wildlife Agencies to determine design strategies that would enhance conditions for giant garter snake movement through the North and East Drainage Canals. Possible strategies may include expanded buffer areas and modified canal cross sections if such measures are, in the determination of Sutter and the Water Agencies, found to be feasible.

The Conservancy has proposed to employ the following measures to minimize and avoid the effects of the proposed action on the snake:

1. All construction activity involving disturbance of habitat, such as site preparation and initial grading, will be restricted to the snake's active period (May 1 - September 30).

2. Pre-construction surveys for the snake, as well as other Covered Species, will be completed for all development projects by a qualified biologist who has been approved by the Service. If snake habitat is found within a specific site, the following additional measures will be implemented to minimize disturbance of habitat and harassment of the snake, unless that project is specifically exempted by the Service:

a. Between April 15 and September 30, all irrigation ditches, canals, or other aquatic habitat will be completely dewatered, with no puddled water remaining, for at least 15 consecutive days prior to the excavation or filling in of the dewatered habitat. The dewatered habitat will be observed to ensure that it does not continue to support snake prey, which could attract snakes to the project site. If a site cannot be completely dewatered, snake prey items will be removed using netting or other salvage methods.

b. Construction activities within 200 feet from banks of giant garter snake aquatic habitat will be avoided to the extent feasible. Movement of heavy equipment will be confined to existing roadways to minimize habitat disturbance to the extent feasible.

c. No more than 24-hours prior to the start of construction activities (site preparation and/or grading), the project area will be surveyed for snakes. If construction activities stop on the project site for a period of two weeks or more, a new snake

survey will be completed no more than 24-hours prior to the re-start of construction activities.

d. Clearing will be confined to the minimal area necessary to facilitate construction activities. Snake habitat within or adjacent to the project will be flagged for avoidance. The avoidance area will be avoided by all construction personnel.

e. Construction personnel completing site preparation and grading operations will receive Service-approved environmental awareness training. This training instructs workers on how to identify the snake and its habitats and what to do if a snake is encountered during construction activities. An on-site biological monitor will be designated during the training.

f. If a live snake is found during construction activities, the Service and the project's biological monitor will be immediately notified. The biological monitor, or his/her assignee, will halt construction in the vicinity of the snake. The snake will be monitored and allowed to leave the area on its own. The monitor will remain in the area for the remainder of the work day to make sure the snake is not harmed or, if it leaves the site, does not return. Escape routes for the snake should be determined in advance of construction and snakes should always be allowed to leave on their own. If a snake does not leave on its own within one working day, further consultation with the Service will be conducted.

g. Upon locating dead, injured or sick Covered Species, the Conservancy or its designated agents will notify, within one working day, the Service's Division of Law Enforcement (2800 Cottage Way, Sacramento CA 95825) or the Sacramento Fish and Wildlife Office (2800 Cottage Way, Room W-2605, Sacramento, CA 95825, telephone 916 414-6600). Written notification to both offices will be made within three calendar days and will include the date, time, and location of the finding of a specimen and any other pertinent information.

h. Fill or construction debris may be used by the snake as an over-wintering site. Therefore, upon completion of construction activities, any temporary fill and/or construction debris will be removed from the site. If the material is located near undisturbed snake habitat and will be removed between October 1 and April 30, it will be inspected by a Wildlife Agency-approved biologist to ensure that snakes are not using it as hibernaculae.

i. No plastic, monofilament, jute, or similar erosion control matting that could entangle snakes will be placed on the project site when working within 200 feet of snake aquatic or rice habitat. Possible substitutes include coconut coir matting, tackified hydroseeding compounds, or other materials approved by the Wildlife Agencies.

Threatened Valley Elderberry Longhorn Beetle Avoidance and Minimization Measures.

The Land Use Agencies will require private developers and public infrastructure projects to comply with conservation practices for the beetle set forth in the Service's July 9, 1999, *Conservation Guidelines for the Valley Elderberry Longhorn Beetle* (Beetle Guidelines)(enclosed), which may be updated in the future. In addition, the Conservancy will follow the Beetle Guidelines. Any destruction or loss of elderberry shrub habitat will be mitigated according to the Beetle Guidelines. The Beetle Guidelines, or any revision or successor to the Beetle Guidelines approved by the Service, are incorporated as terms and conditions of the NBHCP.

Swainson's Hawk Avoidance and Minimization Measures.

In order to minimize the cumulative effects of the proposed action on the Swainson's hawk's foraging habitat, Sutter will not obtain coverage under the NBHCP and ITPs, nor will Sutter grant urban development permit approvals, for development on land within the one-mile wide Swainson's Hawk Zone. The City has limited its Permit Area within the Swainson's Hawk Zone to approximately 252 acres in the North Natomas Community Plan that was designated for urban development in 1994 and, likewise, will not grant development approvals within the Swainson's Hawk Zone beyond this designated 252 acres. Should either the City or Sutter seek to expand NBHCP coverage for development within the Swainson's Hawk Zone beyond that described above, granting of such coverage would require an amendment to the NBHCP and ITPs, which would be subject to review and approval by the Service and the CDFG in accordance with all applicable statutory and regulatory requirements. Approval of any Urban Development within the Swainson's Hawk Zone beyond that described above would constitute a significant departure from the Plan's OCP and would trigger a reevaluation of the City's and/or Sutter's ITPs and possible suspension or revocation of the City's and/or County's ITPs.

The Land Use Agencies will employ the following measures to minimize disturbance of the Swainson's hawk's nesting habitat:

1. Prior to the commencement of activities at any development site within the NBHCP area, a pre-construction survey will be completed by the site's developer to determine: (1) whether any hawk nest trees will be removed on-site; or (2) whether any active hawk nest sites occur on or within ½ mile of the development site. These surveys will be conducted by experienced hawk surveyors and according to the Swainson's Hawk Technical Advisory Committee's (May 31, 2000, enclosed) methodology or updated methodologies, as approved by the Service and CDFG.

2. If breeding hawks are identified, no new disturbances will occur within ½ mile of the active nest between March 15 and September 15, or until a Wildlife Agency-approved biologist, with concurrence by CDFG, has determined that the young have fledged or that the nest is no longer occupied. If the active nest site is located within 1/4 mile of existing urban development, the no new disturbance zone can be limited to 1/4 mile. Routine

disturbances such as agricultural activities, commuter traffic, and routine facility maintenance activities within ½ mile of an active nest will not be restricted.

3. Where disturbance of a hawk nest cannot be avoided, such disturbance will be deferred until after the nesting season (March 15 - September 15). If a nest tree must be removed, tree removal will only occur between September 15 and February 1.

4. If a Swainson's hawk nest tree must be removed and fledglings are present, the tree may not be removed until September 15 or until CDFG has determined that the young have fledged and are no longer dependent upon the nest tree.

5. If construction or other project related activities which may cause nest abandonment or forced fledgling are proposed within the 1/4 mile buffer zone, intensive monitoring (funded by the project sponsor) by a CDFG-approved raptor biologist will be required. Exact implementation of this measure will be based on specific information at the project site.

The Land Use Agencies will employ the following measures to prevent the loss of Swainson's hawk nest trees:

1. Valley oaks, tree groves, riparian habitat and other large trees will be preserved wherever possible. The City and Sutter will preserve and restore stands of riparian trees used by the hawk and other animals, particularly near Fisherman's Lake and elsewhere in the NBHCP Plan Area where large oak groves, tree groves and riparian habitat have been identified.

2. The raptor nesting season will be avoided when scheduling construction near nests in accordance with guidelines applicable guidelines published by the Wildlife Agencies or through consultation with the Wild life Agencies.

3. Annually, prior to the Swainson's hawk nesting season (March 15 to September 15) and until build out of their Authorized Development has occurred, the City and Sutter will notify each landowner of any property within the permit area(s) on which a Swainson's hawk nest tree is present, and will identify the nest tree, and alert the owner to the specific mitigation measures prohibiting the owner from removing the nest tree.

The Land Use Agencies will employ the following measures to mitigate the loss of Swainson's hawk nest trees:

1. The NBHCP will require 15 trees to be planted (5 gallon container size) within the habitat reserves for every hawk nesting tree anticipated to be impacted by authorized development. It will be the responsibility of each Land Use Agency approving development that will impact hawk nest trees to provide funding from the applicable developer for the purchase, planting, maintenance and monitoring of trees at the time of

approval of each authorized development project. The Conservancy will determine the appropriate cost for planting, maintenance and monitoring of trees.

2. The Land Use Agency approving a project that impacts an existing hawk nest tree will provide funding sufficient for monitoring survival of replacement trees (as described in item 1 above) for a period of five years. For every tree lost during the five-year monitoring period, a replacement tree will be planted immediately upon the detection of failure. Trees planted to replace trees lost will be monitored for an additional five-year period to ensure survival until the end of the monitoring period. A 100 percent success rate will be achieved. All necessary planting requirements and maintenance (i.e., fertilizing , irrigation) to ensure success will be provided. Trees must be irrigated for a minimum of the first five years after planting, and then gradually weaned off the irrigation in an approximate two-year period. If larger stock is planted, the number of years of irrigation must be increased accordingly. In addition, ten years after planting, a survey of the trees will be completed to assure 100 percent establishment success.

3. Of the replacement trees planted, a variety of native tree species will be planted to provide trees with differing growth rates, maturation, and life span. This will ensure that nesting habitat will be available quickly (5-10 years in the case of cottonwoods and willows), and in the long term (i.e., valley oaks, black walnut and sycamores), and minimize the temporal losses from impacts to trees within areas scheduled for development within the 50-year ITP life. Trees will be sited on reserves in proximity to hawk foraging areas and planted in clumps of three trees each. Planting stock will be at a minimum 5-gallon container stock for oak and walnut species.

4. In order to reduce temporal effects resulting from the loss of mature nest trees, mitigation planting will occur within 14 months of approval of the NBHCP and ITPs. The July 2002 draft NBHCP estimated that four nesting trees within the City are most likely to be affected by authorized development in the near term. Therefore, in order to reduce temporal impacts, the City will advance funding for 60 sapling trees of diverse, suitable species (different growing rates) to the Conservancy within the above referenced 14 months.

5. For each additional nesting tree removed by Land Use Agencies' Covered Activities, the Land Use Agency will fund and provide for the planting of 15 native sapling trees of suitable species with differing growth rates at suitable locations on Conservancy reserves. Funding for such plantings will be provided by the applicable Land Use Agency within 30 days of approving a Covered Activity that will impact a hawk nesting tree.

In the event that foraging opportunities, as identified in Table IV-2 of the NBHCP (i.e., foraging opportunities within Sutter and Sacramento County), are converted to urban uses without adequate provisions to maintain foraging habitat, such that the effectiveness of the NBHCP's OCP is potentially compromised, the City and Sutter would consider and the Conservancy, on behalf of the City and Sutter, would implement appropriate actions, including the following or

similar measures:

1. Modification of acquisition criteria (as defined in Sections IV.C.2.d and IV.C.4.b) to adjust for impacts to foraging habitat outside of reserves. This could include changes to increase the value of future upland reserve habitat acquisitions for the hawk. For example, the criteria could be changed to further maximize the acquisition of habitat reserves in close proximity to suitable foraging habitat while avoiding the habitat areas that have recently been converted to non-compatible uses.

2. Substitution of reserve sites that have not been restored and are impacted by substantial land use changes, with replacement reserve sites that would provide improved foraging habitat opportunities.

3. Modification of the percentages of the habitat types comprising Conservancy reserve sites. For example, the percentage of uplands in reserve sites could be increased. Such modifications would be applied prospectively to future Conservancy acquisitions and would not affect existing, improved Conservancy reserves.

4. Pursuit of outside funding sources, including private, state and Federal grants, to acquire, improve and manage additional Conservancy reserves that would maintain Basin foraging lands. The Conservancy would be responsible for preparing grant applications or undertaking other actions, as necessary, to secure these funds. Such programs would supplement the mitigation fee required by the NBHCP and would not be used to fund NBHCP mitigation obligations. Lack of outside funding would not preclude the City and Sutter County's obligation to implement appropriate action consistent with this provision and their respective obligations under the NBHCP.

The Conservancy will implement the following measures to further enhance habitat and to reduce the potential for take of upland Covered Species during improvement, operation and maintenance of Conservancy reserves:

1. The Conservancy, in conjunction with the Land Use Agencies, will monitor proposed development in the Swainson's Hawk Zone, where the majority of known hawk nest sites are currently located and, hence, much of the hawk nesting and foraging in the Basin occurs. Based upon existing general plans and the City's and Sutter's NBHCP Permit Areas, development in this zone is expected to be limited over the life of the NBHCP. However, if the NBHCP is amended and such development does occur, mitigation lands established for such development will, likewise, be located within the Swainson's Hawk Zone. In addition, the Conservancy will set as a top priority the acquisition of upland reserve sites in the Swainson's Hawk Zone. Further, any upland reserve lands established in the Swainson's Hawk Zone will, to the maximum extent possible, be managed to benefit all upland-associated Covered Species, though any management in this zone will be fully consistent with Swainson's hawk biology and needs.

2. To enhance the success of upland species, Conservancy reserves will include tree plantings of valley oaks, cottonwoods, various willow (including black willow), or other suitable species to recreate suitable nesting sites for the hawk over the life of the NBHCP. Such tree planting will be in reasonable proximity to upland foraging areas covered by the NBHCP, including agricultural areas managed by the Conservancy.

3. For rice fields operated by the Conservancy, production practices will be incorporated that increase habitat for Swainson's hawk. This includes allowing at least 10 percent of rice fields to fallow each year as well as allowing foraging before and after rice flooding.

4. Where possible, upland components of wetland reserves will be developed or restored such that upland Covered Species, including the hawk, also benefit from the habitat.

5. Best management practices to ensure availability of food sources for the hawk [including meadow voles (*Microtus californicus*) and insects] will be utilized. It is expected that improved agricultural practices, timing of water management (floodup and drawdown) on reserve lands, and the increase in edge or ecotone between upland and wetland habitats will greatly enhance upland habitat values for the hawk.

6. The Conservancy, in consultation with the TAC, will formulate specific plans for the acquisition of upland habitat reserve lands by applying the objectives and criteria described above, and consistent with the requirements described in Chapter IV of the NBHCP. Site-specific management plans for reserve sites providing hawk habitat will be developed as described in Chapter IV of the NBHCP.

7. Upland reserves will initially be designed to maintain existing hawk populations and, where possible, to increase such populations through the tree planting program. However, such reserves will be re-designed, as necessary, to meet hawk recovery plan goals, once a Swainson's Hawk recovery plan has been prepared and approved by CDFG.

8. Reserve design will use wildlife-friendly agricultural practices. For health and safety reasons, rodent control measures will be limited to that necessary to maintain structurally sound flood control levees within the Basin.

The Conservancy will implement the following measures to avoid, minimize, and mitigate Swainson's hawk nest disturbance:

1. Prior to the commencement of development activities at any reserve sites, a pre-construction survey will be completed by the Conservancy to determine whether any hawk nest trees will be removed on-site or whether active hawk nest sites occur on or within ½ mile of the development site. These surveys will be conducted according to the Swainson's Hawk Technical Advisory Committee's (May 31, 2000) methodology or updated methodologies, as approved by the SSMP, for the reserve site.

2. If an active hawk nest is identified, no new disturbances (e.g., heavy equipment operation associated with construction) will occur within ½ mile of the active nest site between March 15 and September 15. If the active site is located within 1/4 mile of existing urban development, the no new disturbance zone can be limited to 1/4 mile. Routine disturbances such as agricultural activities, commuter traffic and routine facility maintenance activities within ½ mile of an active nest site will not be restricted.

3. If practicable, disturbance or destruction of hawk nest sites will be entirely avoided by designing the project (including construction activities) to maintain the year-round integrity of the nest site.

4. If practicable, disturbance or destruction of the hawk's nest site will be avoided during the active nesting season through seasonal use or other restrictions that apply annually or as needed.

5. Where disturbance of a hawk nest cannot be avoided, such disturbance will be deferred until after the hawk's nesting season (March 15 - September 15). If any tree must be removed that has an active nest in the year the impact is to occur, the tree removal should

only occur between September 15 and February 1.

6. Disturbance should be avoided within ½ mile of an active nest between March 15 and August 15, or until fledglings are no longer dependent on nest tree habitat (which could be as late as September 15).

7. If a hawk nest tree is to be removed and fledglings are present, the tree may not be removed until September 15 or until CDFG has determined that the young have fledged and are no longer dependent upon the nest tree.

The Conservancy will plant replacement trees in upland reserve areas and where appropriate on the edges of wetland reserves. These trees may be contributed to the reserve as part of the Land Use Agencies' tree mitigation program or may be determined to be important to the habitat enhancement of objectives of the site. The replacement mitigation trees shall include a variety of native tree species with differing growth rates, maturation and life span. This will ensure that nesting habitat will be available quickly (5 to 10 years in the case of cottonwoods and willows) and in the long term (i.e., valley oaks, black walnut and sycamores). Trees shall be sited on reserves in proximity to hawk foraging areas.

Tricolored Blackbird Avoidance and Minimization Measures.

The Land Use Agencies will employ the following conservation measures to avoid, minimize, and mitigate the effects of the proposed action on the blackbird:

1. Prior to approval of an urban development permit, the involved Land Use Agency will require a pre-construction survey of potential breeding and nesting habitat for presence of breeding and nesting tricolored blackbirds.

2. If surveys determine tricolored blackbirds are present, the following measures will be implemented in accordance with the MBTA to avoid disturbance to active (occupied) nesting colonies during the nesting season: (1) a boundary will be marked by brightly colored construction fencing that establishes a boundary 152.4 m (500 ft.) from the active nest site; (2) no disturbance associated with authorized development will occur within the fenced area during the nesting season (April 1 - July 1); and (3) a Wildlife Agency-approved biologist, with concurrence of the Service, must determine young have fledged and nest sites are no longer active before the nest site may be disturbed.

The Conservancy will employ the following conservation measures on reserve lands to minimize the effects of the proposed action on the blackbird:

1. Foraging.

   a. As part of baseline species survey for each reserve and as part of the annual survey of reserves, any colonization by tricolored blackbirds will be recorded by location and if possible, with a population estimate and activity description.

   b. Where tricolored blackbirds have been observed in colonies (active nesting and foraging), the nesting area and a reasonable foraging area adjacent to the nesting area within the reserve will be identified and incorporated into the SSMP, or if necessary, accommodated through adaptive management of an existing developed reserve.

   c. In order to enhance wetland to upland edges of reserves to attract tricolored blackbirds, plantings of wild rose, tule and cattails will be incorporated in habitat reserve units where biologically appropriate.

   d. During the nesting season, disturbance of foraging areas adjacent to active nest sites or previously active nest sites on reserve lands will be avoided to the maximum extent possible. If nests are occupied, a reasonable buffer of foraging lands adjacent to the nest will be marked and protected on reserve lands.

2. Nesting

   a. Disturbance to tricolored blackbird nesting colonies will be strictly avoided within the nesting season (April 1 to July 1 or while birds are present) during Conservancy development and management activities undertaken on Conservancy property in wetland and upland reserve areas unless approved by the Service and CDFG. In accordance with the MBTA, disturbance to active (occupied) nesting colonies will be avoided during the nesting season. A boundary will be established (through a method determined by the Conservancy and in consultation with the TAC) to establish a boundary 152.4 m (500 ft.) from the active nest site on reserve lands. No disturbance associated with Conservancy reserve construction, such as major grading operations will occur within the designated 500 foot buffer of the reserve during the nesting season of April 1 to July 1 or while birds are present, unless a Wildlife Agency-approved biologist, with concurrence of the Service and CDFG, determines young have fledged and nest sites are no longer active. Routine disturbances such as agricultural activities and Conservancy reserve management within 152.4 m (500 ft.) of an active nest site are not restricted so long as no physical disturbance to the nest site occurs.

   b. During the nesting season, disturbance of foraging areas adjacent to active nest sites or previously active nest sites on reserve lands will be avoided to the maximum extent possible. If nests are occupied, a reasonable buffer of foraging

lands adjacent to the nest will be marked and protected on reserve lands if construction or major grading operations are occurring on the Reserve.

c. Plantings of wild rose, tule and cattails will be incorporated in habitat reserve units where biologically appropriate to enhance tricolored blackbird nesting habitat.

The NBHCP includes measures to avoid, minimize, and mitigate take of the snake. Because the tricolored blackbird shares some habitat similarities with the snake, these measures may also benefit the blackbird. Specific measures include: (1) timing restrictions; (2) dewatering requirements; and (3) and vegetation control management.

Aleutian Canada Goose Avoidance and Minimization Measures.

In order to avoid, minimize, and mitigate take of the proposed action on the goose, prior to approval of an urban development permit, the applicable Land Use Agency will require a pre-construction survey. If the survey determines geese are present, the Land Use Agency will require the developer to consult with the Service and CDFG to determine appropriate measures to avoid and minimize take of individuals. Such measures will be appropriate for the use (e.g., foraging, roosting, etc.) and activity of the species, since the goose is only seasonally present in the Basin.

In order to minimize the effects of the proposed action on the goose, the Conservancy will utilize applicable Service-approved goose recovery or management plans and the adaptive management provisions described in the NBHCP to implement any additional conservation measures deemed appropriate should use of the NBHCP Area by the goose appreciably increase at any time in the future.

White-faced Ibis Avoidance and Minimization Measures.

The following measures have been proposed by the Land Use Agencies to avoid, minimize, and mitigate take of the white-faced ibis:

1. Prior to approval of an urban development permit, the involved Land Use Agency will require a pre-construction survey.

2. If surveys determine the presence of active nest sites of white-faced ibis, disturbance by authorized development within 1/4 mile of nests will be avoided within the nesting season of May 15 through August 31, or until a Wildlife Agency-approved biologist, with concurrence of the Service, has determined that young have fledged or that the nest is no longer occupied.

In order to minimize the effects of the proposed action on the ibis, the Conservancy proposes to:

1. Utilize applicable Service-approved white-faced ibis recovery or management plans, and the adaptive management provisions described in the NBHCP to implement any additional conservation measures deemed appropriate should use of the Plan Area by the ibis appreciably increase at any time in the future.

2. Disturbance to white-faced ibis nesting colonies by Conservancy reserve construction activities will be strictly avoided within the nesting season (May 15 to August 31 or while birds are present, or until a Wildlife Agency-approved biologist, with concurrence of the Service and CDFG, has determined that young have fledged or that the nest is no longer occupied). During the nesting season, a foraging buffer 1/4 mile in width will be identified around any active nest site to ensure minimal disturbance to the nest and nearby foraging areas on reserve lands.

Loggerhead Shrike Avoidance and Minimization Measures.

The Land Use Agencies have proposed the following measures to avoid, minimize, and mitigate take of the loggerhead shrike:

1. Prior to approval of an urban development permit, the involved Land Use Agency will require a pre-construction survey.

2. If surveys identify an active loggerhead shrike nest that will be impacted by authorized development, the developer will install brightly colored construction fencing that establishes a boundary 30.5 m (100 ft.) from the active nest. No disturbance associated with authorized development will occur within the 100 foot fenced area during the nesting season (March 1 - July 31). A Wildlife Agency-approved biologist, with concurrence of the Service, must determine young have fledged or that the nest is no longer occupied prior to disturbance of the nest site.

The Conservancy has proposed the following measures to avoid, minimize, and mitigate take of loggerhead shrike:

1. The Conservancy will encourage and maintain loggerhead shrike perching and nesting sites to the maximum extent practicable on all Conservancy lands.

2. The Conservancy will avoid disturbance to loggerhead shrike nest sites and disturbance of the loggerhead shrike during nesting season during reserve management and enhancement activities to the maximum extent practicable, unless otherwise approved by the Conservancy and the TAC.

3. If the loggerhead shrike nests on a Conservancy reserve, the Conservancy will establish, identify and mark (through a method determined appropriate by the Conservancy and in consultation with the TAC) a buffer extending 30.5 m (100 ft.) from the active nest on reserve lands. No disturbance associated with Conservancy reserve construction, such as major grading activities, will occur within the 100 ft. marked area during the nesting season of March 1 through July 31, unless a Wildlife Agency-approved biologist, with concurrence of the Service and CDFG, determines young have fledged or that the nest is no longer occupied. Routine disturbances such as agricultural activities and Conservancy reserve management within 30.5 m (100 ft.) of an active nest site are not restricted so long as no physical disturbance to the nest site occurs.

Burrowing Owl Avoidance and Minimization Measures.

The Land Use Agencies have proposed the following measures to avoid, minimize, and mitigate take of the burrowing owl:

1. Prior to the initiation of grading or earth disturbing activities, the applicant/developer will hire a CDFG-approved biologist to perform a pre-construction survey of the site to determine if any burrowing owls are using the site for foraging or nesting. The pre-construction survey will be submitted to the Land Use Agency with jurisdiction over the site prior to the developer's commencement of construction activities and a mitigation program will be developed and agreed to by the Land Use Agency and developer prior to initiation of any physical disturbance on the site.

2. Occupied burrows will not be disturbed during nesting season (February 1 - August 31) unless a Wildlife Agency-approved biologist approved by CDFG verifies through non-invasive measures that either: (1) birds have not begun egg-laying and incubation; or (2) juveniles from the occupied burrows are foraging independently and are capable of independent survival.

3. If nest sites are found, the Service and CDFG will be contacted regarding suitable mitigation measures, which may include a 300 ft. buffer from the nest site during the breeding season (February 1 - August 31), or a relocation effort for the burrowing owls if the birds have not begun egg-laying and incubation, or the juveniles from the occupied burrows are foraging independently and are capable of independent survival. If on-site avoidance is required, the location of the buffer zone will be determined by a Wildlife Agency-approved biologist. The developer will mark the limit of the buffer zone with yellow caution tape, stakes, or temporary fencing. The buffer will be maintained throughout the construction period.

4. If relocation of the owls is approved for the site by the Service and CDFG, the developer will hire a Wildlife Agency-approved biologist to prepare a plan for relocating the owls to a suitable site. The relocation plan must include: (1) the location of the nest and owls

proposed for relocation; (2) the location of the proposed relocation site; (3) the number of owls involved and the time of year when the relocation is proposed to take place; (4) the name and credentials of the biologist who will be retained to supervise the relocation; (5) the proposed method of capture and transport for the owls to the new site; (6) a description of the site preparations at the relocation site (e.g., enhancement of existing burrows, creation of artificial burrows, one-time or long-term vegetation control, etc...); and (7) a description of efforts and funding support proposed to monitor the relocation.

Relocation options may include passive relocation to another area of the site not subject to disturbance through one way doors on burrow openings, or construction of artificial burrows in accordance with CDFG's October 17, 1995, *Staff Report on Burrowing Owl Mitigation* (Burrowing Owl Report) (attached as Appendix D to the NBHCP).

5. Where on-site avoidance is not possible, disturbance and/or destruction of burrows will be offset through development of suitable habitat on Conservancy upland reserves. Such habitat will include creation of new burrows with adequate foraging area (a minimum of 6.5 acres) or 300 ft. radii around the newly created burrows. Additional habitat design and mitigation measures are described in the Burrowing Owl Report.

The Conservancy has proposed the following measures to avoid, minimize, and mitigate take of the burrowing owl:

1. The Conservancy will avoid disturbance to active nest burrows during reserve management activities to the maximum extent practicable. Disturbance to nesting burrowing owl colonies will be strictly avoided within the nesting season or while birds are present, unless otherwise approved by the TAC. The Burrowing Owl Report will be utilized to the extent practicable to avoid active nests during reserve construction and management activities

2. The Conservancy will utilize applicable Service or CDFG-approved burrowing owl recovery or management plans, and the adaptive management provisions described in the NBHCP to implement any additional conservation measures deemed appropriate ,should use of the NBHCP Area by this species appreciably increase at any time in the future.

3. The Conservancy may be asked to create new burrowing owl habitat in upland reserve areas by creating new burrows or restoring old burrows in upland reserve areas, based on avoidance, minimization and mitigation measures applied by the Land Use Agency Permittees to proponents of authorized development (see NBHCP, Section V.A.5.h). New habitat will include adequate foraging area around the burrow and burrow design will be done in consultation with Wildlife Agency-approved biologists. Additional habitat design and mitigation measures are described in the Burrowing Owl Report.

Bank Swallow Avoidance and Minimization Measures.

The Land Use Agencies have proposed the following measures to avoid, minimize, and mitigate take of the bank swallow:

1. Disturbance to bank swallow nesting colonies will be avoided within the nesting season of May 1 through August 31 (or until a Wildlife Agency-approved biologist, with concurrence of the Service and CDFG, has determined that young have fledged or that the nest is no longer occupied) during all authorized development activities conducted in the Permit Areas.

2. If surveys identify an active bank swallow nesting colony that will be impacted by authorized development, the developer will install brightly colored construction fencing that establishes a boundary 76.2 m (250 ft.) from the active nesting colony. No disturbance associated with authorized development will occur within the fenced area during the nesting season. Additionally, disturbance within ½ mile upstream or downstream of the colony will be avoided if the colony is located upon a natural waterway.

The Conservancy has proposed the following measures to avoid, minimize, and mitigate take of the bank swallow:

1. The Conservancy will avoid disturbing active bank swallow nests during reserve management activities to the maximum extent practicable.

2. The Conservancy will utilize applicable Service or CDFG-approved bank swallow recovery or management plans and the adaptive management provisions described in the NBHCP to implement any additional conservation measures deemed appropriate, should use of the NBHCP Area by the species appreciably increase at any time in the future.

3. Disturbance to bank swallow nesting colonies will be strictly avoided within the nesting season (May 1 through August 31, or until a Wildlife Agency-approved biologist, with concurrence of the Service and CDFG, has determined that young have fledged or that the nest is no longer occupied) during Conservancy reserve development and management activities unless otherwise approved by the TAC.

4. If surveys identify an active bank swallow nesting colony that will be impacted by Conservancy activities, the Conservancy will identify and mark (through a method to be determined by the Conservancy in consultation with the TAC) a boundary 76.2 m (250 ft.) from the active nesting colony on reserve lands. No disturbance associated with Conservancy activities will occur within the 250 ft. marked area of the reserve during the nesting season of May 1 through August 31. Additionally, disturbance within ½ mile upstream or downstream of the colony on reserve lands will be avoided if the colony is located upon a natural waterway. Routine disturbances such as agricultural activities and Conservancy reserve management within 76.2 m (250 ft.) of an active nesting colony or within ½ mile upstream or downstream of an active nesting colony are not restricted so

long as no physical disturbance to the nest site occurs.

Northwestern Pond Turtle Avoidance and Minimization Measures.

In order to avoid, minimize, and mitigate take of the northwestern pond turtle by the proposed action, the Land Use Agencies have proposed to dewater suitable habitat, as described in the conservation measures for the snake.

In order to avoid, minimize, and mitigate take of the northwestern pond turtle by the proposed action, the Conservancy has proposed to consult with northwestern pond turtle researchers and experts periodically during implementation of the NBHCP to determine what, if any, conservation opportunities for the species exists within the Conservancy's reserve system. The Conservancy will implement such conservation measures through the NBHCP's adaptive management provisions as appropriate. Such opportunities might include, but are not limited to, provision of suitable upland habitat for nesting (e.g., unshaded slopes), plentiful basking sites (e.g., floating snags), and shallow water with dense emergent and submergent vegetation for juveniles.

California Tiger Salamander Avoidance and Minimization Measures.

In order to avoid, minimize, and mitigate take of the California tiger salamander by the proposed action, the Land Use Agencies have proposed to require a pre-construction survey prior to approval of an urban development permit. If the survey determines the presence of California tiger salamander, the Land Use Agency will require the developer to consult with the Service and CDFG to determine appropriate measures to avoid and minimize take of individuals. Examples include, but are not limited to: (1) developing specific measures to retain pools, hydrology, suitable estivation sites, open habitat between breeding and estivation sites; (2) replacing wetland within 1.5 miles of known breeding sites; (3) providing species and habitat training to construction personnel; (4) recording setbacks on maps; and (5) prohibiting the following: alteration of topography, structures, dumping, burning, impacting native vegetation, storm drains, fire protection, pesticides and chemicals.

The Conservancy will consult with the TAC and California tiger salamander experts periodically during implementation of the Plan to determine what, if any, additional conservation opportunities for this species might exist within the Plan's proposed reserve system. The Conservancy will implement such conservation measures through the Plan's Adaptive Management and the Site Specific Management Plans prepared for reserve sites as appropriate. In the event preconstruction surveys or other scientific evidence show that the salamander is impacted by authorized development, the Conservancy will create habitat within reserve sites that is conducive to California tiger salamanders, such as stock ponds or "artificial" vernal pools with nearby natural materials for cover such as logs or large rocks). Possible relocation from the site to be impacted or elsewhere in the Basin of tiger salamanders into the Conservancy's reserve system may be considered if preconstruction surveys or other NBHCP monitoring show the species is impacted by Authorized Development.

Western Spadefoot Toad Avoidance and Minimization Measures.

In order to avoid, minimize, and mitigate take of the western spadefoot toad by the proposed action, the Land Use Agencies have proposed to require a pre-construction survey prior to approval of an urban development permit. If the survey determines the toad is present, the Land Use Agency will require the developer to consult with CDFG and the Service to determine appropriate measures to avoid and minimize take of individuals. Examples include, but are not limited to: (1) timing restrictions (i.e., limiting time when pool can be filled to when it is not occupies by toads); and (2) avoidance of the pool.

In order to avoid, minimize, and mitigate take of the western spadefoot toad by the proposed action, the Conservancy has proposed to consult with the TAC and western spadefoot toad experts periodically during implementation of the NBHCP to determine what, if any, additional conservation opportunities for this species exist within the NBHCP's proposed reserve system. The Conservancy will implement such conservation measures through the NBHCP's adaptive management provisions as appropriate. Within reserve sites, the Conservancy will consider creating habitat that is conducive to western spadefoot toads such as areas of slow-moving waters (i.e., pools and plunge pools of small creeks), short grasses with sandy or gravelly soils, and other grassy areas.

Delta Tule Pea Avoidance and Minimization Measures.

In order to avoid, minimize, and mitigate loss of the Delta tule pea by the proposed action, the Land Use Agencies have proposed to require a pre-construction survey. If Delta tule pea plants are identified through a pre-construction survey, the involved Land Use Agency will provide notice to the Service, CDFG and the California Native Plan Society. The development proponent will allow the transplantation of the pea plants prior to site disturbance.

In order to avoid, minimize, and mitigate loss of the Delta tule pea by the proposed action, the Conservancy has proposed:

1. The Conservancy will evaluate the potential for, and as appropriate, implement measures to further the conservation of Delta tule pea within the NBHCP's reserve system through appropriate means. The Conservancy will implement such conservation measures through the NBHCP's adaptive management provisions as appropriate. In the event preconstruction surveys or other scientific documentation indicate impacts to the Delta tule pea as a result of authorized development, the Conservancy's adaptive management program and Site Specific Management Plan process will be used to further the conservation of the species including but not limited to, relocation of the impacted individuals of the into suitable locations on the Conservancy's reserve sites.

2. The Conservancy will monitor any known populations of the pea within the NBHCP Area.

Sanford's Arrowhead Avoidance and Minimization Measures.

In order to avoid, minimize, and mitigate the effects of the proposed action on Sanford's arrowhead, the Land Use Agencies have proposed to conduct a pre-construction survey. If Sanford's arrowhead plants are identified, the involved Land Use Agency will: (1) provide notice to the Service, CDFG and the California Native Plant Society; and (2) allow the development proponent to transplant the plants prior to site disturbance.

In order to avoid, minimize, and mitigate the effects of the proposed action on Sanford's arrowhead, the Conservancy has proposed to:

1. Evaluate the potential for, and as appropriate, implement measures to further the conservation of Sanford's arrowhead within the NBHCP's reserve system through appropriate means. In the event preconstruction surveys or other scientific documentation indicate impacts to the Sanford's arrowhead as a result of authorized development, the Conservancy's adaptive management program and Site Specific Management Plan process will be used to further the conservation of the species including but not limited to, relocation of the impacted individuals of the into suitable locations on the Conservancy's reserve sites.

2. Monitor any known populations of Sanford's arrowhead within the NBHCP Area.

Status of the Species and Environmental Baseline

Threatened Vernal Pool Fairy Shrimp and Endangered Vernal Pool Tadpole Shrimp

The vernal pool fairy shrimp and vernal pool tadpole shrimp were federally-listed as threatened and endangered, respectively, on September 19, 1994 (59 **FR** 48136). Neither species has been designated any special status by the State. The vernal pool fairy shrimp inhabits vernal pools, swales, and other seasonal wetlands in California and southern Oregon. The vernal pool tadpole shrimp lives in similar habitats in California's Central Valley and San Francisco Bay area. Additional information on the life history and ecology of these species may be found in the final rule, Eng *et al*. (1990), Simovich *et al*. (1992), Helm (1998), and Witham *et al.* (1998).

Description, Reproductive Ecology

The vernal pool fairy shrimp has a delicate, elongate body; large, stalked, compound eyes; 11 pairs of swimming legs; a length typically less than 2.5 cm; and no carapace. It swims or glides gracefully upside-down by means of complex, wavelike beating movements as it feeds upon algae, bacteria, protozoa, rotifers, and detritus. Females carry their eggs in pear-shaped, ventral brood sacs until the eggs are either dropped or sink to the pool bottom with the female as she dies. "Resting" or summer eggs are known as cysts. These cysts are able to withstand heat, cold, and prolonged desiccation. When pools refill in the same or subsequent seasons, some, but not all, of the cysts may hatch, resulting in a cyst bank in the soil that may include cysts from several breeding seasons (Donald 1983). Young develop rapidly and may become sexually mature as soon as two weeks after hatching (Gallagher 1996, Helm 1998). This quick maturation permits populations to persist in short-lived, shallow bodies of water (Simovich *et al*. 1992).

The vernal pool tadpole shrimp has a large, shield-like carapace typically measuring less than 2.5 cm in length that covers most of its body; dorsal, compound eyes; and a pair of long cercopods, one on each side of a flat caudal plate, at the end of the last abdominal segment. It is primarily bottom-dwelling and moves with its legs down as it feeds on detritus and living organisms, including fairy shrimp and other invertebrates (Pennak 1989). Females deposit their eggs on vegetation or other objects on the pool bottom. Although some eggs may hatch quickly, others remain dormant as cysts to hatch during later rainy seasons (Ahl 1991). When winter rains refill inhabited wetlands, the species reestablishes from dormant cysts. Individuals may become sexually mature within three to four weeks of hatching (Ahl 1991, Helm 1998) and reproductively mature adults may be present in pools until the habitats dry up in the spring (Ahl 1991, Simovich *et al*. 1992, Gallagher 1996).

Essential Habitat Components, Range

The vernal pool fairy shrimp inhabits alkaline pools, ephemeral drainages, rock outcrop pools, ditches, stream oxbows, stock ponds, vernal pools, vernal swales, and other seasonal wetlands (Helm 1998). Occupied habitats range in size from rock outcrop pools as small as one square meter to large vernal pools up to 4.5 hectares. Potential ponding depth of occupied habitat ranges from 3 cm to 1.2 m. The species has been collected from early December to early May. Known populations in California extend from Stillwater Plain in Shasta County through most of the length of the Central Valley to Pixley in Tulare County and along the central coast range from northern Solano County to Pinnacles National Monument in San Benito County. Several additional, disjunct populations exist: one near Soda Lake in San Luis Obispo County, one in the mountain grasslands of northern Santa Barbara County, one on the Santa Rosa Plateau in Riverside County, and one near Rancho California in Riverside County. Additional populations occur in southern Oregon (59 **FR** 48136).

The tadpole shrimp inhabits alkaline pools, clay flats, ditches, freshwater marshes, stream oxbows, vernal lakes, vernal pools, vernal swales, and other seasonal wetlands (Helm 1998).

Occupied habitats range in size from vernal pools as small as two square meters to large vernal lakes up to 36 hectares. The potential ponding depth of occupied habitat ranges from 4 cm to 1.5 m (59 **FR** 48136). Vernal pool tadpole shrimp populations occur in the Central Valley in California, ranging from east of Redding in Shasta County south to Tulare County. One occupied vernal pool complex is located on the San Francisco Bay National Wildlife Refuge in the City of Fremont, Alameda County (59 **FR** 48136).

The vernal pool fairy shrimp and vernal pool tadpole shrimp are ecologically dependent on seasonal fluctuations in their habitat such as presence or absence of water, duration and timing of inundation, and other abiotic factors such as temperature, salinity, conductivity, dissolved solids, and pH. Water chemistry is one of the most important factors affecting their distribution (Belk 1977, Simovich *et al.* 1992). For example, Helm (1998) found that water temperatures in excess of 24 degrees Celsius killed vernal pool fairy shrimp. This change in water temperature could be caused by placing fill in a portion of the pool. The resulting decrease in the size of the pool would change the period of inundation, thereby decreasing the capacity of the pool to buffer potential changes in water temperature caused by solar radiation.

The genetic characteristics of the fairy shrimp and tadpole shrimp, and ecological conditions, such as watershed continuity, indicate that populations of these animals are defined by pool complexes rather than by individual vernal pools (Fugate 1992). Therefore, the most accurate indication of the distribution and abundance of these species is the number of inhabited vernal pool complexes. Individual vernal pools occupied by these species are most appropriately referred to as subpopulations. The pools and, in some cases, pool complexes supporting these species are usually small. Man-caused and unforeseen natural catastrophic events such as long-term drought, non-native predators, off-road vehicles, pollution, berming, and urban development, threaten their extirpation at some sites.

Dispersal

The primary historical dispersal method for the vernal pool tadpole shrimp and vernal pool fairy shrimp may have been large-scale flooding resulting from winter and spring rains which allowed the animals to colonize different individual vernal pools and other vernal pool complexes. This dispersal mechanism may no longer function in some areas due to the construction of dams, levees, and other flood control measures, and widespread urbanization within significant portions of the range of this species. Waterfowl and shorebirds are now considered the primary dispersal agents for vernal pool tadpole shrimp and vernal pool fairy shrimp (Brusca and Brusca 1992, Simovich *et al.* 1992). The eggs of these crustaceans are ingested (Krapu 1974, Swanson 1974, Driver 1981, Ahl 1991) and/or adhere to the legs and feathers where they are transported to new habitats.

Reasons for Decline and Threats to Survival

The ephemeral wetlands that support this network of populations are remnants of what was formerly a pristine vernal pool ecosystem, which has been converted to primarily agricultural and urban uses. This highly disturbed remnant habitat is imperiled by a variety of human-caused activities, primarily urban development, water supply/flood control projects and conversion of land to agricultural use.

Holland (1978) estimated that between 60 and 85 percent of the habitat that once supported vernal pools, had been destroyed by 1973. Since 1973, a substantial amount of remaining habitat has been converted for human uses. The rate of loss of vernal pool habitat in the state has been estimated at two to three percent per year (Holland and Jain 1988).

Conversion of natural habitat for urban and agricultural uses has highly fragmented the habitat of the listed vernal pool crustaceans throughout their ranges. Fragmentation such as this results in small isolated fairy shrimp populations. Ecological theory predicts that such populations will be highly susceptible to extinction due to chance events, inbreeding depression, or additional environmental disturbance. If an extinction event occurs in a population that has been fragmented, the opportunities for recolonization are thought to be greatly reduced due to physical (geographical) isolation from other (source) populations (Gilpin and Soule 1986; Goodman 1987a, b).

Environmental Baseline and Status within the Action Area

The proposed action is located on the western extremity of the Southeastern Sacramento Valley Vernal Pool Region, one of 17 vernal pool regions defined by the CDFG in the State of California. Regions were identified according to biological, geomorphological, and soils information. According to the report, "One of the primary assumptions is that these regions are ecologically distinct and that they encompass the full range of variability of vernal pools and species in the State" (Keeler-Wolf *et al.* 1998). Of the seventeen defined regions, the Southeastern Sacramento Valley Vernal Pool Region is most threatened by development.

The Southeastern Sacramento Valley Vernal Pool Region contains almost 15 percent of the remaining vernal pool grasslands in the State of California, and supports 35 percent of the known occurrences of the vernal pool fairy shrimp documented in the California Natural Diversity Database.

Developments within Sacramento County have resulted in both direct and indirect impacts to vernal pools, and have contributed to the loss of vernal pool fairy shrimp and vernal pool tadpole shrimp populations. Although the reduction of federally-listed vernal pool crustacean populations has not been quantified, the acreage of lost habitat continues to increase. General and specific plans for the Sacramento area have identified significant, unavoidable impacts to biological communities, including elimination of vernal pools, intermittent drainages and other seasonal wetlands. Despite these impacts, many government entities continue to implement

development projects within the area. However, this is not the case in Natomas, where the City and Sutter County have engaged in regional habitat conservation planning efforts.

There are 314 reported occurrences of vernal pool fairy shrimp in California, 52 of which are reported from Sacramento County and one of which is reported from Sutter County (CNDDB 2002). However, there is only one vernal pool fairy shrimp occurrence known in the Basin; it is located in the eastern portion of Sutter's Permit Area. Additionally, there are several occurrences east of the Natomas Basin in Elverta and Rio Linda (CNDDB, 2002). Potential vernal pool fairy shrimp habitat of approximately 21.3 acres occurs in the vernal pools on the east side of the Basin, in 886 acres of grasslands primarily north of Del Paso Road. This estimate of vernal pool acreage is based upon assessments of the amount of vernal pool habitat per acre of grasslands in Sacramento County and probably greatly overestimates the actual amount of vernal pool habitat per acre of grassland in the Basin (K. Fuller, pers. comm. to C. Aubrey, 2003). Additional potential habitat occurs in 96 acres of other ponds and seasonally wet areas in the Basin. Once again, this estimate greatly overestimates the amount of potential vernal pool habitat in the Basin, as most of the ponds and seasonally wet areas do not have the hydrology sufficient to support vernal pool crustaceans. No potential vernal pool fairy shrimp habitat is located within 76 m (250 ft.) of any of MAP's proposed action activities.

There are 160 reported occurrences of vernal pool tadpole shrimp in California, 55 of which are reported from Sacramento County, and four of which are reported from Sutter County. There is only one vernal pool tadpole shrimp occurrence known in the Basin; it is located in the eastern portion of Sutter's Permit Area (CNDDB 2002). Potential vernal pool tadpole shrimp habitat of approximately 21.3 acres occurs in the vernal pools on the east side of the Basin, in 886 acres of grasslands primarily north of Del Paso Road. This estimate of vernal pool acreage is based upon assessments of the amount of vernal pool habitat in grasslands in Sacramento County and probably greatly overestimates the actual amount of vernal pool habitat in the Basin (K. Fuller, pers. comm.). Additional potential habitat occurs in 96 acres of other ponds and seasonally wet areas in the Basin. Once again, this estimate greatly overestimates the amount of potential vernal pool habitat in the Basin, as most of the ponds and seasonally wet areas do not have the hydrology sufficient to support vernal pool crustaceans. No potential vernal pool tadpole shrimp habitat is located within 76 m (250 ft.) of any of MAP's proposed action activities.

Threatened Giant Garter Snake

The Service published a proposal to list the giant garter snake as an endangered species on December 27, 1991 (56 **FR** 67046). The Service reevaluated the status of the snake before adopting the final rule. The snake was listed as a threatened species on October 20, 1993 (58 **FR** 54053). The *Draft Recovery Plan for the Giant Garter Snake* was published by the Service in July 1999. Additional information on the species' biology may be found in those documents.

Description

The giant garter snake is one of the largest garter snakes and may reach a total length of at least 160 centimeters (cm)(64 inches [in.]). Females tend to be slightly longer and proportionately heavier than males. The weight of adult female snakes is typically 500-700 grams (g)(1.1-1.5 pounds). Dorsal background coloration varies from brownish to olive with a checkered pattern of black spots, separated by a yellow dorsal stripe and two light-colored lateral stripes. Background coloration and prominence of a black-checkered pattern and the three yellow stripes are geographically and individually variable (Hansen 1980). The ventral surface is cream to olive or brown and sometimes infused with orange, especially in northern populations.

Historical and Current Range

This species formerly occurred throughout the wetlands that were extensive and widely distributed in the Central Valley. Fitch (1941) described the historical range of the snake as extending from the vicinity of Sacramento and Contra Costa Counties southward to Buena Vista Lake, near Bakersfield, in Kern County. Prior to 1970, the snake was recorded historically from 17 localities (Hansen and Brode 1980). Five of these localities were clustered in and around Los Banos, Merced County. The paucity of information makes it difficult to determine precisely the species' former range. Nonetheless, these records coincide with the historical distribution of large flood basins, fresh water marshes, and tributary streams. Destruction of wetlands for agriculture and other purposes apparently extirpated the species from the southern one-third of its range by the 1940s -1950s, including the former Buena Vista Lake and Kern Lake in Kern County, and the historic Tulare Lake and other wetlands in Kings and Tulare Counties (Hansen and Brode 1980, Hansen 1980). Surveys over the last two decades have found the snake as far north as the Butte Basin in the Sacramento Valley. As recently as the 1970s, the range of the snake extended from near Burrell, Fresno County (Hansen and Brode 1980), northward to the vicinity of Chico, Butte County (Rossman and Stewart 1987).

Essential Habitat Components

Endemic to wetlands in the Sacramento and San Joaquin valleys, the snake inhabits marshes, sloughs, ponds, small lakes, low gradient streams, and other waterways and agricultural wetlands, such as irrigation and drainage canals and rice fields, and the adjacent uplands. The snake feeds on small fishes, tadpoles, and frogs (Fitch 1941, Hansen 1980, Hansen 1988). Essential habitat components consist of: (1) wetlands with adequate water during the snake's active season (early-spring through mid-fall) to provide food and cover; (2) emergent, herbaceous wetland vegetation, such as cattails and bulrushes, for escape cover and foraging habitat during the active season; (3) upland habitat with grassy banks and openings in waterside vegetation for basking; and (4) higher elevation uplands for escape cover (vegetation, burrows) and underground refugia (crevices and small mammal burrows) (Hansen 1980).

Reproductive Ecology

The breeding season extends through March and April, and females give birth to live young from late July through early September (Hansen and Hansen 1990). Brood size is variable, ranging from 10 to 46 young, with a mean of 23 (Hansen and Hansen 1990). At birth, young average about 20.6 cm (8.1 in.) snout-vent length and 3-5 g (0.10-0.18 ounces). Young immediately scatter into dense cover and absorb their yolk sacs, after which they begin feeding on their own. Although growth rates are variable, young typically more than double in size by one year of age, and sexual maturity averages three years in males and five years for females (58 **FR** 54053).

Movements and Habitat Use

The snake typically inhabits small mammal burrows and other soil crevices throughout its winter dormancy period (November to mid-March). The snake also uses burrows as refuge from extreme heat during their active period. While the snakes usually remain in close proximity to wetland habitats, the Biological Research Division (BRD) of the U.S. Geological Service has documented snakes using burrows as much as 50 m (165 ft.) away from the marsh edge to escape extreme heat (Wylie *et al.* 1997). Overwintering snakes have been documented to use burrows as far as 250 m (820 ft.) from the edge of marsh habitat. Snakes typically select south- and west-facing burrows as hibernacula (58 **FR** 54053).

In studies of marked snakes in the Natomas Basin, snakes moved about 0.40-0.80 kilometers (km)(0.25-0.5 mile) per day (Hansen and Brode 1993). However, total activity varies widely between individuals, and individual snakes have been documented moving up to 8 km (5 miles) over the period of a few days in response to dewatering of habitat (Wylie *et al.* 1997). In agricultural areas, snakes were documented using rice fields in 19-20 percent of the observations, marsh habitat in 20-23 percent of observations, and canal and agricultural waterway habitats in 50-56 percent of the observations (Wylie 1999). Telemetry studies have also shown that active snakes use uplands extensively–more than 31 percent of observations were in uplands (Wylie 1999). Almost all snakes observed in uplands during the active season were near vegetative cover, where cover exceeded 50 percent in the area within 0.5 m (1.6 ft) of the snake; less than 1 percent of observations were of snakes in uplands with less than 50 percent cover nearby (Wylie 1999).

Reasons for Decline and Threats to Survival

Ongoing maintenance of aquatic habitats for flood control and agricultural purposes eliminate or prevent the establishment of habitat characteristics required by snakes and can fragment and isolate available habitat, prevent dispersal of snakes among habitat units, and adversely affect the availability of the garter snake's food items (Hansen 1988, Brode and Hansen 1992). In many areas, the restriction of suitable habitat to water canals bordered by roadways and levee tops renders snakes vulnerable to vehicular mortality. Fluctuation in rice and agricultural production affects stability and availability of habitat. Recreational activities, such as fishing, may disturb snakes and disrupt basking and foraging activities. Nonnative predators, including introduced

predatory gamefish, bullfrogs (*Rana catesbeiana*), and domestic cats (*Felis catus*) also threaten snake populations. While large areas of seemingly suitable snake habitat exist in the form of duck clubs and waterfowl management areas, water management of these areas typically does not provide the summer water needed by snakes. Although snakes on national wildlife refuges are relatively protected from many of the threats to the species, degraded water quality continues to be a threat to the species both on and off refuges. A number of land use practices and other human activities currently threaten the survival of the snake throughout the remainder of its range. Although some snake populations have persisted at low levels in artificial wetlands associated with agricultural and flood control activities, many of these altered wetlands are now threatened with urban development.

Status with Respect to Recovery

The draft recovery plan for the snake subdivided its historic range into four recovery units (Service 1999). These are: (1) the Sacramento Valley unit, extending from the vicinity of Red Bluff south to the confluence of the Sacramento and Feather Rivers; (2) the Mid-Valley unit, extending from the American and Yolo Basins south to Duck Creek near the City of Stockton; (3) the San Joaquin Valley unit, extending south from Duck Creek to the Kings River; and (4) the South Valley unit, extending south of the Kings River to the Kern River Basin. Portions of Mid-Valley recovery unit are within the action area.

The Sacramento Valley Recovery Unit at the northern end of the species' range is known to support relatively large, stable populations of the snake. This unit contains three populations (Butte Basin, Colusa Basin, and Sutter Basin) and a large amount of suitable habitat, in protected areas on state refuges and refuges of the Sacramento NWR Complex in the Colusa and Sutter Basins, and along waterways associated with rice farming (Service 1999).

The Mid-Valley Recovery Unit, directly to the south of the Sacramento Valley Recovery Unit, includes seven populations: American Basin, Yolo Basin–Willow Slough, Yolo Basin–Liberty Farms, Sacramento Area, Badger Creek/Willow Creek, Caldoni Marsh, and East Stockton. The status of the seven snake populations in the Mid-Valley Recovery Unit is uncertain. The East Stockton population may be extirpated, and is not considered recoverable as a result of urban encroachment into habitat (Service 1999). Five of the remaining six populations within the recovery unit are small, highly fragmented and isolated, and, except for the Badger Creek/Willow Slough population, are also threatened by urbanization. This latter population is within a small isolated area. Within the Mid-Valley unit, only the American Basin population supports a sizeable snake population which is dependent largely upon rice lands.

The remaining two recovery units are located to the south in the San Joaquin Valley, where the best available data indicate that the snake's status is precarious. The San Joaquin Valley Recovery Unit contains three historic snake populations: North and South Grasslands; Mendota Area; and Burrel/Lanare Area (Service 1999). This recovery unit formerly supported large snake populations, but numbers have declined severely in recent decades, and recent survey efforts indicate numbers are very low compared to Sacramento Valley populations.

No surviving snake populations are known from the fourth recovery unit, the South Valley Recovery Unit, at the southern end of the snake's historic range; this unit includes only extirpated populations, including the historic but lost Tulare and Buena Visa lakes.

The draft recovery criteria require multiple, stable populations within each of the four recovery units, with subpopulations well-connected by corridors of suitable habitat. Currently, only the Sacramento Valley Recovery Unit, at the northern end of the species' range, is known to support relatively large, stable populations. Habitat corridors connecting populations or subpopulations, even for the Sacramento Valley Recovery Unit, are not present and/or protected.

In 1994, the BRD (then the National Biological Survey) began a study of the life history and habitat requirements of the snake in response to an interagency request from the Service. Since April of 1995, the BRD has further documented occurrences of snakes within some of the known populations. The BRD has studied snake subpopulations at the Sacramento and Colusa NWRs within the Colusa Basin, at Gilsizer Slough within the Sutter Basin, the Badger Creek area of the Cosumnes River Preserve within the Badger Creek-Willow Creek area, and the Natomas area within the American Basin (Wylie *et al.* 1997, Wylie 1999). These subpopulations represent the largest known extant subpopulations. With the exception of the American Basin, these subpopulations are largely protected from many of the threats to the species. Outside of these protected areas, snakes in these populations are still subject to all the threats identified in the final listing rule. The remaining nine populations identified in the final rule are distributed discontinuously in small isolated patches and are vulnerable to extirpation by stochastic environmental, demographic, and genetic processes. The 13 extant populations are largely isolated from each other, with any dispersal corridors between them limited and not protected. When small populations are extirpated, the recolonization is unlikely in most cases, given the isolation from larger populations and the lack of dispersal corridors between them.

Environmental Baseline

Surveys over the last two decades have located the giant garter snake as far north as the Butte Basin in the Sacramento Valley. Currently, the Service recognizes 13 separate populations of the snake, with each population representing a cluster of discrete locality records (Service 1993). The 13 extant population clusters largely coincide with historical riverine flood basins and tributary streams throughout the Central Valley (Hansen 1980, Brode and Hansen 1992): (1) Butte Basin, (2) Colusa Basin, (3) Sutter Basin, (4) American Basin, (5) Yolo Basin-Willow Slough, (6) Yolo Basin-Liberty Farms, (7) Sacramento Basin, (8) Badger Creek-Willow Creek, (9) Caldoni Marsh, (10) East Stockton-Diverting Canal and Duck Creek, (11) North and South Grasslands, (12) Mendota, and (13) Burrell-Lanare. These populations span the Central Valley from just southwest of Fresno (Burrell-Lanare) north to Chico (Hamilton Slough).

Since April of 1995, the Biological Resources Division (BRD) of U.S. Geological Survey has further documented occurrences of giant garter snakes at the Sacramento, Delevan, and Colusa National Wildlife Refuges within the Colusa Basin, at Gilsizer Slough within the Sutter Basin, at the Badger Creek area of the Consumnes River Preserve within the Badger Creek-Willow Creek

area, and in the Natomas Basin within the American Basin (Wylie 1999; 2001: Wylie *et al.* 1997; 2000a,b; 2002). These populations of giant garter snakes represent the largest extant populations. With the exception of the American Basin, these areas are largely protected from many of the threats to the species. Outside of protected areas, giant garter snakes in these population clusters are still subject to all threats identified in the final rule. The remaining nine population clusters identified in the final rule are distributed discontinuously in small isolated patches and are vulnerable to extirpation by random environmental, demographic, and genetic processes. Until recently, there were no post-1980 sightings of snakes from Stockton and southward, and surveys of historic localities conducted in 1986 did not detect any snakes (Service 1999). Since 1995, however, surveys conducted by CDFG in cooperation with BRD in the Grasslands Area in the San Joaquin Valley have detected snakes, but in numbers much lower than those found in the Sacramento Valley populations. These observations indicate that snakes are still extant in at least three locations in the San Joaquin Valley, but probably in extremely low numbers (Service 1999). All 13 population clusters are isolated from each other with no protected dispersal corridors. Opportunities for recolonization of small populations which may become extirpated is unlikely given the isolation from larger populations and lack of dispersal corridors between them.

The proposed action occurs within the Natomas Basin portion of the American Basin population of giant garter snakes, within the Mid-Valley Recovery Unit identified by the giant garter snake recovery team (Service 1999). Scattered natural habitats comprise a small component of this larger, 53,000-acre agricultural habitat Natomas Basin complex. Numerous California Natural Diversity Database (CNDDB 2002) locality records for giant garter snakes are known from the Natomas Basin portion of the American Basin and are distributed throughout most of the Natomas Basin. Additionally, the snake has been documented in Area B (Hansen 2002). Because the Natomas Cross Canal may pose a barrier to the snake's movement, snakes in Area B and the Basin may now represent two distinct populations.

Brode and Hansen (1992) evaluated the status and future management of the snake within the Natomas Basin. They stated that the Basin provides the most important habitat remaining for the snake and observed that snake habitat within the Basin occurs in three large areas that are separated by major highways (Figure 5). Area 1 is defined as lands north of Interstate 5 (I-5) and west of State Route 99/70 (SR-99/70). Important habitat areas include Prichard Lake, the North Drain Canal, and its associated rice fields. Area 2 is defined as the lands south and west of I-5. The most important habitat area is Fisherman's Lake. Area 3 is defined as the lands east of I-5 and SR-99/70. Within Area 3, the most important habitat area is "Snake Alley," an area comprised of the North Main Canal and its associated rice fields and irrigation ditches on the east side of SR-99/70. The authors hypothesized that snakes could move between the three geographic areas through large box culverts under the major highways. Brode and Hansen (1992) attributed the snake's continued success in the Basin to the numerous irrigation ditches, rice fields, and especially the extensive network of irrigation canals, feeder canals, and drains. The authors concluded by presenting a conceptual conservation plan for the snake in the Basin. This plan was based upon a minimum of one core habitat in each of the geographic areas with connecting canal to ensure snake's could move between each of the three areas. The proposed

action includes effects to snake habitat within all three of the geographic areas.

Recent research efforts by BRD to collect demographic and habitat use data during from 1998 through 2002, have further documented occurrences of giant garter snakes within the Natomas Basin (Wylie *et al.* 2000b, Wylie and Cassaza 2002, Wylie and Martin 2002). BRD surveys have provided significant recent information on the distribution of giant garter snakes within the Natomas Basin, and supplement previous research on the snake within the Natomas Basin (e.g. Brode and Hansen 1992, Hansen and Brode 1993). BRD capture data and CNDDB records indicate giant garter snakes are distributed throughout the Natomas Basin, but the relative abundance varies. Wylie *et al.* (2000b) concluded that habitat within the Natomas Basin has apparently degraded over time, as compared to previous accounts of habitat in the Natomas Basin. They also concluded that the quality of habitat within the Natomas Basin is poorer than that at other geographic locations where giant garter snakes are found. The other localities studied by BRD included more extensive areas of native or restored and/or protected habitat as compared with the Natomas Basin. Results of the most recent snake surveys in the Natomas Basin indicated that habitat quality is decreasing near Fisherman's Lake and in the area addressed in the MAP biological opinion (Wylie and Cassaza 2002). This decrease in habitat quality is likely due to the fallowing of rice fields and encroaching development. Major areas classified as having good habitat quality are located in the northwest portion of the Basin (in the vicinity of the Conservancy's Lucich North, Lucich South, and Bennett South sites) and in the unincorporated area of Sacramento County between Elverta Road and the Sacramento-Sutter County line. Of those areas of the Basin sampled, snake densities were greatest at Bennett South, Lucich North, Lucich South, and Snake Alley.

A number of State, local, private, and unrelated Federal actions have occurred within the action area and adjacent region affecting the environmental baseline of the species. Some of these projects have been subject to prior section 7 consultation. These actions have resulted in both direct and indirect impacts to snake habitat within the region.

Several flood control programs are completed or ongoing within the action area, within the range of the species, and within the Natomas Basin. Completed projects include the Natomas Area Flood Control Project that provided flood protection necessary for development in the Natomas Basin to move forward. On-going projects associated with the common features of the American River Watershed Investigation administered by the Corps of Engineers will affect giant garter snakes within the Natomas and American Basins. Activities that are either on-going or in various stages of planning include levee raising along the Natomas Cross Canal, American River, and Sacramento River; modification of the Natomas East Main Drainage Canal levee; and relocation of canals and construction of stability/seepage berms along the levees.

Ongoing agricultural activities also affect the environmental baseline for the snake, and are largely not subject to section 7 consultation. Some agriculture, such as rice farming, can provide valuable seasonal foraging and upland habitat for the snake. Although rice fields and agricultural waterways can provide habitat for the snake, agricultural activities such as waterway maintenance, weed abatement, rodent control, and discharge of contaminants into wetlands and

waterways can degrade snake habitat and increase the risk of snake mortality (Service 1999). Ongoing maintenance of agricultural waterways can also eliminate or prevent establishment of snake habitat, eliminate food resources for the snake, and can fragment existing habitat and prevent dispersal of snakes (Service 1999). Flood control and maintenance activities which can result in snake mortality and degradation of habitat include levee construction, stream channelization, and the riprapping of streams and canals (Service 1999).

In addition to agricultural, flood control, and maintenance activities, other activities have occurred in the Basin that likely affected the snake and did not receive incidental take authorization. For example, over the last three to four years, approximately 75 acres of potential snake seasonal wetland habitat were altered and/or degraded on lands owned by the Sacramento International Airport. This is a significant percentage of the remaining natural wetlands in the Basin. These unauthorized activities are currently under investigation by the Service.

The Natomas Basin currently supports approximately 24,567 acres of snake habitat (Table 4). Of that, approximately 96 acres are ponds and seasonally wet areas, 22,693 acres are rice fields, and 1,778 are canals.

Threatened Valley Elderberry Longhorn Beetle

The valley elderberry longhorn beetle was listed as a federally-threatened species on August 8, 1980 (45 **FR** 52803). Two areas along the American River in the City's metropolitan area have been designated as critical habitat for the beetle [50 **FR** 17.95 (I)]. In addition, an area along Putah Creek, Solano County, and the area west of Nimbus Dam along the American River Parkway, Sacramento County, are considered essential habitat, according to the Recovery Plan for the beetle (Service 1984). These areas support large numbers of mature elderberry shrubs (*Sambucus* spp.) with extensive evidence of use by the beetle. A detailed account of the beetle's life history is presented in the "Valley Elderberry Longhorn Beetle Recovery Plan" (Service 1984) and Barr (1991).

Description

Longhorn beetles (family Cerambycidae) are characterized by somewhat elongate and cylindrical bodies with long antennae, often in excess of 2/3 of the body length. The valley elderberry longhorn beetle is large and stout-bodied. Males range in length from about 13-21 mm (measured from the front of the head to the end of the abdomen) with antenna about as long as the body. Females are slightly more robust than males, measuring about 18-25 mm, with somewhat shorter antennae. The beetles are dark metallic-green with a bright red-orange border on the elytra (thickened, hardened forewings). Males generally have the metallic-green elytral pattern reduced to four oblong spots, exhibiting much of the red-orange color. Females and some males are mostly metallic-green and exhibit only a narrow band of red-orange color along the front margin of the elytra.

Reproductive Biology

Adult beetles are active from March through June. They are uncommon and rarely observed despite their large size and conspicuous coloration. They presumably mate at this time, the females laying their eggs on the bark of an elderberry. How the beetle locates mates is unknown, although some other cerambycids appear to use pheromones. The larvae hatch in a few days and bore into the stem, where they remain, feeding on the pith until they complete their development. The larva then cuts an emergence hole, pupates inside the stem, and emerges as an adult in the spring. The complete life cycle is thought to take one or two years. Adults are presumed to die after reproducing, but this is not definitively known.

Essential Habitat Components, Movement

The beetle is dependent on its host plant, elderberry, which is a common component of the remaining riparian forests of the Central Valley. Use of the elderberry by the beetle, a wood borer, is rarely apparent. Frequently, the only exterior evidence of the shrub's use by the beetle is an exit hole created by the larva just prior to the pupal stage. Recent field work along the Cosumnes River and in the Folsom Lake area indicates that larval galleries can be found in elderberry stems with no evidence of exit holes; the larvae either succumb prior to constructing an exit hole or are not far enough along in the developmental process to construct an exit hole. Larvae appear to be distributed in stems which are 1.0 inch or greater in diameter at ground level. Barr (1991) noted that elderberry shrubs and trees with many exit holes were most often large, mature plants; young stands were seldom occupied.

Population densities of the beetle are probably naturally low (Service 1984); it has been suggested, based on the spatial distribution of occupied shrubs (Barr 1991), that the beetle disperses poorly. Low density and limited dispersal capability may cause the beetle to be vulnerable to the negative effects of the isolation of small subpopulations due to habitat fragmentation.

Range

The beetle's current distribution is patchy throughout the remaining habitat of the Central Valley from Redding to Bakersfield. Surveys conducted in 1991 (Barr 1991) found evidence of beetle activity at 28 percent of the 230 sites with elderberry. The beetle appears to be only locally common i.e., found in population clusters which are not evenly distributed across available elderberry shrubs). Frequently, only particular clumps or trees in the study areas were found to harbor the beetle.

Reasons for Decline and Threats to Survival

Extensive destruction of California's Central Valley riparian forests has occurred during the last 150 years due to agricultural and urban development (Katibah 1984, Smith 1977, Thompson 1961). Based on a 1979 aerial survey, only about 102,000 acres out of an estimated 922,000 acres of Central Valley riparian forest remain (Katibah *et al.* 1984). More extreme figures were given by Frayer *et al*. (1989), who reported that approximately 85 percent of all wetland acreage

in the Central Valley was lost before 1939 and that from 1939 to the mid-1980's, the acreage of wetlands dominated by forests and other woody vegetation declined from 65,400 acres to 34,600 acres. Differences in methodology may explain the differences between the studies. In any case, the historical loss of riparian habitat in the Central Valley strongly suggests that the range of the beetle has been reduced and its distribution greatly fragmented. Loss of non-riparian habitat where elderberry occurs (e.g., savanna and grassland adjacent to riparian habitat, oak woodland, mixed chaparral-woodland), and where the beetle has been recorded (Barr 1991), suggests further reduction of the beetle's range and increased fragmentation of its upland habitat. In Sacramento County, some riparian forest along the American River corridor is protected as parks and open space, but elderberries in savanna and streamside riparian habitats in the southern portion of the County are vulnerable to expansion of residential and commercial developments.

Habitat fragmentation not only isolates small populations, but also increases the interface between habitat and urban or agricultural land, increasing negative edge effects such as the invasion of non-native species (Huxel 2000) and pesticide contamination (Barr 1991). There are several edge effect-related factors that may be related to the decline of the beetle. Recent evidence indicates that the invasive Argentine ant (*Iridomyrmex humilis*) poses a risk to the long-term survival of the beetle. Surveys along Putah Creek found beetle presence where Argentine ants were not present or had recently colonized, and beetle absence from otherwise suitable sites where Argentine ants had become established (Huxel 2000). The Argentine ant has negatively impacted populations of other native arthropod species (Holway 1995; Ward 1987). Predation on eggs, larvae, and pupae are the most likely impacts these ants have on the beetle. In Portugal, Argentine ants have been found to be significant egg predators on the eucalyptus borer (*Phoracantha semipunctata*), a cerambycid like the valley elderberry longhorn beetle. Egg predation on the beetle could lead to local extirpations, as indicated by a population viability study suggesting that egg and juvenile mortality are significant factors affecting probability of extinction for the beetle (Huxel and Collinge, in prep.). The Argentine ant has been expanding its range throughout California since its introduction around 1907, especially in riparian woodlands associated with perennial streams (Holway 1995, Ward 1987). Huxel (2000) states that, given the potential for Argentine ants to spread with the aid of human activities such as movement of plant nursery stock and agricultural products, this species may come to infest most drainages in the Central Valley along the valley floor, where the beetle is found.

Direct spraying and drift of pesticide, including herbicides and/or insecticides, in or near riparian areas (which is done to control mosquitos, crop diseases, invasive and/or undesirable plants, or other pests) is likely to adversely affect the beetle and its habitat. Although there have been no studies specifically focusing on the effects of pesticides on the beetle, evidence suggests that the species is likely to be affected by pesticides. As of 1980, the prevalent land use adjacent to riparian habitat in the Sacramento Valley was agriculture, even in regions where agriculture was not generally the most common land use (Katibah *et al.* 1984). Therefore, the species is likely vulnerable to pesticide contamination from adjacent agricultural practices. Recent studies of major rivers and streams documented that 96 percent of all fish, 100 percent of all surface water samples and 33 percent of major aquifers contained one or more pesticides at detectable levels

(Gilliom 1999). Pesticides were identified as one of the 15 leading causes of impairment for streams included on the Federal Water Pollution Control Act, as amended (Clean Water Act), section 303(d) lists of impaired waters. As the beetle occurs primarily in riparian habitat, the contamination of rivers and streams affects this species and its habitat. Pesticides have been identified as one of a number of potential causes of pollinator species' declines and declines of other insects beneficial to agriculture (Ingraham *et al.* 1996). Therefore, it is likely that the beetle, typically occurring adjacent to agricultural lands, has suffered a decline due to pesticides.

Status Within the Action Area and Environmental Baseline

The California Natural Diversity Database lists 168 beetle occurrences in California (CNDDB 2002). Three of these are located in Sutter County and 16 are located in Sacramento County. The beetle has not been documented to occur within the Basin. However, several occurrences have been recorded in close proximity to the Basin along the Sacramento River. For example, the beetle has been observed on the Yolo County side of the Sacramento River directly west of Fisherman's Lake. Potential beetle habitat (i.e., elderberry shrubs with stems greater than one inch diameter at ground level) is located along the outside perimeter of the Basin, and small patches of potential habitat are known to exist in many locations within the Basin. The number of elderberry shrubs in the Natomas Basin and the local population status of the beetle are not known.

Beetle habitat is defined as elderberry shrubs (*Sambucus* spp.) with stems greater than one inch in diameter at ground level. No attempt was made to quantify the number of elderberry shrubs with stems measuring greater than one inch in diameter at ground level within the proposed action's action area. However, habitat class types identified in the EIR/EIS that may potentially be inhabited by elderberry shrubs (and therefore, the beetle) include 98 acres of oak groves, 124 acres of riparian, and 106 acres of other tree groves (i.e., groves that are neither oak groves or riparian)(Table 13). Additional elderberry shrubs are likely scattered throughout the action area.

Threatened Colusa Grass

Colusa grass is endemic to vernal pools of California's Sacramento and San Joaquin valleys. The Service (1997b) listed it as a threatened species in 1997. Colusa grass has been state-listed as endangered since 1979 (CDFG 1991) and has been considered to be rare and endangered by the California Native Plant Society since 1974 (Powell 1974). The California Native Plant Society now includes Colusa grass on List 1B and considers it to be "endangered throughout its range" (Skinner and Pavlik 1994) and "seriously endangered in California" (Tibor 2001). CDFG considers the status of Colusa grass to be declining (CDFG 2001).

Description

Unlike terrestrial grasses, Colusa grass has pith-filled stems, lacks distinct leaf sheaths and ligules, and produces exudate. Colusa grass differs from other members of the Orcuttieae in that it has zigzag stems, cylindrical inflorescences, and fan-shaped lemmas and lacks glumes,

whereas the other genera within the tribe have fairly straight stems and possess glumes. Moreover, *Orcuttia* species have distichous spikelets and narrow, five-toothed lemmas, and *Tuctoria* species have spikelets arranged in a loose spiral, and narrow, more-or-less entire lemmas. Colusa grass is not likely to be confused with Anthochloa, despite their former taxonomic affiliation. The latter does not occur in North America, is perennial, does not have glands, the inflorescence is not cylindrical, and the spikelets have glumes (Hoover 1940).

All members of the Orcuttieae share several characteristics that differ from many other grasses. Most grasses have hollow stems, but the Orcuttieae have stems filled with pith. Another difference is that the Orcuttieae produce two or three different types of leaves during their life cycle, whereas most grasses have a single leaf type throughout their life span. The juvenile leaves of the Orcuttieae, which form underwater, are cylindrical and clustered into a basal rosette. After the water dries, terrestrial leaves form in all species of the tribe; these leaves have flattened blades and are distributed along the stem (Keeley 1998). *Orcuttia* species have a third type of leaf that is not found in *Neostapfia* or *Tuctoria* (Reeder 1982, Keeley 1998). The terrestrial leaves of the Orcuttieae also differ from other grasses in other respects. Whereas grass leaves typically are differentiated into a narrow, tubular *sheath* that clasps the stem tightly and a broader blade that projects away from the stem, terrestrial leaves of the Orcuttieae are broad throughout and the lower portion enfolds the stem only loosely. The Orcuttieae also lack a ligule, which is a leaf appendage commonly found in other grasses (Reeder 1965, Reeder1982, Keeley 1998). Another characteristic common to all Orcuttieae is the production of an aromatic exudate, which changes from clear to brown during the growing season (Reeder 1965, Reeder 1982). The exudate most likely helps to repel herbivores (Crampton 1976, Griggs 1981).

Compared to other members of the Orcuttieae, Colusa grass shows fewer adaptations to existence underwater, indicative of its relatively primitive evolutionary position and the shorter duration of underwater growth (Keeley 1998). The aquatic seedlings of Colusa grass have only one or two juvenile leaves (Keeley 1998). The terrestrial stage consists of multiple stems arising in clumps from a common root system. The stems are decumbent and have a characteristic zigzag growth form (Crampton 1976). Overall stem length ranges from 10 to 30 cm (3.9 to 11.8 in.). The entire plant is pale green when young (Davy 1898) but becomes brownish as the exudate darkens (Reeder 1982, Reeder 1993). Leaf length is 5 to 10 cm (2.0 to 3.9 in.) (Hitchcock and Chase 1971). Each stem produces one dense, cylindrical inflorescence that is 2 to 8 cm (0.8 to 3.1 in.) long and 8 to 12 mm (0.31 to 0.47 in.) broad. Within the inflorescence, the spikelets are densely packed in a spiral arrangement; the tip of the rachis projects beyond the spikelets. Each spikelet typically contains five florets but does not have glumes. The fan-shaped lemmas are approximately 5 mm (0.20 in.) long. The grains are 2.5 mm (0.10 inch) long and are coated with exudate. Colusa grass has a diploid chromosome number of 40 (Reeder 1982, Reeder 1993).

Historical and Current Range

In the 50 years after its initial discovery (Davy 1898), Colusa grass was reported from only three sites other than the type locality; these were in Merced and Stanislaus counties. By the mid-

1970's, Colusa grass had been reported from a total of 11 sites in Colusa, Merced, Solano, and Stanislaus counties (Hoover 1936, Hoover 1940, Crampton 1959, Medeiros 1976, Reeder 1982). During the 1980's, many new populations of Colusa grass were located during extensive surveys. As of 1989, 40 occurrences were extant and 11 already had been extirpated. Of the 51 occurrences known up to that point, 26 were in Merced County, 22 were in Stanislaus county, two were in Solano County, and one was in Colusa County (Stone *et al*. 1988, CNDDB 2001). These occurrences were in the San Joaquin Valley, Solano-Colusa, and Southern Sierra Foothills vernal pool regions (Keeler-Wolf *et al*. 1998).

Although fewer than one-quarter of the historical occurrences have been visited within the past decade, their status is presumed to be the same as on the last visit (CNDDB 2002). Currently, CNDDB (2002) includes 59 occurrences of Colusa grass; 48 occurrences are presumed to be extant and 11 others are either known or presumed to be extirpated.

The extant populations occur primarily in the Southern Sierra Foothills Vernal Pool Region, where they are concentrated northeast of the city of Merced in Merced County (24 occurrences) and east of Hickman in Stanislaus County (16 occurrences). Of the remaining eight extant occurrences, four are in central Merced County, representing the San Joaquin Valley Vernal Pool Region. The others are in the Solano-Colusa Vernal Pool Region, with two each in southeastern Yolo and central Solano counties (Stone *et al*. 1988, Keeler-Wolf *et al*. 1998, CNDDB 2002). The species has been extirpated from Colusa County (CNDDB 2002).

Life History and Habitat

Many life-history characteristics are common to all members of the Orcuttieae. They are annuals, and all exhibit C_4 photosynthesis (Downton 1975, Griggs 1981, Keeley 1998). All are wind-pollinated, but pollen probably is not carried long distances between populations (Griggs 1980, Griggs and Jain 1983). Local seed (i.e., caryopsis) dispersal is by water, which breaks up the inflorescences (Reeder 1965, Crampton 1976, Griggs 1980, Griggs 1981). Long-distance dispersal is unlikely (Service 1985*c*) but seed may have been carried occasionally by waterfowl (family Anatidae), tule elk (*Cervus elaphus nannoides*), or pronghorn (*Antilocapra americana*) in historical times (Griggs 1980). The seeds can remain dormant for an undetermined length of time, but at least for three or four years, and germinate underwater after they have been immersed for prolonged periods (Crampton 1976, Griggs 1980, Keeley 1998). Unlike typical terrestrial

grasses that grow in the uplands surrounding vernal pools, members of the Orcuttieae flower during the summer months (Keeley 1998).

All members of the Orcuttieae are endemic to vernal pools. Although the various species have been found in pools ranging widely in size, the vast majority occur in pools of 0.01 hectares (0.025 acres) to 10 hectares (24.7 acres) (Stone *et al*. 1988). Large pools such as these retain water until May or June, creating optimal conditions for Orcuttieae (Crampton 1959, Crampton 1976, Griggs 1981, Griggs and Jain 1983). Within the pools, Orcuttieae occur in patches that are essentially devoid of other plant species (Crampton 1959, Crampton 1976). Typically, plants near the center of a pool grow larger and produce more spikelets than those near the margins, but patterns vary depending on individual pool characteristics and seasonal weather conditions (Griggs 1980).

Reproductive Ecology

In an experiment where Colusa grass was grown along with Greene's tuctoria and two species of *Orcuttia* (Keeley 1998), seeds of Colusa grass took approximately three months to germinate following inundation, longer than all other species. Unlike *Orcuttia* species, Colusa grass does not produce flattened, floating juvenile leaves (Reeder 1982, Keeley 1998). Germination and seedling development have not been studied in the wild but are assumed to be similar to those of *Tuctoria* species, which have similar seedlings. Thus, Colusa grass seed would be expected to germinate in late spring when little standing water remains in the pool, and flowering would begin approximately three to four weeks later, as observed for *Tuctoria* (Griggs 1980). Flowering individuals of Colusa grass have been collected as early as May throughout the range of the species (CNDDB 2002). Colusa grass spikelets break between the florets (Reeder 1993), shattering as soon as the inflorescence matures (Crampton 1976).

Among all members of the Oructtiaeae, the soil seed bank may be 50 times or more larger than the population in any given year. In general, years of above-average rainfall promote larger populations of Orcuttieae, but population responses vary by pool and by species (Griggs 1980, Griggs and Jain 1983). Population sizes have been observed to vary by one to four orders of magnitude among successive years and to return to previous levels even after three to five consecutive years when no mature plants were present (Griggs 1980, Griggs and Jain 1983, Holland 1987). Thus, many years of observation are necessary to determine whether a population is stable or declining.

Reproductive and survival rates of Colusa grass have not been reported, but annual monitoring confirms that population sizes of Colusa grass vary widely from year to year. Over a 6-year monitoring period, the population at the Bert Crane Ranch in Merced County dropped from 250 plants in 1987 to zero in 1989 and 1990 but rebounded to over 2,000 plants in 1992 (Silveira in litt. 2000). At Olcott Lake in Solano County, the lowest population of the decade was 1,000 in 1994 yet was followed by a high of over one million the following year (CNDDB 2001).

Habitat and Community Associations

Colusa grass has the broadest ecological range among the Orcuttieae. It occurs on the rim of alkaline basins in the Sacramento and San Joaquin valleys, as well as on acidic soils of alluvial fans and stream terraces along the eastern margin of the San Joaquin Valley and into the adjacent foothills (Stone *et al*. 1988). Elevations range from 5 m (18 ft.) to approximately 105 m (350 ft.) at known sites (CNDDB 2001). Colusa grass has been found in Northern Claypan and Northern Hardpan vernal pool types (Sawyer and Keeler-Wolf 1995) within rolling grasslands (Crampton 1959). It grows in pools ranging from 0.01 to 250 hectares (0.02 to 617.5 acres), with a median size of 0.2 hectares (0.5 acres), and also occurs in the beds of intermittent streams and in artificial ponds (Stone *et al*. 1988, K. Fuller personal communication 1997, EIP Associates 1999). This species typically grows in the deepest portion of the pool or stream bed (Crampton 1959, Stone *et al*. 1988) but also may occur on the margins (Hoover 1937, Stone *et al*. 1988). Deeper pools and stock ponds are most likely to provide the long inundation period required for germination (EIP Associates 1999).

Several soil series are represented throughout the range of Colusa grass. In the Solano-Colusa Vernal Pool Region, Colusa grass grows on clay, silty clay, or silty clay loam soils in the Marvin, Pescadero, and Willows series. In the San Joaquin Valley Vernal Pool Region, soils are clay or silty clay loam in the Landlow and Lewis series (Silveira in litt. 2000). Colusa grass habitat in the Southern Sierra Foothills Vernal Pool Region includes many soil series with textures ranging from clay to gravelly loam. For sites with known soil series, these include Bear Creek, Corning, Greenfield, Keyes, Meikle, Pentz, Peters, Raynor, Redding, and Whitney (Stone *et al*. 1988, EIP Associates 1999, CNDDB 2001). The type and composition of impermeable layers underlying occupied vernal pools also varies, ranging from claypan to lime-silica or iron-silica cemented hardpan and tuffaceous alluvium (Stone *et al*. 1988)

Colusa grass usually grows in single-species stands, rather than intermixed with other plants. Thus, associated species in this case are plants that occur in different zones of the same pools but are present in the same season. For example, Crampton (1959) observed that Colusa grass dominated pool beds, with hairy Orcutt grass forming a band around the upper edge of the stand. In saline-alkaline sites, common associates of Colusa grass are frankenia and saltgrass, whereas on acidic sites associates include coyote-thistle, turkey mullein (*Eremocarpus setigerus*), and vernal pool popcorn flower (Stone *et al*. 1988, EIP Associates 1999). Greene's tuctoria formerly grew in one vernal pool with Colusa grass, but the former no longer occurs there (Stone *et al*. 1988, CNDDB 2001).

Reasons for Decline and Threats to Survival

Colusa grass declined primarily because pools in which it occurred were destroyed by conversion to irrigated agriculture, primarily to orchards and vineyards (Crampton 1976, Medeiros 1976, CNDDB 2001). Other factors that extirpated populations of Colusa grass included altered hydrology, surface disturbance, and excessive livestock grazing. At least nine, and possibly 11, occurrences have been extirpated, although several others most likely were eliminated before being reported (Stone *et al*. 1988). The Yolo County occurrences have been damaged by herbicide application (Witham in litt. 2000) and the groundwater there has been

contaminated by industrial chemicals (K. Fuller personal communication 1997).

The same factors that contributed to the decline of Colusa grass continue to pose threats. Agricultural conversion is most likely to occur in eastern Stanislaus County and threatens the 16 extant occurrences there. Dry-land farming there is gradually being replaced by irrigated agriculture; the former apparently is compatible with the persistence of Colusa grass, but the latter is not (Crampton 1959, Crampton 1976). Changes in natural hydrology, such as draining pools or creating reservoirs, could create unsuitable conditions for Colusa grass by decreasing or increasing inundation periods. Increased grazing intensity or summer grazing would threaten Colusa grass, even though moderate cattle grazing in spring has not posed a problem (Stone *et al*. 1988). Sheep grazing is compatible if the flock is removed before Colusa grass begins growth for the year. However, sheep trampling and bedding during the seedling and flowering stages are detrimental (Witham in litt. 1992).

Another threat to the survival of Colusa grass comes from the construction of the proposed University of California campus and associated community in Merced County. Four occurrences (constituting five pools and ponds) are in the area expected to be developed within the next 15 years, and two others (constituting one pool and one stockpond) are within the "planning area" (EIP Associates 1999, CNDDB 2001).

Additional factors threaten the survival of Colusa grass, particularly the problem of small population size. Although populations may drop to only a few visible plants in certain years, seven consisted of fewer than 100 plants even at their peak (CNDDB 2002) and thus are likely to represent small populations. Non-native plants such as swamp grass and alkali mallow, and invasive native species such as cocklebur and lippia could out-compete Colusa grass and may be particular problems in combination with other factors such as decreased inundation and inappropriate livestock grazing (Stone *et al*. 1988, Witham in litt. 2000). Grasshopper foraging has been observed on Colusa grass (Stone *et al*. 1988), but the extent of this threat is unknown. The two Yolo County occurrences are threatened by herbicide run-off from adjacent agricultural operations (CNDDB 2001).

Status with Respect to Recovery

Most of the conservation efforts for Colusa grass have been accomplished as part of the broader effort to survey and protect vernal pools in the Central Valley. Surveys conducted by Crampton (1959), Medeiros (1976), and Stone *et al.* (1988) contributed to distributional records and identification of threats. Four occurrences of Colusa grass, comprising six occupied pools, have been protected by The Nature Conservancy. One is Olcott Lake on the Jepson Prairie Preserve in Solano County, where the Colusa grass population has been monitored annually since 1989

(Witham in litt. 1992, CNDDB 2001). The other five pools are on the Flying M Ranch conservation easement in eastern Merced County (Stone *et al*. 1988).

Three additional occurrences of Colusa grass are on federal land, which offers more options for conservation but does not in itself constitute protection. Two are on a U.S. Department of Defense facility in Yolo County, which was scheduled to be released from federal ownership in 2001 (Fuller in litt. 2000). The other occurrence is on the Arena Plains Unit of the Merced National Wildlife Refuge in Merced County. The Service, which administers the refuge, acquired the Arena Plains in 1992, and refuge personnel have been monitoring the Colusa grass population annually since 1993. Although the refuge allowed grazing to continue on the Arena Plains after it was purchased, temporary electric fencing was placed around the Colusa grass pool one year to exclude cattle when the population was deemed to be particularly vulnerable (D. Woolington pers. comm. 1997, Silveira in litt. 2000).

Status within the Action Area and Environmental Baseline

Fifty-nine Colusa grass occurrences have been reported in California (CNDDB 2002). None of those are from Sacramento County, Sutter County, or the Basin. The closest reported Colusa grass occurrences are from Yolo County, approximately ten miles southwest of the Basin.

The Natomas Basin supports limited amounts of potential Colusa grass habitat. Potential habitat of approximately 21.3 acres occurs in the vernal pools on the east side of the Basin, in 886 acres of grasslands primarily north of Del Paso Road. This estimate of vernal pool acreage is based upon assessments of the amount of vernal pool habitat per acre of grasslands in Sacramento County and probably greatly overestimates the actual amount of vernal pool habitat per acre of grassland in the Basin (K. Fuller, pers. comm. to C. Aubrey, 2003). Additional potential habitat occurs in 96 acres of other ponds and seasonally wet areas in the Basin. However, none of the vernal pools that have been identified in the Basin are either large or deep. Orcuttieae are almost always associated with pools that retain water into May or June (Crampton 1959, Crampton 1976, Griggs 1981, Griggs and Jain 1983).

Threatened Slender Orcutt Grass

Slender Orcutt grass was federally listed as threatened in 1997 (Service 1997*b*) and has been state-listed as endangered since 1979 (CDFG 1991). It was recognized as rare and endangered by the California Native Plant Society as early as 1974 (Powell 1974), is now included on List 1B, and is considered to be "endangered throughout its range" (Skinner and Pavlik 1994).

Description

Slender Orcutt grass occurs in valley grassland and blue oak woodland. It grows in vernal pools on remnant alluvial fans and high stream terraces and recent basalt flows. It has some ability to

colonize artificial habitats, such as the margins of stock ponds (Stone *et al*. 1988, Corbin and Schoolcraft 1989, CNDDB 2000).

Slender Orcutt grass grows as single stems or in small tufts consisting of a few stems. The plants are sparsely hairy and branch only from the upper half of the stem. Although the stems typically are erect, they may become decumbent if many branches form near the stem tip (Reeder 1982). The stems range from 5 to 20 cm (2.0 to 7.9 in.) in height (Schoolcraft in litt. 2000) and are approximately 0.5 mm (0.02 in.) in diameter. The terrestrial leaves are 1.5 to 2 mm (0.06 to 0.08 in.) wide. In slender Orcutt grass, the inflorescence comprises more than half of the plant's height, and the spikelets are more or less evenly spaced throughout the inflorescence. Each spikelet contains from five to 20 florets. The grains are approximately 3 mm (0.12 in.) long (Hitchcock 1934, Reeder 1982, Stone *et al*. 1988, Reeder 1993). In one study, seed weight ranged from 0.32 to 0.81 milligrams (mg)(1.1 to 2.8 x 10^{-5} ounces) (Griggs 1980). The diploid chromosome number of slender Orcutt grass is 26 (Reeder 1982).

Slender Orcutt grass is most similar to hairy Orcutt grass, but the former has narrower stems and leaves, branches at the upper nodes, larger spikelets that are not crowded on the rachis, larger seeds, a different chromosome number, and flowers earlier (Reeder 1982). Other *Orcuttia* species have unequal lemma teeth and also differ in seed size and chromosome number (Reeder 1982).

Historical and Current Range

By the mid-1980's, slender Orcutt grass was known from only 18 localities in Lake, Sacramento, Shasta, and Tehama counties (Reeder 1982, Stone *et al*. 1988). During the late 1980's, Stone *et al*. (1988) and others (CNDDB 2000) discovered 34 additional occurrences of slender Orcutt grass. Of the 52 occurrences reported prior to 1990, the majority (29 occurrences, 55.8 percent) were in the Northeastern Sacramento Valley Vernal Pool Region of Tehama County; most of those were in the vicinity of Dales, except for four occurrences on the Vina Plains. Another 14 occurrences (26.9 percent) were in the Northwestern Sacramento Valley Vernal Pool Region, on the Stillwater and Millville Plains of Shasta County. The Modoc Plateau Vernal Pool Region accounted for another six occurrences (11.5 percent), including four in Shasta County and two in Siskiyou County. The remaining three occurrences included two in Lake County, which was in the Lake-Napa Vernal Pool Region, and one in Sacramento County, in the Southeastern Sacramento Valley Vernal Pool Region (Griggs and Jain 1983, Stone *et al*. 1988, CNDDB 2000).

During the past decade, 27 new occurrences of slender Orcutt grass have been reported, including three that were introduced into created pools. Thus, a total of 79 occurrences are known, of which 73 are presumed to be extant (Corbin in litt. 1999, CNDDB 2000). In addition to the counties where it was reported historically, slender Orcutt grass is now known from Lassen and Plumas counties.

The primary area of concentration for slender Orcutt grass (42.5 percent of occurrences) is still in the vicinity of Dales, Tehama County, where 28 natural occurrences and the three introduced populations remain extant. Those 31 occurrences and the four in the Vina Plains of Tehama County are all in the Northeastern Sacramento Valley Vernal Pool Region (Keeler-Wolf *et al*. 1998). A secondary area of concentration for slender Orcutt grass is the Modoc Plateau Vernal Pool Region in Lassen, Plumas, Shasta, and Siskiyou counties with 22 extant occurrences (30.1 percent). The portion of Shasta County that is in the Northwestern Sacramento Valley Vernal Pool Region has 12 extant occurrences (16.4 percent). The Lake-Napa Vernal Pool Region accounts for two extant occurrences, both in Lake County, and the remaining two occurrences are in Sacramento County, in the Southeastern Sacramento Valley Vernal Pool Region (Stone *et al*. 1988, Corbin and Schoolcraft 1989, Corbin in litt. 1999, CNDDB 2000).

Reproductive Ecology and Demography

Optimal germination of slender Orcutt grass is achieved through stratification followed by warm days and mild nights (Griggs 1974 in Stone *et al*. 1988). Peak flowering of this species typically occurs in May in the Central Valley (Griggs 1981, Reeder 1982) but not until June or July on the Modoc Plateau (Corbin in litt. 2000, Schoolcraft in litt. 2000). Unlike hairy Orcutt grass and Greene's tuctoria, slender Orcutt grass is not likely to die when pools are flooded by late spring or summer rains. At two sites near Dales that were inundated by rains in May 1977, slender Orcutt grass plants dropped their existing inflorescences but resprouted and flowered again within one month (Griggs 1980, Griggs and Jain 1983). Moreover, the population at the Vina Plains Preserve in Tehama County experienced a second pulse of germination after summer rains in 1982 (Broyles 1983, in Alexander and Schlising 1997). Conversely, drought has been known to cause 100 percent mortality (Griggs 1980, Griggs and Jain 1983).

Similar to other vernal pool annuals, slender Orcutt grass populations can vary greatly in size from year to year. Fluctuations of up to four orders of magnitude have been documented in Lake and Shasta counties (Griggs 1980, Griggs and Jain 1983). At the Vina Plains Preserve, the single population ranged in size from 1,000 to 147,700 individuals during the five times it was reported over a 13-year period (Stone *et al*. 1988, Alexander and Schlising 1997). However, slender Orcutt grass populations do not always fluctuate in size. Among five populations of slender Orcutt grass that Griggs tracked from 1973 to 1979, two remained at the same order of magnitude for the entire period. Both were in the Dales area. None of the other five species of Orcuttieae included in the study remained stable for the full seven years (Griggs 1980, Griggs and Jain 1983).

Seeds of slender Orcutt grass germinate even in dry years, but the proportion of plants surviving to maturity varies. In a 1977 demographic study of two slender Orcutt grass populations near Dales and a third near Redding (Griggs 1980, Griggs and Jain 1983), survivorship ranged from 0 to 75 percent (average = 40 percent). At the two sites near Dales, densities of slender Orcutt grass were 694 and 1,530 per square meter (64.5 and 142.1 per square foot, respectively) in 1977 (Griggs 1980, Griggs and Jain 1983). At the Vina Plains Preserve, the single occupied pool had a density of 71 plants per square meter (6.6 per square foot) in 1995 (Alexander and Schlising

1997). Slender Orcutt grass produced an average of 58 seeds per plant in 1977, ranging from 11.3 to 163.9 among the populations studied. At one Dales-area site, the soil seed bank was estimated to be more than 14 times greater than the population of growing plants in 1977 (Griggs 1980, Griggs and Jain 1983).

Griggs (1980) and Griggs and Jain (1983) reported that most of the genetic diversity in slender Orcutt grass occurred among individuals with the same seed parent. He found nearly as much genetic diversity within a single population but little difference between populations. However, his study included only two populations from Tehama County, which were in close proximity. One of the Sacramento County populations differs considerably from other occurrences in outward appearance, suggesting that it may differ genetically (Cochrane in litt. 1995*a*).

Habitat and Community Associations

Slender Orcutt grass is found primarily on substrates of volcanic origin (Crampton 1959, Corbin and Schoolcraft 1989), on soils that range from slightly to strongly acidic (Stone *et al*. 1988) and from clay to sandy, silty, or cobbly loam (Corbin and Schoolcraft 1989, CNDDB 2000 and unprocessed data). Sacramento Valley populations occur on the Redding, Toomes, and Tuscan soil series (Stone *et al*. 1988, CNDDB 2000). Elsewhere, soil series have not been reported. Natural pools in which slender Orcutt grass grows are classified as Northern Volcanic Ashflow and Northern Volcanic Mudflow vernal pools (Sawyer and Keeler-Wolf 1995). However, this species also has been reported from other natural and artificially-created seasonal wetlands such as creek floodplains, stock ponds, and borrow pits. Impervious layers beneath occupied pools range from iron-silica hardpan to bedrock (Stone *et al*. 1988, Corbin and Schoolcraft 1989, CNDDB 2000).

Among the populations studied by Stone *et al*. (1988), the median area of pools occupied by slender Orcutt grass was 0.65 hectares (1.6 acres) and ranged from 0.08 to 45 hectares (0.2 to 111 acres). On the Modoc Plateau, occupied pools known as of 1989 ranged in size from 2 to 40 hectares (5 to 100 acres) and were typically at least 30 cm (11.8 in.) deep; this species was restricted to the deepest areas of these pools (Corbin and Schoolcraft 1989). Slender Orcutt grass occurs through a wide range of elevations corresponding to its broad geographical range. The lowest reported elevation was 27 m (90 ft.) in Sacramento County (Stone *et al*. 1988) and the highest was 1,640 m (5,380 ft.) in Lassen County (CNDDB unprocessed data).

Vegetation types in which the occupied pools occur are diverse, ranging from grassland and oak woodland to mixed conifer forest, silver sagebrush (*Artemisia cana*) flats, and sedge meadows (Crampton 1959, CNDDB 2000). Associated species vary throughout the range of slender Orcutt grass. Among the most common associates in the Sacramento Valley are vernal pool popcorn flower, pale spikerush (*Eleocharis macrostachya*), coyote-thistle, whiteflower navarretia, and water shamrock. At other locations throughout northern California, slender Orcutt grass occurs with a wide variety of plants, including various species of *Downingia, Eryngium*, and *Navarretia* (Stone *et al*. 1988, Corbin and Schoolcraft 1989, Alexander and Schlising 1997, CNDDB 2000). Although slender Orcutt grass grows in the same vernal pool

complexes as hairy Orcutt grass in Tehama County (including the Vina Plains Preserve) and Sacramento Orcutt grass in Sacramento County, it has not been found to share any pools with either species (Stone *et al*. 1988, Cochrane in litt. 1995*a*, Alexander and Schlising 1997, CNDDB 2000).

Reasons for Decline and Threats to Survival

Urban development in the vicinity of Redding has extirpated or caused the severe decline of five slender Orcutt grass occurrences through construction activities and hydrological alterations (Griggs and Jain 1983, CNDDB 2000). Agricultural conversion apparently eliminated the species from the type locality. Although the exact location of the type collection is not known, the general area was being used for crop fields and both irrigated and dry pastures as of 1987 (Stone *et al*. 1988).

Urban development is continuing in the vicinity of Redding and could eliminate the remaining populations in that area. A variety of other factors are contributing to the continued decline of slender Orcutt grass including off-road vehicle use, inappropriate livestock grazing, altered hydrology, and competition from other plants (Stone *et al*. 1988, Corbin and Schoolcraft 1989). Off-road vehicle use is a particular problem near Redding and in forested areas of the Modoc Plateau. According to Stone *et al*. (1988), "moderate" livestock grazing in spring is compatible with slender Orcutt grass but overstocking, summer grazing, and trampling pose threats to several occurrences. However, grazing may be necessary to control aggressive competitors such as the native species, pale spikerush (Witham in litt. 2000). Altered hydrology contributes to the decline of slender Orcutt grass by creating conditions unsuitable for its germination, growth, or reproduction, and by promoting the growth of competing plant species.

Status with Respect to Recovery

Four natural occurrences of slender Orcutt grass are in designated preserves. These include the Trust for Wildland Communities' Boggs Lake Preserve in Lake County, The Nature Conservancy's Vina Plains Preserve in Tehama County, and two occurrences on CDFG's Dales Lake Ecological Reserve in Tehama County (Broyles 1987, Stone *et al*. 1988, CNDDB 2000). All four populations are monitored annually (Baldwin and Baldwin 1989*a*, Baldwin and Baldwin 1989*b*, Baldwin and Baldwin 1991, CNDDB 2000). A conservation area containing a population of slender Orcutt grass was recently established in Sacramento County to compensate for impacts to vernal pools (Fuller in litt. 2000). An unknown number of additional occurrences are protected from development by conservation easements; one is in Shasta County (CNDDB 2000), and the others are in the Dales Lake area of Tehama County, where a private landowner put more than 16,188 hectares (40,000 acres) of ranch land into a conservation easement in cooperation with The Nature Conservancy (Witham in litt. 2000).

Introductions of slender Orcutt grass have been attempted at two privately-owned sites. In 1978, slender Orcutt grass was seeded into two adjacent "ponds" in Chico, Butte County. Fewer than 100 plants grew in the two ponds that year or in 1979 (Griggs 1980), which was the last time the population size was reported. The other introduction was in 1982, when slender Orcutt grass was seeded into an artificial pool in Shasta County. As of 1987, the population was thriving (CNDDB 2000), but its current size is not known. An unintentional introduction may have taken place at the Dales Lake Ecological Reserve. In 1995, slender Orcutt grass appeared in 11 of 21 artificially-created vernal pools there, possibly because its seeds were contained in plant litter from nearby natural pools that was spread on the surface of the created pool (Witham in litt. 2000). The CNDDB (2000) considers those 11 pools to comprise three element occurrences, but the populations may not be viable; very few plants were found in 1995 and only one of the pools still supported slender Orcutt grass in 1999 (Witham in litt. 2000).

Twenty-seven of the 73 (37.0 percent) extant occurrences of slender Orcutt grass are wholly or partially on federal land. Seventeen of these are managed by the U.S. Forest Service, primarily the Lassen National Forest, although one is on the Shasta-Trinity National Forest. The other ten are on lands operated by the U.S. Bureau of Land Management; nine of these are in the Redding Resource Area and the other is in the Alturas Resource Area. Two of the occurrences on the Lassen National Forest, Adobe North and South Vernal Pools, are within an area that has been proposed as a Research Natural Area (Corbin in litt. 2000). The Green Place Reservoir occurrence in Shasta County is within a Wilderness Study Area and has been jointly proposed by the U.S. Bureau of Land Management and the Lassen National Forest as a Research Natural Area (Schoolcraft in litt. 2000). The Lassen National Forest and Susanville District of the U.S. Bureau of Land Management jointly prepared a management plan for slender Orcutt grass sites under their administration (including those in the Shasta-Trinity National Forest) in order to ensure the long-term survival of the species (Corbin and Schoolcraft 1989). Actions identified in that plan included avoidance of known populations, maintenance of natural hydrology, monitoring selected populations, and surveys in suitable habitats. As a result of the plan, several areas have been fenced to exclude livestock and a considerable number of additional populations have been discovered (Corbin in litt. 1999, CNDDB 2000, Corbin in litt. 2000, Schoolcraft in litt. 2000).

Status within the Action Area and Environmental Baseline

A review of CNDDB (2002) revealed that slender Orcutt grass had been reported 84 times in California. Slender Orcutt grass has not been recorded from Sutter County or the Basin. However, it has been reported twice from Sacramento County. The closest reported slender Orcutt grass record to the Basin is approximately 14 miles away in north-central Sacramento County.

The Natomas Basin supports limited amounts of potential slender Orcutt grass habitat. Potential habitat of approximately 21.3 acres occurs in the vernal pools on the east side of the Basin, in 886 acres of grasslands primarily north of Del Paso Road. This estimate of vernal pool acreage is based upon assessments of the amount of vernal pool habitat per acre of grasslands in

Sacramento County and probably greatly overestimates the actual amount of vernal pool habitat per acre of grassland in the Basin (K. Fuller, pers. comm. to C. Aubrey, 2003). Additional potential habitat occurs in 96 acres of other ponds and seasonally wet areas in the Basin. However, none of the vernal pools that have been identified in the Basin are either large or deep. Orcuttieae are almost always associated with pools that retain water into May or June (Crampton 1959, Crampton 1976, Griggs 1981, Griggs and Jain 1983).

Endangered Sacramento Orcutt Grass

Sacramento Orcutt grass was federally listed as an endangered species in 1997 (Service 1997b) and has been state listed as endangered since 1979 (CDFG 1991). The California Native Plant Society has included it on lists of very rare and endangered plants for over two decades (Powell 1974); Sacramento Orcutt grass is currently on List 1B, with the highest endangerment rating possible (Skinner and Pavlik 1994).

Description

Sacramento Orcutt grass has unequal lemma teeth, unlike hairy and slender Orcutt grasses. Both California and San Joaquin Valley Orcutt grasses have unequal lemma teeth but can be distinguished from Sacramento Orcutt grass by the length of the lemma and its teeth and bristles, the size and density of the inflorescence, and the size of the seeds. Moreover, the chromosome number of Sacramento Orcutt grass differs from all other *Orcuttia* species (Reeder 1982).

Historical and Current Range

Sacramento Orcutt grass is endemic to the Southeastern Sacramento Valley Vernal Pool Region (Keeler-Wolf *et al*. 1998) and has always been restricted to Sacramento County. The earliest collection was from 1936 near Phoenix Field. Three other occurrences documented in 1941 and 1958 extended the range north to Orangevale and south to near Sloughhouse. Sacramento Orcutt grass was introduced to Phoenix Park, Sacramento County, in 1978. Three additional natural occurrences were discovered in the late 1980's, including one in extreme southeastern Sacramento County near Route 104. Thus, by 1990, this species was known from a total of seven natural occurrences and one introduction (Stone *et al*. 1988, CNDDB 2000).

Within the past decade, Sacramento Orcutt grass has been discovered at one new site in Sacramento County, within the previously known range. However, one entire occurrence and a portion of another have been extirpated. Thus, eight of the nine occurrences are extant. Five occurrences, comprising more than 70 percent of the occupied habitat, are concentrated into a single area of approximately 6 km^2 (2.3 square miles) east of Mather Field. Two other occurrences are adjacent to each other: Phoenix Field Ecological Reserve and the introduced population at Phoenix Park. The eighth extant occurrence is near Rancho Seco Lake (Stone *et al*. 1988, Cochrane in litt. 1995*a*, Morey in litt. 1996, CNDDB 2000). All occurrences are in the Southeastern Sacramento Valley Vernal Pool Region (Keeler-Wolf *et al*. 1998).

Reproductive Ecology and Demography

Sacramento Orcutt grass flowers in May and June (Griggs 1977, Skinner and Pavlik 1994, Cochrane in litt. 1995*a*) and sets seed in June and July (Holland 1987). The plants are adapted for wind pollination but do provide a source of pollen for native bees (Griggs 1974, in Stone *et al*. 1988). Seeds likely do not disperse far under natural conditions. In a 6-year period, an experimental population spread at most 3 m (10 ft.) from the seed source, and 95 percent of plants were within 30 cm (11.8 in.) of the source (Holland in litt. 1986). A demographic study conducted from 1974 to 1978 (Griggs 1980, Griggs and Jain 1983) indicated that Sacramento Orcutt grass produced an average of 500 seeds per plant. At one site in 1978, 88 percent of plants survived to maturity. The size of the seed bank stored in the soil was approximately 44 times as great as the population of growing plants (Griggs 1980, Griggs and Jain 1983). The number of plants varies with rainfall. Large numbers of plants grow only in years when seasonal rainfall exceeds 40 cm (15.7 in.), particularly when heavy rains begin in November and continue through the end of April (Holland 1987). This species is less likely to germinate in years of below-normal precipitation than other members of the tribe (Griggs 1980, Griggs and Jain 1983).

In studies of enzyme systems, genetic diversity between populations of Sacramento Orcutt grass was low. However, plants from the primary area of concentration had alleles that did not occur in other areas. The amount of genetic variation occurring among related individuals was approximately equal to that within populations (Griggs 1980, Griggs and Jain 1983).

Habitat and Community Associations

Sacramento Orcutt grass has been found in Northern Hardpan and Northern Volcanic Mudflow vernal pools (Sawyer and Keeler-Wolf 1995). It occurs on high-terrace sites (Stone *et al*. 1988) at elevations of 46 to 82 m (150 to 270 ft.) (CNDDB 2000). Occupied pools occur in blue oak woodland and annual grassland (Crampton 1959, Griggs 1977, CNDDB 2000). Among occupied pools discovered prior to 1988, the median area was 0.28 hectares (0.69 acres) and ranged from 0.1 hectares (0.25 acres) to 0.82 hectares (2.03 acres). Soils underlying pools where Sacramento Orcutt grass grows are acidic with an iron-silica hardpan (Stone *et al*. 1988), and the pools contain numerous cobbles (Crampton 1959, Stone *et al*. 1988). Most of the known occurrences are on soils in the Redding series, but at least two are in the Pentz-Pardee-Red Bluff association (Stone *et al*. 1988).

The most common associates of Sacramento Orcutt grass are vernal pool popcorn flower, coyote-thistle, pale spikerush, and dwarf woolly-heads (Stone *et al*. 1988). Boggs Lake hedge-hyssop co-occurs with Sacramento Orcutt grass in one pool (Stone *et al*. 1988, CNDDB 2000). One population of slender Orcutt grass grows in the same vicinity as Sacramento Orcutt grass, but the two species have not been found together (Cochrane in litt. 1995*a*).

Reasons for Decline and Threats to Survival

One former occurrence of Sacramento Orcutt grass between Orangevale and Folsom was

eliminated by urban development. The species was extirpated from one pool near Grant Line Road by changes in hydrology: pool depth was increased artificially to provide a longer-lasting water source for livestock, which created conditions unsuitable for persistence of Sacramento Orcutt grass (Stone *et al*. 1988, CNDDB 2000). Although they have not been extirpated, extant occurrences at the Phoenix Field Ecological Reserve and the Phoenix Park Vernal Pool Preserve have been degraded by off-road vehicles and alterations to natural drainage patterns (Clark *et al*. 1998).

The remaining pools where Sacramento Orcutt grass grows are subject to a wide variety of factors that threaten the species' survival. Urban encroachment, which encompasses many activities, is the primary factor. One occurrence in the primary area of concentration could be destroyed by expansion of the county landfill (Cochrane in litt. 1995*a*); the precise area of expansion has yet to be determined. At present, trash from the landfill frequently blows into the pools (Cochrane in litt. 1995*b*). An industrial park and road widening threaten another one of the occurrences in the same area (Stone *et al*. 1988, Cochrane in litt. 1995*a*). The Phoenix Field Ecological Reserve and Phoenix Park occurrences are affected by excess runoff from lawns, ball fields, and roads; by herbicide and fertilizer applied in adjacent areas (Griggs and Jain 1983, Holland in litt. 1986, Stone *et al*. 1988, Cochrane in litt. 1995*a*, Morey in litt. 1996, Clark *et al*. 1998); and by dumping of landscape waste (Clark *et al*. 1998). Another threat at the Phoenix Field Ecological Reserve is invasion of garden plants (Clark *et al*. 1998). Recreational activities such as rollerblading (Witham in litt. 2000), biking, and horseback riding (Cochrane in litt. 1995*a*, Cochrane in litt. 1995*b,* Clark *et al*. 1998) also are damaging the Phoenix Park occurrence.

Competition from native plants such as pale spikerush and non-native plants such as mannagrass (*Glyceria* spp.) could displace Sacramento Orcutt grass (Stone *et al*. 1988, Cochrane in litt. 1995*a,* Cochrane in litt. 1995*b*, Clark *et al*. 1998). Livestock grazing during the growing season, or overstocking during winter grazing, may degrade habitat for Sacramento Orcutt grass; however, grazing may be useful in providing control of competing plants if appropriate timing and stocking rates can be determined (Griggs 1977, Stone *et al*. 1988, Cochrane in litt. 1995*b*).

Status with Respect to Recovery

Two reserves have been set aside to protect Sacramento Orcutt grass. The Phoenix Field Ecological Reserve encompasses 3.2 hectares (8 acres) and is managed by CDFG. The site has been fenced and only authorized persons have access. CDFG plans to install a drain to prevent urban and landscape runoff from entering the pools. Volunteers and agency personnel monitor the Sacramento Orcutt grass population periodically (Morey in litt. 1996, Clark *et al*. 1998). The nearby Phoenix Park Vernal Pool Preserve encompasses 5.7 hectares (14 acres) and is managed by the Fair Oaks Recreation and Park District. A low fence excludes motorized vehicles but allows foot traffic. Interpretive signs and a footbridge also have been installed (Clark *et al*. 1998).

Griggs (1980) studied the ecology, demography, and genetics of several species in the Orcuttiae

tribe, including Sacramento Orcutt grass. In the course of his research, he introduced local seeds into an unoccupied, natural pool in Phoenix Park. The introduction apparently was successful because the population has persisted and remained stable since 1978 (Cochrane in litt. 1995*a,* CNDDB 2000).

The Service funded a status survey for members of the Orcuttieae in the 1980's, which led to the discovery of several new populations (Stone *et al*. 1988). The CDFG sponsored a native plant recovery workshop in 1995 to develop recovery strategies for Sacramento Orcutt grass (Cochrane in litt. 1995*a*). Workshop participants have since conducted several tasks contributing to the species' recovery, including monitoring populations, assessing threats, and providing public education (Cochrane in litt. 1995*b*, Morey in litt. 1996).

Status within the Action Area and Environmental Baseline

A review of CNDDB (2002) revealed that Sacramento Orcutt grass had been reported nine times in California. Sacramento Orcutt grass has not been recorded from Sutter County or the Basin. However, it has been reported nine times from Sacramento County. Most of these records are from northeastern Sacramento County. The closest reported Sacramento Orcutt grass record to the Basin is approximately 15 miles away in northeastern Sacramento County.

The Natomas Basin supports limited amounts of potential Sacramento Orcutt grass habitat. Potential habitat of approximately 21.3 acres occurs in the vernal pools on the east side of the Basin, in 886 acres of grasslands primarily north of Del Paso Road. This estimate of vernal pool acreage is based upon assessments of the amount of vernal pool habitat per acre of grasslands in Sacramento County and probably greatly overestimates the actual amount of vernal pool habitat per acre of grassland in the Basin (K. Fuller, pers. comm. to C. Aubrey, 2003). Additional potential habitat occurs in 96 acres of other ponds and seasonally wet areas in the Basin. However, none of the vernal pools that have been identified in the Basin are either large or deep. Orcuttieae are almost always associated with pools that retain water into May or June (Crampton 1959, Crampton 1976, Griggs 1981, Griggs and Jain 1983).

Swainson's Hawk

The Swainson's hawk is listed by the State of California as a threatened species and is protected under the MBTA. Additional information on the life history of the Swainson's hawk can be found in CDFG's November 1, 1994, *Staff Report regarding Mitigation for Impacts to Swainson's Hawk (Buteo swainsoni) in the Central Valley of California* (CDFG 1994).

Description

The Swainson's hawk is a medium sized buteo (708 - 992 g [25-35 ounces]) with relatively long, pointed wings and a long, square tail. It occurs in three primary color phases (plumage morphs), including a light-morph, dark-morph, and rufous-morph. Some individuals are an intermediate morph, with variations of the three primary morphs (Estep 2001, in City *et al.* 2003). The dark-morph hawk differs from the light-morph in that it is entirely brown with a light patch under the tail. The trailing edges of the wings are slightly lighter in color than the leading edges. Both the dark and light morphs can have white undertail coverts. The third variation is a rufous-morph, which is characterized by a lighter color of brown with rusty barrings on the underparts. The Swainson's hawk soars with its wings held above the horizontal in a dihedral or "v" shape. When perched, its wings are slightly pointed and extend to or beyond the tail feathers (Estep 2001, in City *et al.* 2003).

Swainson's hawks are opportunistic foragers, flushing prey (rodents, insects and some birds) from fields, pastures and grasslands adjacent to their nests. In the Central Valley, their primary diet consists of small rodents, including meadow voles (*Microtus californicus*). During the summer months, the hawks consume large quantities of insects (Estep 1989).

Historical and Current Range, Movements

The Swainson's hawk breeds throughout western North America, including provinces of Canada and most states west of the Mississippi River (Dechant *et al*. 2001). It winters in grassland and agricultural regions from Central Mexico to southern South America (England *et al*. 1997).

Historically, the Swainson's hawk nested throughout lowland California. However, its current California nesting distribution is limited to the Mojave Desert, northeastern California, the Central Valley, and a few isolated locations in the Owens Valley (CDFG 1992b, 1994). The Swainson's hawk typically occurs in California only during the breeding season (March through September) and winters outside of the U.S. in Mexico and South America. The species was once thought to winter exclusively in Argentina. However, recent telemetry studies (satellite radio) have shown the species to winter in Mexico, with additional detections in Central America and South America. The Central Valley population migrates only as far south as Central Mexico (Estep 2001, in City *et al.* 2003). Additionally, 30 individual hawks have been wintering in the Delta for the past several years (Estep 2001, in City *et al.* 2003) and there are records of small numbers of Swainson's hawks wintering in southern Florida and Texas.

Essential Habitat Components and Use

Stringers of remnant riparian forest along drainages contain the majority (87 percent) of known nests in the Central Valley (England *et al*. 1995, Estep 1984, Schlorff and Bloom 1984). Swainson's hawks usually nest in large (12.2-18.3 m, 40-60 ft.) native trees such as valley oak (*Quercus lobata*), cottonwood (*Populus fremontii*), walnut (*Juglans* sp.), and large willow (*Salix* sp.) and generally do not utilize non-native trees (Estep and Teresa 1992). Nest sites are always

directly associated with high-quality foraging habitat (Estep 1989). The loss of foraging habitat is recognized as having the potential to cause the abandonment of breeding territories and to contribute to a continued reduction in the statewide breeding population (CDFG 1988).

The hawk's minimum foraging area depends upon the vegetation supporting the prey populations and the farming activities that make prey particularly susceptible to predation, such as reduction of cover after harvesting, discing, mowing, flood irrigation and burning. The hawk's highly active foraging behavior often results in birds traveling as far as 30 km from a nesting site (Estep, 1989). Hawk foraging ranges fluctuate annually in response to changing crop patterns, and seasonally in response to changes in prey accessibility and abundance (Estep and Teresa 1992). Communal foraging occurs, especially when agricultural fields such as alfalfa undergo some form of cutting or harvesting (Babcock 1995). Swainson's hawks have been observed foraging behind farm machinery (moving harvester blade or disc), capturing rodents that have become exposed from ground disturbance (Estep, 1989). Foraging ranges in fields with increased vegetation cover and reduced prey availability can be as large as 15,000 acres (Koford, 1992). Suitable cover types for foraging habitats, in order of suitability, include native grassland, agriculture soon after discing, alfalfa and other hay crops, fallow fields, lightly grazed pasture, combinations of hay, grain, and row crops, rice fields prior to flooding and after draining, and heavily grazed pasture. Unsuitable cover types for foraging habitats include vineyards, mature orchards, flooded rice fields, cotton, thistle in fallow fields and any crop where prey are unavailable due to high vegetation height and density (Estep 1989). Because of the distribution of remaining potential nest trees (i.e., narrow riparian bands), Central Valley hawks have shortest average inter-nest distance recorded to date (Estep 1989).

Reproductive Ecology

Swainson's hawks begin to arrive in the Central Valley from their wintering grounds in March to breed and raise their young. The species typically roosts and migrates in groups. Territories are usually established by April with incubation and brooding occurring through June. The earliest fledging of young occurs in July and the young remain with the parents for approximately one month following fledging or until the southern migration in early fall. Recent telemetry studies have shown that some fledglings leave the nesting area and their parents to join a juvenile group or remain alone before the fall migration (Estep 2001, in City *et al.* 2003). Males provision females while the females incubate the eggs. Later, both parents feed the young. Nesting success is inversely correlated with distance to foraging habitat (Woodbridge 1991).

Swainson's hawks show a high degree of nest fidelity and generally return to the same area in which they nested previously. They will investigate several nest sites within this "territory," and settle on one nest dependent on local disturbances, surrounding habitat variables, the proximity of other nesting raptors (i.e., great horned owls, redtail hawks, etc.), and nest condition, although this selection mechanism is not well understood. Some pairs may repair several nests before settling in on one nest site. In the case of juvenile birds, they may build and/or repair a nest and then leave without laying eggs. Therefore, in any given year, and any given area, depending on nest site availability, many of the available nest sites may not be used. Generally, in the

Natomas Basin, one in every three nest sites are used each year, based on annual surveys of successfully nesting Swainson's hawks (T. Roscoe, pers. comm., in NBHCP 2003).

Reasons for Decline and Threats to Survival

Swainson's hawks were once described as a very common raptor in California, found throughout the State's lowlands (Sharp 1902). Since the mid-1800s, the native grasslands have undergone a gradual conversion to agricultural uses. This habitat loss has caused a substantial reduction in the breeding range and size of the breeding population in California (Bloom 1980, England *et al.* 1995).

The loss of agricultural lands due to urban development is further removing essential Swainson's hawk foraging habitat throughout the mid-section of the Central Valley (Estep and Teresa 1992). Swainson's hawks are sensitive to habitat fragmentation and will avoid low density development even though suitable prey conditions may exist (Estep and Teresa 1992). They have not been found in apparently suitable urban areas in the Central Valley where foraging habitat is unavailable for 5-8 km (e.g., Lodi and Sacramento), thus requiring long-distance transport of prey throughout the entire nesting cycle. Rapid urbanization or crop changes near cities could cause the long-term decline of Swainson's hawks in existing urban neighborhoods (England *et al*. 1995). Additional threats are habitat loss due to riverbank protection projects, conversion from agricultural crops that provide abundant foraging opportunities to crops such as vineyards and orchards, shooting, pesticide poisoning of prey animals and hawks on wintering grounds, competition from other raptors, and human disturbance at nest sites.

Status with Respect to Recovery

Nesting surveys conducted periodically by CDFG indicate a relatively large and stable hawk population along the Sacramento River every three or four years. Populations of meadow voles, the principal prey item of adult Swainson's hawks in the Central Valley, vary cyclically, peaking every three to four years. Vole populations in the Basin appeared to reach a peak in 1999 (SHTAC 2000).

Historically, as many as 17,000 Swainson's hawk pairs may have nested in California (CDFG 1992b, 1994). Currently, there are 882 known extant nesting site occurrences in California (Estep 2001, in City *et al.* 2003). The proposed action is in the Central Valley population of hawks, which consists of an estimated 600 to 900 of the remaining breeding pairs. The overall Swainson's hawk population is considered to be declining (CDFG 1992b, 1994). However, the Central Valley's breeding population has remained stable over the past ten years (Estep 2001, in City *et al.* 2003).

Status within the Action Area and Environmental Baseline

More than 87 percent of the known nest sites in the Central Valley are within riparian systems (Estep, 1984; Schlorff and Bloom, 1984). This is primarily a function of tree availability and not a preference for large riparian stands or the presence of other components of a riparian forest. Swainson's hawks also nest in mature roadside trees, isolated individual trees in agricultural fields, small groves of oaks, and trees around farm houses (CDFG, 1992, 1994). The Sacramento River location affords the hawk relatively easy access to foraging uplands on either side of the river, including lands in Yolo County. Relative to the Basin specifically, information indicates that nesting sites and foraging activity occur throughout the Basin (Estep 2001, in City *et al.* 2003), again depending on the presence of suitable trees in proximity to upland foraging areas.

Estep (2002) monitored Swainson's hawk nesting in and along the Natomas Basin in 2002. Seventy hawk territories were identified and monitored; the majority of them were located along the banks of the Sacramento River. Nest trees included walnut, cottonwood, willow, eucalyptus, valley oak, ornamental mulberry, and sycamore. Forty-three of the total 70 territories monitored were active (i.e., at least one adult was active on the nesting territory). Of the 43 active sites, 24 were occupied by breeding pairs that successfully nested (i.e., reared at least one young to fledging). The remaining nineteen sites were either unsuccessful (N = 18) or could not be determined (N = 1). At the 18 failed nest sites, eleven nested but failed to rear young to fledging; seven were occupied by the adult breeding pair but did not attempt to nest. Although the number of nests and active nests has increased yearly since 1999, overall reproductive performance has remained relatively constant because the proportion of successful nests has declined. The number of young per successful nest has remained relatively stable and is consistent with the Sacramento Valley population as a whole.

The proposed action will occur within the range of the Central Valley population of Swainson's Hawks. Much of this population's nesting habitat has been lost to agricultural practices, flood control projects, and urban expansion (Estep 2002). These same factors have also contributed to an overall reduction in native foraging habitat (e.g., grasslands). Within the proposed action's action area, projects have been and continue to be conducted that likely degrade the baseline of the species. In 2001 and 2002, the County of Sacramento approved several small development projects (residential and commercial) in the Natomas Basin that likely resulted in the loss of Swainson's foraging habitat. These developments were discussed in a January 31, 2003, letter from the Service and CDFG to the County of Sacramento (Service File no. 1-1-03-TA-0052). Some of the County-approved developments were relatively close to Swainson's hawk nest trees, which may affect nesting success at those trees. However, the total amount of habitat converted was small (< 10 acres) and was dispersed throughout the southwestern portion of the Basin. The amount developed would not be considered urbanization. The Sacramento International Airport removed three Swainson's hawk nest trees in 2002, two of which had been active in 2001. The third had not been active for the last couple of years (J. Estep, pers. Comm. to Craig Aubrey, 2003).

The Natomas Basin currently supports approximately 328 acres of potential Swainson's nesting habitat (riparian = 124 acres, oak groves = 98 acres, tree groves = 106 acres) (Table 5). This does not include potential nesting habitat on the west side of the levee on the Sacramento River. The majority (80 percent) of nesting habitat is located outside of the proposed Permit Areas. The amount of potential Swainson's foraging habitat fluctuates and is dependant on the amount and composition of agricultural crops. There is currently a total of approximately 22,051 acres of potential Swainson's foraging habitat in the Basin. Non-rice crops represent the majority (16,686 acres). Additional habitat types include: alfalfa (371 acres), idle (1,464 acres), grassland (886 acres), pasture (674 acres), and ruderal (1,970 acres). About 40 percent of the potential foraging habitat is located within the proposed Permit Areas. Drained rice fields are also known to provide potential foraging habitat for the hawk. Therefore, when drained or fallow, a portion of the Basin's 22,693 acres of rice fields are potential foraging habitat for the hawk.

In their April, 2003, Addendum to the Technical Memorandum for the NBHCP (Technical Addendum), the applicants include a detailed analysis regarding potential suitable foraging habitat in the Basin (see Appendix K to the NBHCP). Using assumptions derived from the literature (e.g., Bechard 1982, Estep 1989, Estep and Theresa 1992), they classified the Basin's available foraging habitat according to habitat quality and temporal availability. They found: (1) the majority (almost 75 percent) of available foraging habitat is moderate in quality (Table 5); (2) only eight percent of potential foraging habitat in the Basin is considered high quality; and (3) most of the Basin's potential foraging habitat is not available during the hawk's nesting period, especially when considered in proximity to nest sites because most of the Basin's row crops are bot available as foraging habitat until the late summer and early fall crop harvest. The availability of foraging habitat in proximity to the nest during the nesting season is important because studies have shown that Swainson's hawk reproductive performance decreases with increasing distance between the nest and foraging habitat (England *et al.* 1997, Woodbridge 1991). The authors analyzed the effects of the project under three possible scenarios[3] in which mitigation would be implemented and determined: (1) in two of the three scenarios, although there was an overall decrease in the amount of available foraging habitat, the amount of foraging habitat available to the hawk throughout the nesting season increased; (2) the NBHCP's conservation recommendations directed the Conservancy to focus upland habitat acquisitions in the vicinity of Swainson's nests; (3) implementation of the NBHCP would result in a net increase in the amount of high-quality foraging habitat in the Basin, especially in the vicinity of nest sites; and (4) although some nest sites in the vicinity of the proposed development activities might be abandoned upon implementation of the proposed action, factors such as the existing surplus of nest territories and planned tree plantings in the Basin would prevent any significant adverse effects to the nesting population.

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[3]The authors evaluated these three potential scenarios in which the mitigation program would be implemented depending on the nature of the baseline habitat to be replaced by the mitigation in order to capture the full range of potential future baseline habitat conditions in the Natomas Basin.

Aleutian Canada Goose

The Aleutian Canada goose (goose) was federally listed as endangered on March 11, 1967 (32 **FR** 4001), reclassified as threatened on December 12, 1990 (55 **FR** 51112), and de-listed on March 20, 2001 (66 **FR** 15643). The State has not issued the goose any special status. Additional details of the physical description and life history of the goose can be found in the Aleutian Canada Goose Recovery Plan (Service 1991a).

Description

The Aleutian Canada goose is one of the smallest subspecies of Canada goose . Adults are slightly larger than a mallard duck (*Anas Platyrhynchos*), weighing 1.8-2.7 kg. Like all Canada geese, Aleutian Canada geese have a black head and neck with a white cheek patch, brown wings and back, a grayish-brown breast and belly, a white rump patch, and black legs and feet. The Aleutian Canada goose is distinguished from other Canada goose subspecies by its small size, short bill, and white ring encircling the base of the neck.

Wintering and migrating Aleutian Canada geese forage in harvested corn fields, newly planted or grazed pastures, or other agricultural fields (e.g., rice stubble and green barley). Lakes, reservoirs, ponds, large marshes, and flooded fields are used for roosting and loafing (Grinnell and Miller 1944, Service 1991). In winter, Aleutian Canada geese exhibit a crepuscular foraging pattern, roosting in large flocks during most of the day and night and flying to and from foraging areas during the hours around dawn and dusk.

Historical and Current Range

Historically, the Aleutian Canada goose nested on most of the larger islands in the Aleutian chain and in the Commander and northern Kuril Island chains. When it was listed in 1967, it was only known to nest on Buldir Island in the western Aleutian Islands. Subsequently, remnant flocks have been found on Chagulak Island in the eastern Aleutians, and Kaliktagik in the Semidi Islands.

The Aleutian Canada goose's major migration and wintering areas include coastal areas of Oregon and northern California and California's Sacramento and San Joaquin Valleys. The Aleutian Canada goose migrates between breeding and wintering areas from August to mid-March.

Reasons for Decline and Threats to Survival

The decline in numbers of Aleutian Canada geese and the reduction of their breeding range is attributed to predation by arctic fox (*Alopex lagopus*), which were introduced on many Aleutian islands by fur traders during the period from 1836 to 1930 (55 **FR** 239). The role of migration and wintering habitat loss in the historic decline of Aleutian Canada geese is not well understood. Changing land use practices, including the conversion of cropland and pastures to

housing and other urban development, and sport and subsistence hunting likely contributed to the historical decline (Service 1991).

Status with Respect to Recovery

Most historic nesting islands are protected and managed, in part, for Aleutian goose recovery by the Alaska Maritime National Wildlife Refuge (Service 1991). The overall population of Aleutian Canada geese has sustained a strong increase in numbers since 1990. The most recent and highest population estimate of Aleutian Canada geese from the Aleutian Islands is of birds from their staging area near Crescent City in spring 1998. This estimate suggests that the Aleutian Canada goose population now exceeds 27,000 individuals, compared to fewer than 800 birds in 1975. Since 1990, the annual rate of growth of the population, based on peak counts of birds in California, has averaged about 20 percent. The overall annual growth rate of the population since recovery activities began in the 1970s has been about 14 percent. The Service delisted the Aleutian Canada goose on March 20, 2001 (66 **FR** 15643).

Environmental Baseline and Status within the Action Area

Aleutian geese forage and roost in suitable habitats throughout the Sacramento Valley, including the Sacramento, Colusa, Butte Sink, and Sutter National Wildlife Refuges and the agricultural fields that surround them. The Butte Sink, in particular, is a major fall staging area for Aleutian geese. Aleutian geese migrate to this location in the fall, remain about 1.5 months, then continue south in December (Service 1991). Staging geese roost in flooded fields, ponds, and berms in rice fields in the Butte Sink, and fly out to surrounding agricultural fields to forage on waste grains and beans, and sprouting winter wheat. Approximately 40,000 acres of potential suitable winter habitat exists in the Natomas Basin (Table 6). The Aleutian Canada goose winters in areas both north and south of the Natomas Basin and occasionally seen as a winter transient foraging in the Basin.

Burrowing owl

The borrowing owl is classified by the State of California as a Species of Special Concern. It is classified as endangered in Canada and is listed as threatened or endangered in many of the states that it is known to inhabit (Rosenberg *et al*. 1998).

Description, Essential Habitat Components

The burrowing owl is a small, long-legged owl of open habitats that possesses a short tail, long, narrow wings, and flat head. It is often observed perched on the ground or on fence posts (Sibley, 2000). The burrowing owl generally inhabits vacated burrows created by small mammals, such as badgers (*Taxidea taxus*), ground squirrels (*Spermophilus* spp. and *Ammospermophilus* spp.), and foxes (*Vulpes* spp.) or artificial structures (e.g., culverts, wood debris piles, etc...) for nesting and shelter. It also uses the burrow as refugia from the daytime heat (Haug and Oliphant, 1990). Ground squirrel burrows are most often used by burrowing

owls in central California (Johnson, pers. comm.). At the Conservancy's Betts-Kismat-Silva and Ayala properties, owls use ground squirrel and muskrat burrows (Roberts, pers. comm.). Burrowing owls forage nocturnally on small mammals and may take invertebrates during the day (Haug and Oliphant, 1990). The species is often found in areas with few visual obstructions such as roadsides and other disturbed areas inhabited by ground squirrels. It also favors elevated places such as berms, levees, road and rail beds where it can overlook open lands (NBHCP 2003). Additional information about burrowing owls can be found in CDFG's *Staff Report on Burrowing Owl Mitigation* (CDFG, 1995).

Historical and Current Range, Movements

The burrowing owl is a neotropical migrant that occurs throughout the western United States, including portions of northern Mexico and southern Canada. Its breeding range extends from the Canadian prairie provinces through the western United States to southern California and Texas. The species is also locally distributed throughout suitable habitat in the Caribbean, Central America, and South America. The owl winters in the southern portion of its range (Haug *et al*. 1993).

There are two subspecies of burrowing owl in North America. The Florida burrowing owl (*Speotyto cunicularia floridans*) is located primarily in Florida and the Bahamas. The western burrowing owl (*S. c. hypugaea*) is located throughout Mexico, the western United States , and southwestern Canada (Haug *et al.* 1993).

California appears to have a nonmigratory population of burrowing owls (primarily in the Imperial Valley), as well as burrowing owls wintering from other regions. Burrowing owls in northern California are probably migratory, but little information is known about their migration habits (Haug *et al*. 1993). Burrowing owls in Natomas are non-migratory and resident (Johnson, pers. comm.). The owl is fairly uncommon along the coast north of Marin County, and rare east of the crest of the Sierra Nevada. Additional populations are reported from the Modoc Plateau and Great Basin region. Fragmentation or elimination of historic habitat and population declines have been noted throughout its range (NBHCP 2002).

Essential Habitat Components

Burrowing owls occupy open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation (e.g., campuses, airports, golf courses, perimeter of agricultural fields, banks of irrigation canals) (Natureserve 2000). They use well-drained, level to gently sloping areas characterized by sparse vegetation and bare ground such as moderately to heavily grazed pasture. Although specific habitat characteristics associated with burrowing owls vary by location, the three basic attributes of nesting habitat are: (1) available nest burros; (2) short or sparse vegetation; and (3) open terrain (Zarn, 1974). Burrowing owls forage in a variety of habitats including cropland, pasture, prairie dog colonies, fallow fields, and sparsely vegetated areas. In Saskatchewan, burrowing owls preferred foraging in dense, permanent grass-forb vegetation greater than 30 cm in height located in uncultivated areas and

right-of-ways. They also tended to avoid cultivated cropland and pasture (Haug and Oliphant 1990). Benedict *et al*. (1996), Warnock (1997), and Warnock and James (1996) stated that large, contiguous areas of native grassland are important for the species.

Reasons for Decline and Threats to Survival

Numerous factors have contributed to the owl's decline throughout its range including: (1) habitat loss, fragmentation, and degradation (e.g., agricultural practices, land development); (2) vehicle collisions; (3) rodent control measures; and (4) predation from domestic animals. Of these, habitat alteration and destruction is most important (Sheffield 1997). Habitat alteration and destruction as a result of development appears to be the most important recent influence on burrowing owl populations in central California. Agricultural practices such as the removal of ground squirrels, use of chemical herbicides on levees along irrigation canals, and increased use of insecticides and rodenticides likely also contribute to the owl's decline in central California (DeSante *et al.* 1997). Urbanization is likely a key threat to the species in the proposed action's action area.

Status with Respect to Recovery

Populations of the Florida burrowing owl are stable and are at no risk of extinction. In contrast, populations of the western burrowing owl are declining throughout the subspecies' range (Haug *et al.* 1993).

Burrowing owl populations are decreasing in California. DeSante *et al*. (1997) observed: (1) that only about 873 breeding pairs of owls existed in central California in 1991; (2) owls almost exclusively bred at lower elevations (where the majority of development is occurring); (3) the species was apparently extirpated in the last decade from Sonoma, Marin, Santa Cruz, and Napa Counties; (4) there was at least a 12 percent decrease in the number of breeding pairs in Central California between 1986 and 1991; and (5) there was at least a 23 percent decrease in the number of breeding groups in central California between 1986 and 1991. They also observed that burrowing owls in central California had been or would soon be reduced to three isolated breeding populations: (1) lower San Francisco Bay between Alameda and Redwood City; (2) Livermore; and (3) the Central Valley. Of the three remaining populations, the Central Valley was the largest with approximately 720 breeding pairs and appeared to have decreased the least between 1986 and 1991.

Little scientific information is available for the local burrowing owl population (e.g., home range information), but suitable habitat in the action area consists of areas with small mammal burrows and nearby foraging habitat. The Sacramento Regional County Sanitation District (SRCSD) monitors and manages burrowing owls at its Bufferlands facility south of Sacramento. The number of owls observed in annual surveys increased from 12 resident owls in 1991 to more than 20 in 1997, with as many as 38 birds observed in one survey (SRCSD 2002).

Status within the Action Area and Environmental Baseline

CNDDB (2002) lists 514 burrowing owl occurrences in the State; one of them is from Sutter and 25 are from Sacramento County. Four CNDDB occurrences are known from the Natomas Basin; three of them are presumed extant. Two of the three extant CNDDB occurrences are located within the City's and Sutter's proposed Permit Areas. CNDDB (2002) does not list all of the known owl occurrences (records were likely not submitted to CNDDB). There is presently a colony of burrowing owls located within the MAP Area (Thomas Reid Associates 2000), and colonies have been protected via the acquisition of the Betts-Kismat-Silva and Ayala reserves by the Conservancy (NBHCP EIR 2003). The Conservancy's Betts-Kismat-Silva and Ayala reserves include four owl sites (Roberts, pers. comm.).

The Natomas Basin has about 140 miles of canals and ditches and associated adjacent agricultural fields which are potentially suitable burrowing owl habitat. Due to the frequently changing conditions of the crop fields, occupied owl burrows are likely to be restricted to the canal and ditch banks which are mostly left undisturbed, except when bank stabilization is needed. The adjacent agricultural fields provide foraging habitat for the owls. Crop types that provide potential owl foraging habitat include alfalfa (371 acres), grassland (886 acres), and pasture (674 acres)(Table 7).

Loggerhead Shrike

The shrike is listed as threatened or endangered in 14 states, and is also listed as endangered in eastern Canada and threatened in western Canada. The Service designated it as a Migratory Nongame Bird of Management Concern in the United States in 1987. The shrike is designated as a state Species of Special Concern (CDFG 1992) and was designated as a Category 2 candidate for federal listing as threatened or endangered throughout its range in 1991. However, on November 15, 1994, the Service eliminated all subspecies of the shrike, except the migrant loggerhead shrike of the central, eastern, and southern United States, from the federal candidate list. The Service determined that populations of the other loggerhead shrike subspecies, including populations of the subspecies that occur in California, were more abundant or widespread than previously thought and were not subject to any identifiable threat (59 FR 58992, November 15, 1994). Therefore, no loggerhead shrike subspecies that occur in California are candidates for federal listing.

Description

The loggerhead shrike is a mockingbird-like songbird with a hooked and notched beak and a heavy build. It has slender legs and feet designed for perching. It ranges in size from 20 to 25 cm and has a wing span of 30 to 35 cm. The loggerhead shrike is gray with a black eye band and black tail. It has a white underbelly and white patch on the wing. Sex is indistinguishable from a distance. Juveniles are a lighter gray color on top then adults. Juveniles also have light gray barring on the breast (USACE, 1997).

The shrike preys upon insects, small rodents and small birds. It impales its prey on barded wire, and thorns in the fork of branches so that it can eat it (USACE 1997). The shrike's primary

spring and summer diet is insects. In the winter, it primarily fees upon small rodents (Fraser and Luukkonen 1986). The shrike is often observed perching on branches, fences or other structures with an unobstructed view its surrounding area. It drops off the perch before beginning a rapid flight low to the ground and glides upwards before perching. It has a rapid wing beat in flight.

Historical and Current Range

Deserts, shrub-steppes, and southern savannas were likely the shrike's main habitat types prior to 1800. Reforestation, abandoned fields and loss of habitat due to human development beginning in the 1930 pushed the shrike's populations from its northeast range (Cade and Woods 1997).

The expansion of agriculture and deforestation associated with settlement and western expansion of North America allowed for an expansion of the shrike's range. Logging practices and agricultural methods opened up addition breeding and feeding habitat for the loggerhead shrike (Cadman 1985). However, the development of new farming practices and the use of pesticides in central and southern Canada, throughout the United States and most of Mexico later caused the shrike's breeding and wintering range to contract. The shrike no longer breeds with regularity in the northeastern portions of its former range or in northern tier states of Michigan, Wisconsin, and Minnesota (CWS 1999). Loggerhead shrikes occasionally winter as far north as southern New England (Bent 1950). Eastern populations are not regularly found north of Oklahoma, Arkansas, Kentucky and Maryland (Miller 1931). The milder winters have allowed the species to extend its winter range into northern California, southern Pennsylvania, southern Nevada, northern Utah, central Colorado and southern and eastern Kansas (Hunter *et al*. 1995). The shrike's winter range also extends south into much of Mexico (Yosef 1996).

Essential Habitat Components

Habitat requirements include nesting habitat with nearby forging habitat. Nesting habitat requires shrubs or trees for nests that are isolated in short grass fields (Yosef 1996). Individuals may build nests in trees or shrubs from three to 6.1 m (20 ft.) from the ground (Fraser and Luukkonen 1990). They will require perches the allow for an unobstructed view of the surrounding area for hunting, as well as thorns, barbed wire, or other objects that can be used to impale or hang their prey.

Movement and Habitat Use

The loggerhead shrike prefers grassland habitat throughout its life cycle. It may use man-made or heavily altered habitat types to fulfill its habitat requirements. The shrike will use agricultural, pasture land and other man-made habitat types (Temple 1995). It requires isolated or thin patches of shrubs, trees or artificial perches like fences for nesting locations and perching locations for hunting. A site for impaling prey is also a necessary habitat feature. Winter habitat requirements are the same as the breeding habitat requirements (Yosef 1996). Nonmigratory populations will use the same region in the winter as they do other times of the year (Miller 1931).

Northern populations of loggerhead shrikes will migrate south into the United States from Canada. Areas with an annual average snow cover of ten to 30 days have less abundant winter populations (Miller 1931). Many of the southern populations of shrikes do not migrate. Nonmigratory populations use the same region in the winter as they do other times of the year (Miller 1931).

Reasons for Decline and Threats of Survival

Habitat loss and, to a lesser extent, the deleterious effects of pesticides have caused the shrike's populations to decline. The conversion of pasture lands and hayfields into row crops and urbanized areas has reduced the shrike's forging habitat. Modern framing practices have removed potential hunting perches (Brooks and Temple 1990). Abandonment and reforestation of fields has also reduced the forging habitat for the species. DDE and other organochlorines have been found in the tissue of adult shrikes and eggshells (Anderson and Dunzan 1978). Low concentrations of pesticides to kill young shrikes (Busbee 1977). Although the use of organochlorines in the United States has been banned, populations continue to decline. Collisions with automobiles may be minor factor in the decline of shrike populations. Suitable foraging habitat is often associated with roadsides.

Status with Respect to Recovery

Shrike populations have declined over much of the United States, especially in the central and eastern portions of the country. Shrike populations in the western United States declined slightly between 1955 and 1979 but currently appear to be stable. No recovery plan has been prepared for the shrike. Although current laws may protect the birds from trapping, killing or harassment, they do not protect the shrike's habitat. Therefore, no efforts are being made to reduce the most significant source of the shrike's decline.

Status within the Action Area and Environmental Baseline

The loggerhead shrike is common throughout most of lowland California (CDFG 1990). It is a non-migratory resident of the Natomas Basin, is known to breed in the Basin, and is observed regularly throughout Natomas Basin (Thomas Reid Associates 2000). Suitable nesting and

foraging habitat are common throughout the Basin. Several shrikes were observed on or near the Metro Air Park project site during a site reconnaissance conducted on March 23, 2000 (Thomas Reid Associates 2000), and three shrikes were observed along the eastern portion of the Plan Area during NBHCP habitat mapping surveys in 2001 (NBHCP 2003).

CNDDB (2002) only lists two occurrences of the shrike in California; both were from Riverside County. However, as indicated above, this is not indicative of the actual distribution or abundance of the species in the State or the project's action area. Several shrikes were observed on or near the MAP project site during a site reconnaissance conducted on March 23, 2000 (MAPPOA 2000). An additional three shrikes were observed along the eastern portion of the Basin in 2001 (May & Associates 2001).

IN THE NATOMAS BASIN, POTENTIAL FORAGING HABITAT FOR THE LOGGERHEAD SHRIKE PRIMARILY CONSISTS OF PASTURE, GRASSLANDS, PONDS AND SEASONALLY WET AREAS, CROPLANDS, ORCHARDS, AND RUDERAL HABITATS. SHRIKES ALSO COULD NEST IN TREES OR SHRUBS OCCURRING IN OR ALONG THE MARGINS OF THESE HABITATS. CANALS, RIPARIAN AREAS, AND OAK AND TREE GROVES ALSO PROVIDE NESTING OPPORTUNITIES FOR THIS SPECIES. BASED ON THE GIS, THE NATOMAS BASIN SUPPORTS APPROXIMATELY 23,350 ACRES OF POTENTIAL HABITAT FOR LOGGERHEAD SHRIKE. HABITAT TYPES THAT POTENTIALLY PROVIDE HABITAT FOR THE SHRIKE IN THE BASIN include: (1) alfalfa (371 acres); (2) grassland (886 acres); (3) non-rice crops (16,686 acres); (4) oaks groves (98 acres); (5) orchard (182 acres); (6) pasture (674 acres); (7) ponds and seasonally wet areas (96 acres); (8) riparian (124 acres); (9) ruderal (1, 970 acres); 10) rural residential (377 acres); (11) tree groves (106 acres); and (12) canals (1,778 acres)(Table 8). Potential foraging habitat for the shrike primarily consists of pasture, grasslands, ponds and seasonally wet areas, croplands, orchards, and ruderal habitats. Shrikes also could nest in trees or shrubs occurring in or along the margins of these habitats. Canals, riparian areas, and oak and tree groves also provide nesting opportunities for this species. However, the actual value of much of this habitat is probably limited. Additionally, only a portion of the potential habitat likely would be used by loggerhead shrikes because the species occurs in close association with small trees and shrubs that it uses as perch sites from which foraging bouts are launched and as nest sites. Small trees and shrubs are often not found in the middle of a field; rather, they occur sporadically along the margins of fields. Telephone lines along the roads also are used as perch sites. Because loggerhead shrikes forage by making short forays from perch sites, they would not use the inner portions of fields that occur at some distance from perch sites. Thus, loggerhead shrikes would predominantly use only the margins of fields and areas where there are perch sites. Considering the entire acreage of agricultural fields as potential habitat for loggerhead shrike likely overestimates the amount of habitat available to this species in the Natomas Basin.

Tricolored Blackbird

The Service (since 1995) considers the tricolor blackbird a Species of Concern (Service 1995) and CDFG has considered it a Bird Species of Special Concern in California since 1992.

Description

The tricolor was first described in 1836 and given the name "tricolored red-wing." In the mid 1900s the species was given its current name. There have been no subspecies described (American Ornithologist Union [AOU] 1998).

The tricolor is a medium-sized, sexually dimorphic blackbird. Males and females are strikingly similar in appearance to the common and ubiquitous red-winged blackbird (*Agelauis phoeniceus*, hereafter "redwing") with which they are sympatric (but do not hybridize). Adult male tricolors are entirely black to glossed bluish, with bright brownish-red lesser wing coverts forming a reddish patch (epaulet) on the wing shoulder and buffy white to pure white median coverts forming a distinctive white boarder to the epaulet (DeHaven 1975). Adult female tricolors are smaller than males, mostly black, with distinct grayish streaks, a whitish chin and throat, and a small but distinct reddish epaulet (DeHaven 1975). Immature (less than 2nd year) birds of both sexes, like redwings, are generally duller in color with more mottling and less distinctive epaulets.

Two other significant morphological distinctions between tricolors and redwings are: (1) the narrower and more pointed wing shape of tricolors; and (2) the somewhat longer and narrower bill of tricolors. Nevertheless, immature birds of the two species, and also adult females of the two species, are difficult for inexperienced observers to separate in the field. Distinctions between tricolors and redwings are especially problematic when the California race of the redwing (*A.p.californicus*) is involved, since it tends to lack the yellowish median covert boarder to the epaulet which is characteristic of other redwing races and helps to distinguish them from tricolors.

The tricolor is a relatively long-lived bird. From recoveries of banded birds, DeHaven and Neff (1973) showed that some individual tricolors survive up to 13 years. However, the available banding data was and still is insufficient for estimating annual survivorship.

Historical and Current Range

The tricolor is native to California where over 99 percent of the total population occurs (Beedy and Hamilton 1999). Tricolor distribution within California extends throughout the Central Valley, surrounding foothills, coastal areas, and scattered inland areas of northern and southern California (Beedy and Hamilton 1999). Small segments (less than 1 percent) of the population sporadically extend into scattered sites in Oregon, western Nevada, central Washington, and western coastal Baja California (Beedy and Hamilton 1999). Several occurrences on the fringes of the species' range are relatively recent phenomena, which may reflect either the increased focus of attention the species has experienced in recent decades or minor range extensions. However, there is no evidence that the species is undergoing any significant range expansion or

that its primary current range is substantially different from that described by Neff (1937), based on studies he conducted in the 1930s.

Reproductive Ecology

Tricolors are colony nesters which form the largest colonies of any North American passerine species. Under its colonial regime, the tricolor male only briefly defends a small area of up to a few square feet immediately around the nest(s), nests with 1-4 females (average 2), and (with females) forages in groups up to several miles from the colony site. The tricolors' synchronized colonial breeding may have been an adaptation resulting from the need to exploit a rapidly changing environment where the locations of secure nesting habitat and rich insect food supplies were ephemeral and likely to change each year (in Beedy and Hamilton 1997). Females breed in the first year, whereas males apparently defer breeding until at least year two (Orians 1963; Payne 1969).

Colony Distribution and Size

Over the past two decades, active breeding colonies of tricolors have been observed in 46 California counties, but most of the population and the species' largest colonies have regularly been recorded in the Sacramento and San Joaquin valleys (Beedy and Hamilton 1999). Colonies range in size from a few hundred birds (rarely as small as just a few dozen birds) to about 300,000 (Neff 1937), but the majority found during the 1930s by Neff (1937) and during the 1970s by DeHaven *et al*. (1975a) contained 1,000-10,000 birds. The most recent studies of the tricolor, beginning in the early 1990s show that many of today's colonies remain in the 1,000-10,000-bird range, but a significant number of larger colonies in the 25,000-50,000-bird range have also been located (in Beedy and Hamilton 1999). Overall during recent studies, most (greater than 60 percent) of the total range-wide nesting effort each year has been in the ten largest colonies, and in 1994, greater than 71 percent of all adult tricolors counted throughout the nesting season were associated with colonies of 10,000 or more birds (Beedy and Hamilton 1997). Also, the recent range-wide surveys of breeding colonies have demonstrated that in many years greater than two-thirds of all tricolor nests are found on private agricultural land (in Beedy and Hamilton 1997).

The annual concentration of such high proportions of the overall breeding population in just a few colonies which are often on private lands increases the risks of continued population declines of tricolors if perturbations to reproduction occur (Beedy and Hamilton 1997; RWD = Richard W. DeHaven's personal observations).

Nesting Substrates

Breeding colonies may establish over water or land and utilize a wide range of nesting substrates. In studies conducted prior to the 1990s, the most common substrates were cattail and bulrush marshes, and Himalaya blackberries (Neff 1937; DeHaven *et al*. 1975a). During the 1990s, along with these substrates, a significant number of colonies have been recorded utilizing

certain spiny grain crops, including barley and wheat grown for either grain or dairy silage (Beedy and Hamilton 1999). Sporadic nesting also occurs in other dense, protective vegetation such as willows, nettles, thistles, giant cane, and safflower, and at sites with various mixtures of the recorded wetland and upland vegetation types (DeHaven *et al*. 1975a; Beedy and Hamilton 1999).

In several recent years, over half of the total yearly breeding effort has occurred in Himalya blackberries (California blackberry is rarely utilized, perhaps due to its smaller clump-size, larger spines, and generally more robust cane structure) and other exotic, non-native plant substrates (in Beedy and Hamilton 1997). During one recent study, the overall reproductive success for entire colonies was higher in Himilaya blackberry colonies than in cattail marshes (Cook 1996), although great variation can occur between years (RWD).

The tricolors' nests are generally bound with grasses to upright plant stems from a 0.3 to 1.5 m (1-5 ft.) above the water or ground.

Insect Requirements

In addition to a spiny, thorny, or wetland-plant nesting substrate capable of supporting the nests and affording protection from weather and predators, another major tricolor breeding requirement is for a large supply of insects (for adults to feed nestlings) in proximity to, and in synchrony with, the colony's nestling production (in DeHaven *et al*. 1975a; DeHaven 2000a; in Beedy and Hamilton 1999). Insect foraging associated with any given colony may occur nearby (within sight of the colony) or extend out greater than ten miles; however, most foraging occurs within about 3 miles of the nesting site (Orians 1961a; Beedy and Hamilton 1997).

Tricolors opportunistically utilize locally available insect populations (Skorupa *et al*. 1980; Beedy and Hamilton 1997). Thus, the insect taxa utilized for nestling provisioning may vary widely by location or time, or both. For example, Beedy and Hamilton (1999) found extensive utilization of dragonfly larvae (Odonata) and lakeshore midges (Diptera) at different colonies. Crase and DeHaven (1977) and Skorupa *et al*. (1980) found other insect taxa broadly utilized for nestling provisioning, including Coleopterans (ground-dwelling beetles, water beetles, and weevils), Orthopterans, Arachnidans, Hemipterans, and others.

Nesting success at large colonies of tricolors in particular necessitates exploitation of concentrated and temporarily abundant insect food resources (Orians 1961b; Payne 1969). Often, suitable insect densities for provisioning nestlings of large colonies become available in response to insects being driven from the ground en masse by shallow flooding associated with agricultural or wetlands management. The most ideal shallow flooding occurs where livestock pastures (or silage fields) of alfalfa, hay, grain, or native grasses, which have recently been cut or grazed to optimal height (less than 15 cm [6 in.]; see below), are being flood-irrigated to stimulate additional forage production (DeHaven 2000a).

Such ideal habitat is often found in association with dairy operations, and dairies and livestock

feedlot operations have become an increasingly important component of many tricolor breeding habitats (Beedy and Hamilton 1999). For example, in 1994, over half of all observed tricolor nesting efforts were associated with dairies and their related/surrounding crops and agricultural uses (Beedy and Hamilton 1997); this included pastures, hay, and silage fields as well as tricolors using the feeding troughs or bunkers at dairies and feedlots (for both grain- and insect-gathering).
The flock-foraging behavior and characteristics of tricolors facilitates their locating and most efficiently exploiting insect food resources suitable to support their colonial breeding activity (Orians, 1961a; RWD). Large foraging areas may be needed by the species to locate the proper juxtaposition of abundant seasonal insect supply and protective nesting substrate capable of supporting a successful colony. Tricolors can quickly respond and begin nesting when such proper conditions are located.

Range-wide breeding surveys in recent years have shown that often, less than 85 percent of all foraging by nesting tricolors occurs on private agricultural land (in Beedy and Hamilton 1997). Tricolors generally do not forage over, or in, deep water greater than wading depth of 2.5-5 cm (1-2 in.). However, recently, birds from several breeding colonies nesting near flooded rice fields have been observed procuring insects from the fields while perching on the rice plants (Hamilton pers. comm., 2001 and report in prep.).

Water Requirement

The more recent studies of tricolors over the past decade have also cited the importance of a third breeding colony requisite: the presence nearby of open, accessible water (Beedy and Hamilton 1997; 1999). Water is necessary for tricolor drinking, preening, and bathing. While a strong association of colonies with such water is apparent, it is less clear whether the lack of such water constitutes a significant limitation on breeding substrate utilization (RWD).

Low-Value Habitats

Outside of dairy (or pasture and grazing)-associated habitats and crops, most cultivated agricultural crops are low in insect-foraging values for breeding tricolors. Examples of low-value, mainly non-habitat crops include: tomatoes, sugar beets, potatoes, beans, cole (Brassica spp.) crops, melons, cucumbers, peas, peppers, spices and herbs, and a wide range of other vegetables. Cotton fields, vineyards (grapes; berry crops), and orchards (fruit or nut crops) are particularly low in value, and are rarely utilized by tricolors for food gathering (RWD; Beedy and Hamilton 1997, 1999).

The large number of agricultural crop-types with low or no values for tricolor breeding is likely related to: (1) the relative lack of large concentrations of preferred insects in such crops; and (2) the tricolors' basic foraging strategy. Like other blackbirds, tricolors forage primarily in small groups or flocks in open spaces, where the vegetative ground cover is less than 15.2 cm (6 in.) in height and overhead cover is sparse or absent, thereby providing good visibility of aerial predators (DeHaven 2000a).

Occasionally, grain crops not associated with dairy operations, including ripening corn, oats, wheat, barley, sorghum, rye, and rice are utilized by tricolors for insect gathering and provisioning of young. More often, however, adult tricolors are found "milking" such crops and consuming the ripening seed heads as they mature during spring through fall.

Patterns Determined from Banding

Banding studies (i.e., Neff 1942; DeHaven and Neff 1973; DeHaven *et al*. 1975b) in which about 70,000 tricolors were banded through the early 1970s revealed:

1. During the annual post-breeding period, many tricolors from throughout the Sacramento Valley and San Joaquin Valley converge on the major rice-growing area near Colusa (in the Sacramento Valley), presumably because of abundant food (waste rice grain) and suitable roosting habitat (blackbirds utilize large [hundreds of thousands to greater than one million birds], mixed-species, communal roosts at night during fall and winter).

2. During winter, a sizable but variable proportion of the Central Valley tricolor population migrates to the San Joaquin Valley and San Francisco Bay-Delta area, with other tricolors wintering throughout fringe areas of their range, including foothill locations above 305 m (1,000 ft.) elevation adjacent to agricultural valleys.

3. During spring, roving flocks of tricolors begin to distribute back out to breeding areas. However, most individuals do not end up breeding where they were hatched or where they bred the previous year (although there may indeed be somewhat greater breeding site fidelity after the initial breeding; RWD). Breeding colony establishment is probably largely controlled by where abundant insects necessary for nestling provisioning are encountered by the roving flocks. Thus, the general distribution of breeding colonies can vary widely between years.

4. Some tricolors may travel nomadically the entire length of the Central Valley and from there into the Bay-Delta region, the northern and eastern plateau region of California, and southern Oregon. In short, Central Valley tricolors move nearly everywhere within the species' range, except no band recoveries have demonstrated any interchange with southern California (which could support a hypothesis that tricolors consist of two separate and largely distinct metapopulations). Thus, overall, a reasonable description of the tricolor is that it is largely a resident within California, but partly migratory within the Sacramento-San Joaquin drainage.

Despite most tricolors not nesting where they were hatched or had nested the previous year (DeHaven *et al*. 1975b), certain breeding sites do show site fidelity with the same location and substrate being used year after year. The consistently used sites may have the three essential breeding requirements–a protective nest substrate, water, and suitable insect-foraging habitat–available on a consistent basis (Beedy and Hamilton 1997;1999).

Habitat Use

Throughout their non-breeding periods, and particularly during winter, tricolors continue to forage in flocks. Such flocks may contain mixed blackbird species and sexes or be highly species and/or sex-specific. For example, during the 1970s, flocks estimated at from 50,000 to over 100,000 tricolors have been observed foraging, and on foraging flights, in the San Joaquin Valley and Bay-Delta area; some of these large flocks were less than 99 percent composed of adult male tricolors (RWD). Tricolors collected during food-habits studies in the fall and winter months in the 1970s had consumed by volume predominantly (88-91 percent) plant matter composed of rice, water grass, sorghum, oats and various other cultivated grains and wild seeds. Rice utilization was particularly high, at 49 and 37 percent, respectively, during the fall and winter periods (Crase and DeHaven 1978). The present non-breeding season food-habits of tricolors, including whether significant changes have occurred since the 1970s have not been assessed (RWD). Nevertheless, it is clear that irrigated and non-irrigated pastures (alfalfa, various hay crops, etc.) and grasslands of various kinds, dry seasonally-wet areas, dairies, livestock feedlots, and harvested grain fields continue to be important foraging areas for tricolors during their non-breeding periods (Beedy and Hamilton 1997, 1999; RWD) just as during breeding periods.

Reasons for Decline and Threats to Survival

Early in the twentieth century, widespread commercial hunting of blackbirds, including tricolors, occurred in California, partly for their commercial value and partly because of their depredations on agricultural crops. In one 5-year period during the 1930s for example, greater than 300,000 tricolors and redwings were killed and marketed for food in the Sacramento Valley alone (Neff 1937). As agriculture expanded in the State, blackbird depredations also increased, and blackbird "control" was expanded to include widespread poisoning of thousands of blackbirds annually for many decades up to about the mid-1960s.

Prior to 1989, under two depredations orders (50 CFR 21.43 and 21.44), such population control could be done without a Federal permit if birds were "committing or about to commit" depredations. However, effective November 15, 1989 [Federal Register 54(219):47524-47526], the Service modified these two previous depredations orders and began requiring Federal permits for such depredations control efforts. This gave the additional protection believed necessary for tricolors and several other birds, while still permitting control if and when necessary for the protection of California's agriculture.

More recently, in 1991, as tricolor populations appeared to be continuing a long-term population decline, the Service included the species as a candidate (Category 2) for federal listing as either Threatened or Endangered (Federal Register 59 [219]:58990). However, subsequent policy changes by the Service in 1995 eliminated the Category 2 designation and further listing action for the tricolor was curtailed.

Nevertheless, the most recent work suggests that this species' downward trend is continuing.

Relevant factors include further incremental habitat losses and direct losses during nesting, which, because of the species' colonial breeding, have the potential to affect thousands of nests and birds.

In the Central Valley, of the more than 4 million acres of wetlands estimated to exist at the start of modern, intensive development and reclamation in the 1850s, only about 560,000 acres (14 percent) remained by 1939. By the mid-1980s, freshwater emergent marsh acreage had been reduced to only about 243,000 acres (6 percent). In addition, the native perennial grasslands historically used by foraging tricolors were reduced by greater than 99 percent in the Central Valley and surrounding foothills (in Beedy and Hamilton 1997).

The early decades of modern development in California may have had little, if any, overall effect on tricolor populations. However, as agriculture, especially expansion of low-tricolor-value crops and urbanization expanded, critical thresholds were eventually exceeded beyond which tricolors were no longer able to continue adapting to cumulative habitat losses. Their populations began a gradual decline. The habitat losses, and downward population trend, are both continuing today.

Urbanization, which in most cases totally eliminates tricolor habitat, has been large and ever-intensifying throughout most of the important tricolor range areas. For example, just within the CALFED sphere of influence alone, over 1.4 million acres in the State are estimated to now be urbanized (Service 2000). This suggests that for the State as a whole, the loss of historical habitat, much of which served the tricolor, due to urbanization has likely been in the range of at least 2-3 million acres. And urbanization is continuing today at an ever-increasing pace.

Losses of tricolor habitat in the State to agriculture have also been quite large, are still continuing, and in some instances, are accelerating. Some 350 crops, including seeds, flowers, and ornamentals are produced in the State. Agricultural commodities include at least 13 field crops, 25 fruit and nut crops, 22 vegetable and melon crops, and numerous nursery products and cut flowers. In addition, the State produces at least 11 major categories of livestock and poultry products. A vast majority of these commodities are neither utilized by, nor otherwise useful to, tricolors.

Crops which do provide some limited values to the species in certain circumstances include barley, wheat, corn, and oats. In recent years, tricolors have been recorded nesting in dense fields of wheat, barley, and various other spinous, grain-crop hybrids being grown for dairy silage. And the species is known to feed on both ripening grain and waste grain left in fields following harvest. The Statewide acreage for barley, wheat, corn, and oats combined is usually about two million acres annually.

Probably the crop of highest recent historical value to tricolors is rice. During the 1970s, Crase and DeHaven (1978) found that rice was an important component of the tricolor's fall and winter diet. Although Statewide acreages of rice have remained relatively stable over the past quarter century at about 0.4-0.5 million acres annually, this crop may now have become much less

valuable to the species, which in turn may be resulting in a population-limiting factor during fall and winter (DeHaven 2000a). The drop in value of rice to tricolors is related to major changes in cultural practices.

From the time rice was introduced in the State early in the century to about the mid-1980s, rice fields were commonly burned in the fall following harvest. This practice resulted in abundant fall-winter food resources for blackbirds and other birds including waterfowl, in the form of waste rice seeds remaining on the ground in harvested fields. And burning of fields reduced or removed the rice straw, thus providing the "open" foraging conditions with less than 6-inch-tall vegetation, which is preferred by blackbirds. As a result, in the Sacramento Valley during the fall and winter months of the 1970s, it was quite common to observe huge foraging flocks of mixed blackbird species (including large numbers of tricolors) foraging in burned rice fields. Such flocks commonly contained tens of thousands of birds (DeHaven 2000a).

Conditions today are much different. Miller and Wylie (1996) have reported that in the past (i.e., until about the mid-1980s), rice fields harvested with conventional cutter-bar headers which cut off the rice heads, left rice stubble behind (which was burned) and rice waste grain on the ground totaling about 388 kg/ha. Today, use of cutter-bar headers has been largely replaced by new, faster technology called a "stripper header" which strips the seeds from the rice head. Although stripping results in roughly the same amount of waste rice remaining in harvested fields (Miller and Wylie 1996), it is much less available to blackbirds, because of the taller stubble left standing. This problem (for blackbird foraging) is further exacerbated because burning, which clears and opens fields for blackbird foraging, is being phased out because of environmental concerns. Moreover, an increasing amount of rice acreage is now being flooded in the fall following harvest. This provides high-value water bird habitat, especially for waterfowl, but generally precludes any significant foraging by blackbirds (DeHaven 2000a).

Clearly, the specific issue of availability of waste rice grain and the overall issue of fall-winter food resources and availability for blackbirds in the Central Valley, including tricolors, needs further study. How these factors may relate to the tricolors' observed and continuing population decline have not been studied. Clearly, problems for this species may not only be related to its breeding, as is being commonly assumed and reported by most recent investigators (DeHaven 2000a).

Besides rice (and occasionally the other spinous grain crops), the other main agricultural crop-type of importance to tricolors is hay. Hay is classified as either "alfalfa" or "other" by the California Agricultural Statistics Service (CASS). Together, these two hay classifications total about 1.5 million acres statewide annually. The benefits of hay fields, as well as irrigated and non-irrigated pastures, grasslands, and vernal pool/grassland complexes, is mainly for tricolor insect-foraging, especially during the breeding season. Generally, for tricolors to extensively use a particular field, it must have been grazed or mowed to reduce vegetative height to less than 15.2 cm (6 in.). Tricolors will generally not settle to the ground to forage in taller, very dense vegetation. Although there have been no confirming studies, with respect to hay fields, it is likely that modern, intensive pest control management practices implemented over recent

decades have substantially reduced insect-foraging opportunities in such crops (RWD).

Population Status

A number of studies were conducted on tricolors throughout the 1990s, including: (1) an historical breeding records analysis; (2) several annual State- or range-wide surveys of breeding colonies, beginning in 1994; and (3) a number of studies of breeding ecology. While these recent efforts have shown the species' geographic range mostly unchanged compared to the 1930s (Neff 1937) and 1970s (DeHaven *et al*. 1975a), they do provide strong evidence of a continuing overall population decline. In particular, Beedy *et al*. (1991) summarized all historical and recent breeding records, including unpublished reports and inventories, and through supplemental field surveys concluded that breeding tricolors had declined further since the DeHaven *et al*. (1975a) study era. In addition, extensive breeding colony surveys in 1994 and 1997, showed a 37 percent population decline in the later year (Beedy and Hamilton 1997; 1999). The recent population declines have been most apparent in historical strongholds of the species' range in the Central Valley, including Fresno, Kern, Merced and Sacramento counties, although range-wide losses are evident as well (Beedy and Hamilton 1997).

Recent extensive breeding-season surveys of tricolors in which dozens of participants canvassed all known breeding sites, except a few very sparsely used areas on fringes of the species' range, found these total numbers of individuals: 1994–369,000 birds; 1997–238,000 birds; 1999–105,000 birds; and 2000–163,000 birds (in Hamilton 2000). It is believed that these annual totals reflect most of the overall remaining breeding population of the species.

The consensus among recent tricolor investigators as well as the principal investigator from the 1970s work on this species (RWD) is that the tricolors' decline is resulting largely from continuing losses of nesting and foraging habitats due to agricultural conversions and urban expansions (e.g., Cook 1996; Beedy and Hamilton 1997, 1999; DeHaven 2000a). Range-wide losses of tricolor habitat due to such land-use changes have not yet been systematically quantified. However, a picture of the severity of the problem is evident in DeHaven's (2000a) recent report comparing tricolor breeding over a quarter-century observation period. In Sacramento County–a traditional stronghold of the species' breeding, for example, he found that the losses of habitat due to urbanization of thousands of acres in the Natomas, Elk Grove, and Galt areas, was striking. Similar striking losses of habitat have occurred from conversions of pastures, grasslands, hay, and grain fields to vineyards and orchards. For example, Sacramento County's grape acreage expanded 75 percent from 7,533 acres to 13,176 acres in just one recent 2-year (1996-1998) period, which was far ahead of the 50 percent increase rate for the State overall during the entire previous 10-year (1989-1998) period.

Status within the Action Area and Environmental Baseline

CNDDB (2002) lists 348 tricolor occurrences in the State; six of these are from Sutter and 79 are from Sacramento County. A nesting colony is located on the Conservancy's Betts-Kismat-Silva reserve in the eastern edge of the Natomas Basin. The colony nests in riparian scrub and its population has increased in recent years (Roberts, pers. comm.).

In the Natomas Basin, large canals, ponds and seasonally wet areas, and riparian habitat have the potential to support tricolor nesting colonies. For foraging, pasture, annual grassland, alfalfa, rice, and nonrice crops could be used in addition to the nesting habitats. Based on these definitions, the Natomas Basin currently supports about 1,998 acres of potential nesting habitat and 41,310 acres of potential foraging habitat (Table 9).

White-Faced Ibis

The white-face ibis was formerly included as a Category 2 candidate for listing as endangered or threatened (Service 1991b), but is now considered a species of concern. It is a Species of Special Concern in the State of California because of population declines in the 1960s and 1970s (Remsen 1978). Additional information can be found in the *Draft Recovery Plan for the Giant Garter Snake* (Service 1999).

Description

The white-faced ibis (*Plegadis chihi*) is closely related to the glossy ibis (*P. falcinellus*) and the puna ibis (*P. ridgwayi*) (Hancock *et al*. 1992) and is considered a full species (American Ornithologist's Union 1988, Sibley and Ahlquist 1990, Hancock *et al.* 1992). There are no recognized subspecies (American Ornithologist's Union 1998).

Adult white-faced ibis are medium-sized wading birds [total length 46 to 56 cm (18.1 to 20.0 in.), weight 450 to 525 g (15.8 to 18.5 ounces)], dark maroon-brown in color, with a long decurved bill that is thicker at the base than in curlews. The neck and legs are long; the bill and legs are blackish in color (Belknap 1957, Cogswell 1977, Ryder and Manry 1994). During the breeding season the plumage reflects iridescent purple, violet, and green; a white band of feathers separates the face from the forehead and extends completely behind the back of the eye; the legs and the irises are red; and bare facial skin turns reddish or purple (Belknap 1957, Cogswell 1977, Hancock *et al*. 1992, Ryder and Manry 1994).

Breeding white-faced ibis can be distinguished from breeding glossy ibis by the latter's brown iris, blackish facial skin, grayish legs, and lack of white encircling the back of the eye (Belknap 1957, Ryder and Manry 1994). Non-breeding adult plumage is similar in these two species except for the red iris (versus brown) in the white-faced ibis (Belknap 1957, Ryder and Manry 1994). In the wild, juveniles of the two species are difficult or impossible to distinguish (Hancock *et al.* 1992).

White-faced ibis forage largely on invertebrates and to a lesser degree on small vertebrates. Major food items reported include earth worms (Bray and Klebenow 1988), crayfish (Belknap 1957) and larval and adult insects (Belknap 1957, Capen 1976). Other foods include spiders, snails, leeches (Kaneko 1972, Capen 1976), small fish, and frogs (Belknap 1957).

White-faced ibis are highly gregarious and feed in loose flocks that can exceed 1,000 birds (Ryder and Manry 1994). They feed while walking by probing in soft substrates or at the base of vegetation (Belknap 1957, Kotter 1970, Bray and Klebenow 1988). Foraging white-faced ibis also secure food by snatching animals exposed on the soil surface (Capen 1976). In deeper water, they feed by sweeping their bills sideways while vibrating their mandibles rapidly in the water column (Belknap 1957).

Historical and Current Range

White-faced ibis occur in two disjunct populations, one largely in western North America and the other in the pampas of central and southern South America (Hancock *et al.* 1992). In North America, white-faced ibis winter primarily in Mexico and also in the Central and Imperial Valleys of California, coastal Louisiana, and Texas (Ryder 1967, Capen 1976, Ryder and Manry 1994, Shuford and Hickey 1996). Key areas of wintering white-faced ibis in California's Central Valley include the Delevan-Colusa Butte Sink Area, northwestern Yuba County, the Yolo Bypass, Grasslands Wetlands Complex, and Mendota Wildlife Area (Shuford and Hickey 1996). In southern California, wintering areas include the Imperial and Coachella Valleys, and the Prado Basin/Upper Santa Ana River Valley (Shuford and Hickey 1996).

The largest North American breeding colonies of white-faced ibis occur in Utah (Great Salt Lake), Nevada (Carson River Basin), Oregon (Harney Basin), and coastal Texas and Louisiana (Ivey *et al.* 1988, Taylor *et al.* 1989, Ryder and Manry 1994, Kelchlin 1997). Substantial colonies of nesting white-faced ibis have recently been reported in southeastern Idaho (Taylor *et al.* 1989) and in California. The largest recent breeding colonies in the Central Valley of California have been reported from Mendota Wildlife Area and Colusa National Wildlife Refuge. Reports of smaller breeding colonies of white-faced ibis in California's Central Valley since 1985 include the Woodland Sugar Ponds (Earnst *et al*. 1998), San Luis National Wildlife Refuge, and Tulare Lake Basin. White-faced ibis have also bred in California's Central Valley at South Wilbur Flood Area (Ivey and Severson 1984), Kern National Wildlife Refuge (Voeks and English 1981, J. Allen pers. comm. 1998), and Buena Vista Lake (Voeks and English 1981, Booser and Sprunt 1980).

The distribution of white-faced ibis before settlement by Europeans was likely greater than it is now because rapid human population growth during the last century has destroyed wetland habitat throughout its distribution in California (Frayer *et al.* 1989). Ibis breeding colonies have been destroyed at various historical locations throughout California, including Tulare and Buena Vista Lakes (Kern County) and San Jacinto Lake (Riverside County). Both of these areas also provided habitat for ibis during migration (Booser and Sprunt 1980).

Reproductive Ecology

White-faced ibis nest in colonies of varying size. Nesting in North America begins about mid-April and ends with fledged young in August or September (Kotter 1970, Kaneko 1972, Capen 1977, Ryder and Manry 1994). Reproduction is often asynchronous with courting, nest-building, incubating birds, and fledglings present concomitantly within larger colonies (Belknap 1957, Ivey and Severson 1984).

Usually three to four eggs are laid, approximately one every two days per nest (Kotter 1970, Kaneko 1972, Capen 1976, Kelchlin 1997). Both parents share with incubation, which lasts about 17 to 26 days (Belknap 1957, Kotter 1970). The parents also share with feeding their altricial (not capable of moving about on its own soon after hatching) young until fledging approximately eight weeks later (Kotter 1970). Mortality of young occurs from exposure to excessive heat, cold and rain, and predation by birds and mammals (Belknap 1957, Kotter 1970, Capen 1976). Usually one brood is attempted each nesting season except when an earlier nesting attempt fails (Capen 1976). Annual reproductive success has been reported to range from 1.42 to 2.99 chicks per clutch (Ryder and Manry 1994, Taft *et al.* 1995).

Nesting and wintering white-faced ibis concentrate locally in large numbers and also occur in lesser numbers over a wide area of its range (Ryder 1967, Booser and Sprunt 1980, Hancock *et al.* 1992). The white-faced ibis is well adapted to changes in environmental conditions such as drought and flooding (Ryder 1967). Therefore, use of specific areas can vary greatly from year to year depending on habitat conditions (Ryder 1967).

Most populations of white-faced ibis are migratory (Ryder 1967). Birds breeding in Utah, Nevada, Oregon, and Idaho migrate southerly to wintering grounds in Mexico, and the Central Valley and southern coastal regions of California (Ryder 1967, Ryder and Manry 1994, Kelchlin 1997). Ibis breeding in California's Klamath Basin also migrate south in winter. However, the proportion of California's breeding population that overwinters outside of California is unknown (E. Kelchlin pers. comm. 1998). White-faced ibis nesting in Louisiana and Texas are mostly resident (Ryder and Manry 1994). Individuals also wander and have been sighted in southern British Columbia, Alberta, Saskatchewan, Ohio, New York, Illinois, Florida, and Hawaii (Hancock *et al.* 1992, Ryder and Manry 1994).

Habitat Use

White-faced ibis typically nest over water in emergent vegetation such as hardstem bulrush (*Scirpus acutus*), baltic rush (*Juncus balticus*), and cattail (*Typha latifolia*) (Kaneko 1972, Capen 1976, Ivey and Severson 1984, Cornely *et al*. 1994, Taft *et al.* 1995). The height of the nest above water is variable ranging from near the water's surface to 137 cm (53.9 in.) above (Ryder and Manry 1994). Nests are constructed of the dominant emergent plants available (Ryder and Manry 1994).

Foraging occurs in flooded [less than 20 cm (7.9 in.) water depth] fields, pastures, open marshes

(Kotter 1970, Capen 1976, Bray and Klebenow 1988, Taft *et al.* 1995), mudflats, and edges of canals, ponds and ditches (Belknap 1957, Taylor *et al.* 1989). In Yolo, Sacramento and Colusa Counties, rice is preferred foraging habitat; ibis may be foraging primarily on crayfish (E. Beedy pers. comm. 1998). Flooded alfalfa is reported to be a preferred foraging habitat compared to irrigated pasture, wheat-barley, and corn (Capen 1976, Bray and Klebenow 1988). Nitrogen fixation by alfalfa and reduced tillage practices may contribute to greater invertebrate abundance for foraging ibises (Bray and Kebenow 1988).

White-faced ibis communally roost in dense vegetation over shallow water and in open sites. They are reported to roost in dense emergent vegetation such as reed (*Phragmites communis*), bulrush, and cattail (Belknap 1957, Kaneko 1972, Ryder and Manry 1994). They also roost in open marshes and small shallow ponds surrounded by dense emergent vegetation, and on exposed islands in the middle of ponds (Hancock *et al.* 1992, Shuford and Hickey 1996).

Other bird species that have been reported to nest in mixed colonies with white-faced ibis include great blue heron (*Ardea herodias*), double crested cormorant (*Phalacrocorax auritus*), great egret (*Casmerodius albus*), snowy egret (*Egretta thula*), cattle egret (*Bubulcus ibis*), black-crowned night heron (*Nycticorax nycticorax*), Franklin's gull, Forster's tern (*Sterna foresteri*) and American coot (*Fulica americana*) (Ryder 1967, Kotter 1970, Ivey and Severson 1984, Cornely *et al*. 1994, Taft *et al.* 1995).

Reasons for Decline and Threats to Survival

Low numbers of white-faced ibis in the western United States including California during the 1950s and 1960s have been attributed to a variety of human induced factors, including destruction of breeding habitat and pesticide effects (Ryder 1967, Booser and Sprunt 1980, Ryder and Manry 1994). Approximately 91 percent of wetlands [more than 1.8 million hectares (4.5 million acres)] in California have been lost to agricultural and urban development since the 1780s (Dahl 1990). About 98,000 hectares (243,000 acres) of potential ibis nesting habitat (emergent wetlands) were lost in the California Central Valley between 1939 and the 1980s (Frayer *et al.* 1989). Wetlands were also lost at high rates in other western states with important white-faced ibis breeding colonies: Idaho (56 percent wetland loss), Nevada (52 percent wetland loss), Oregon (38 percent wetland loss) and Utah (30 percent wetland loss) (Dahl 1990).

The agricultural pesticide DDT was used widely in the United States until its ban in the 1970s. DDE, a metabolic biproduct of DDT, is positively associated with egg shell thinning and cracking, and crushed eggs in birds including white-faced ibis (Capen 1976, Steele 1984, Henny and Herron 1989, Dileanis and Sorenson 1992, Dileanis *et al.* 1996). DDE concentrations greater than or equal to three to four parts per million have been associated with lower hatching success and reproductive output in white-faced ibis (Steele 1984, Henny and Herron 1989). White-faced ibis are considered highly susceptible to the toxic effects of DDE because DDE concentrations in body tissues have remained relatively high in this species, and the levels of DDE resulting in reproductive failure are lower in white-faced ibis compared to other bird

species (Capen 1976, Henny *et al.* 1985).

White-faced ibis continue to experience high concentrations of DDE, egg shell thinning, and reproductive failure in California and adjacent western states (Henny and Herron 1989, Dileanis and Sorenson 1992, Cornely *et al.* 1994, Dileanis *et al.* 1996). Ibis may be exposed to DDT used in agricultural fields in Mexico (Shuford and Hickey 1996). In the Imperial Valley of California, a major wintering area for white-faced ibis, DDE residues are among the highest reported in the United States (Setmire *et al.* 1993). DDE concentrations in white-faced ibis are among the highest of the birds sampled at the Salton Sea, California (Setmire *et al.* 1993).

A wide variety of agricultural pesticides are currently used as algicides, fungicides, herbicides and insecticides in California (Dileanis *et al.* 1996). Many pesticides in use are moderately to highly toxic; synergistic effects are largely unknown. White-face ibis are at risk to direct contact with pesticides during and shortly after application because they feed in and nest near agricultural lands (King *et al.* 1980). Ibis wintering in Mexico are at potential risk from pesticide contamination, excessive hunting, and habitat destruction (Hancock *et al.* 1992). The magnitude of these risks for white-faced ibis wintering in Mexico, however, has received little attention (Ryder 1967).

Because white-faced ibis depend on wetland habitat for nesting, increased competition in the Central Valley for water by urban, industrial, and agricultural uses may threaten the integrity of breeding habitat in the future. White-faced ibis wintering and breeding colonies close to large human populations such as the southern Sacramento Valley, San Joaquin Valley and the southern California region may be at risk from increasing human disturbance and loss of foraging habitat to urban development.

Status With Respect to Recovery

Numbers of overwintering white-faced ibis in the major wintering areas of California have tended to increase from the 1970s to the 1990s (Shuford and Hickey 1996). In the Sacramento Valley, wintering ibis were rare in the 1970s, with the highest counts of 11 birds in 1978 and 1979 (Shuford and Hickey 1996). In the 1980s, flocks of 225 were frequently seen at or near Colusa and Delevan National Wildlife Refuges, Colusa County. At Delevan National Wildlife Refuge in January and December 1994, 1,100 and 1,370 ibis were reported, respectively (Shuford and Hickey 1996). Aerial surveys of the Grasslands wetlands complex near Los Banos showed increases in ibis numbers from 100-300 in the early 1980s, to 500-700 in the mid to late 1980s, to 2,000-2,200 during 1992 to 1994 (Shuford and Hickey 1996). In 1985, Beedy (pers. comm. 1998) estimated about 800 adult ibis at the Woodland Sugar Ponds in Yolo County. Shuford and Hickey (1996) estimated that a minimum of 10,000 to 11,000 ibis wintered in California's Central Valley in 1994-1995. Between 2,000 to 3,000 ibis were in the Sacramento Valley, and up to 8,000 in the Grasslands wetlands complex during this time.

There are seven known ibis occurrences (rookeries) in California (CNDDB 2001). There are no known nesting occurrences in Sutter or Sacramento counties. The nearest known nesting

occurrence is in Yolo County, north of the City of Woodland. No suitable white-faced ibis nesting habitat occurs in the Natomas Basin, although approximately 20,000 acres of suitable winter foraging habitat (i.e., rice, alfalfa, and other agricultural fields) exists there (MAPPOA 2000). In the Sacramento Valley, wintering ibis were very rare in the 1970s, with the highest counts numbering only 11 birds in 1978 and 1979. Since then, they have increased in the Sacramento Valley, and white-faced ibis are now common in the Natomas Basin in the winter.

Overall numbers of white-faced ibis breeding pairs have tended to increase in the Central Valley of California since 1985. Ibis are not reported to have bred at Mendota Wildlife Area during 1985 to 1991. However, breeding ibis numbers at Mendota Wildlife Area represented approximately 95 percent of breeding ibis in the Central Valley during 1992 to 1997. Ibis numbers at Colusa National Wildlife Refuge increased from 1985 to 1989, but no nesting was reported there from 1990 to 1997.

Environmental Baseline

White-faced ibis are most-often associated with emergent wetland habitats, particularly for nesting. The elimination of marsh habitat from the Natomas Basin has precluded the ibis from nesting there. However, the ibis does commonly winter and forage in the Basin. The Natomas Basin supports about 25,000 acres of potential ibis wintering and foraging habitat including alfalfa fields (371), rice (22,693), canals (1,778), and ponds and seasonally wet areas (96 acres)(Table 10).

Bank Swallow

The bank swallow is listed by the State of California as a threatened species. It is a protected migratory bird in the United States and Canada (Schloriff 1992, Palmer-Ball 1996).

Description

The bank swallow (*Riparia riparia*) is approximately 12 cm long, has a wing span of 89-110 cm, and weighs 10-18 g. Adults have a grayish brown mantle, crown, rump and wing-coverts; a white throat with a distinct brown breast-band that extends to the belly and ends at a point; a black to brown-black bill; a dark brown iris; and black-brown or dark brown legs and feet. Adult males and females have the same color scheme but may be distinguished by the presence or absence of a brood patch (Lethaby 1996, Pyle 1997, Turner and Rose 1989).

Juvenile bank swallows can be identified from adults by whitish upperparts and a buffy pink wash to the throat, which they lose after one year (Lethaby 1996 and Pyle 1997). They have a horn-brown bill and pale yellow bill flanges that darken after the first month of fledging. The iris of juveniles is a lighter brown, and the feet and legs are flesh-brown or horn brown at fledging. The claws are dull yellow.

The bank swallow is a social bird that spends most of its life in a colony or migrating with mix-

species flocks. It develops colonies from ten to 2,000 birds. The bank swallow is an aerial feeder that forages over lakes and ponds, rivers and streams, meadows, pastures, and bogs (Stoner 1936, Gross 1942). It tends to avoid dense forests, woodland, deserts, and alpine areas. During breeding, its forging sites are usually 200 m from the colony (Mead 1979; Turner 1980, in Garrison 1999). The bank swallow feeds upon terrestrial and aquatic jumping or fly insects and larvae. It forages primarily from dawn to dusk (Hobson and Sealy 1987) and may feed singly, in pairs or in a flock. Flock feeding usually occurs when a colony is feeding on a local source of food (Stoner 1936, Turner and Rose 1989).

Preening can occur singly or in large groups. Preening in larger groups usually occurs during the migration period (Cramp *et al*. 1988, in Garrison 1999). Preening occurs on wires and vegetation, often spaced as closely as three to four cm or with shoulders touching (Meservey and Kraus 1976). Bank swallows are also known to dust-bathe in areas of loose bare soil (Hobson and Sealy 1987). A bank swallow will bathe in water by wading into shallow water or hitting the surface of the water briefly while flying (Cramp *et al*. 1988, in Garrison 1999). Sunbathing is done by spreading open both wings slightly away from body, ruffling feathers, and leaning to one side (Barlow *et al*. 1963).

Historical and Current Range

The breeding range for the bank swallow covers most of central and southern Alaska, most of Canada (except in the northern extremes), and across the northern half of the United States. The winter range is primarily in South America and the Pacific slopes of southern Mexico. The bank swallow can also be found in most of Europe and Asia during the breeding season and in Arabia and Africa during the winter. Its range has been changed in local areas where development, flood and erosion control projects has reduced the available nesting habitat.

In California, bank swallow colonies were found in Siskiyou, Shasta, and Lassen Counties. Colonies were also found along the Sacramento River from Shasta County south to Yolo County (Small 1994). Colonies in California range from sea level to 21,00 m above sea level (Campbell *et al*. 1997). The bank swallow was know to nest on coastal bluffs in southern California and riverbanks throughout the Central Valley and northern California. Current populations are concentrated on the banks of the Central Valley streams. Seventy-five percent of the current populations occur along the banks of the Sacramento and Feather Rivers (most on the Sacramento River upstream of its confluence with the Feather River). Other colonies are located along the central coast, from Monterey to San Mateo County. There are no breeding colonies remaining in southern California (Laymon *et al.* 1988). No suitable nesting habitat exists within the Natomas Basin.

Essential habitat components

The bank swallow requires vertical or near vertical dirt banks formed by erosion action on low-gradient, meandering streams or rivers, or bluffs or cliffs formed by storms, tidal action and wind-eroded banks along the coastline. Potential nesting sites need alluvial soils or other soil material that the bank swallow can dig a burrow in. Foraging areas should be near the colony and may include wetlands, open water, agricultural areas or grasslands.

Reproductive ecology

The bank swallow usually arrives at the colony site unpaired. In California, some of the flocks arrive at the colony site and spend most of their time foraging for food for two to three weeks before the rest of the flocks arrive. The later groups arrive at the colony site and begin to form pair bonds (Kuhnen 1985). The male secures a mate as he builds the burrow. Soon after he secures a mate and the burrow is finished, nest building begins. Building of the burrow usually takes four to five days; the nest takes one to three days to complete (Asbik 1976, Sieder 19870). Nest building has been observed as early as April 12 in California. However, egg-laying has been observed as early as April 11. A brood may be replaced if lost in the early or middle of the breeding period.

Egg incubation by the female begins one to two days before the clutch is complete (Petersen 1955, Turner and Rose 1989). The male only incubates the clutch when the female leaves the nest (Ellis 1982). The clutch is incubated for 13 to 16 days before hatching begins. Hatching may take two to three days to finish (Petersen 1955). Brooding begins after hatching and is continuous for the first two to three days, gradually decreasing and halting after seven to ten days. Females do all the brooding at night. Both parents brood during the day (Beyer 1938). Feeding of the hatchlings begins after hatching and ends three to five days after fledging. Both parents are involved in the feeding process, with the male predominating. Feeding rate increases as hatchling size increases. Fledging occurs in mid-July approximately 22 days after hatching. During fledging, the parents reduce the feeding rate of the hatchlings. The fledgling returns to the nest after first flight and stays in the burrow for four to five days before leaving the nest. The flock stays at the colony site about one week after the juveniles fledge (Turner and Bryant 1979, Petersen 1955; Cramp *et al*. 1988, in Garrison 1999).

Movements and Habitat Use

The bank swallow is a medium to long-distant migrant that migrates with mixed-species flocks, which may be as large as 5,000 to 9,000 birds (Bull 1985, in Garrison 1999). The flocks can be mixed with Barn, Cliff, Northern Rough-winged, and Tree swallows. The bank swallow usually leaves the wintering grounds in February (when nestlings fledge) and arrive in North America between early March and late May. It returns to the wintering grounds in Mexico, Central America and South America during late summer or early fall (Am. Ornithol Union 1998, Hilty and Brown 1986, Oberholser 1974, in Garrison 1999; Keller *et al*. 1986). The species arrives in California around early March and begins to leave for the wintering grounds in July and early

August (NBHCP 2003).

Nesting colonies are usually found along rivers, streams, lakes, coastlines, or in sand and gravel pits. The colony site is usually near open water at erosion sites, or areas exposed to wave wash (Hjertaas 1984, in Garrison 1999). The colony site is chosen by the colony before the individual burrow sites are chosen. The colony site selection is based on the colony size, breeding success of the previous year and available habitat. A colony site is more likely to be recolonized if the previous year was a successful breeding year (Freer 1979). The preferred burrow site is higher on the stream bank to protect them from predators (Sieder 1980). The burrow is dug with bill, feet and wings, which takes about 4 to 5 days to complete.

Both the male and female bank swallow roost in the burrow during nest-building and the beginning of the egg-laying period. During the egg incubation and brooding of young nestlings period the female would spend most of the time roosting in the burrow. During this period of time the male would roost on rocks, fences, trees, empty burrows or other available structures. The male bank swallow may occasionally roost in the burrow at night during the brooding period. In adverse weather several adults may roost in the same burrow. Young bank swallows would roost in the burrow about one week after fledging. After fledging and before the colony migrates, adults and juveniles roost on exposed rocks, vegetation, logs and other available structures (Cramp *et al*. 1988, in Garrison 1999). Migration roosts include vegetation at wetlands and marshes (Paton and Fellows 1994).

The average burrow depth in California is 61.5 cm long with an average entrance of 5.5 cm by 7.2 cm. The average distance between each burrow in California is 13.2 cm (Humphrey and Garrison 1987). Most of the colonies in California were found in the banks of rivers, lakes, streams, and coastlines at a rate of 105 to 111 colonies (Laymon *et al*. 1988). The colonies were located in the vertical face of the bank and bluffs in friable soils made up mostly of sandy, silty, loamy soils. In California, of the 22 sites recorded, 14 (64 percent) were located in sandy loam soil, 4 (18 percent) in loam sand soil, 3 (14 percent) in loam soils, and 1 (5 percent) in sand soils. The average height of the colony was 3.3 m (Humphrey and Garrison 1987). The average success rate of building and occupying a burrow in California is 59.6 percent (Garrison *et al*. 1987).

Reason for Decline and Threats to Survival

The bank swallow is sensitive to weather changes that effect successful foraging, cold weather during the migration, and cause banks to collapse (i.e., flood and rain events). Predation by birds or reptiles and the collapse of a burrow when predators are digging into the burrow also result in mortalities (Persson 1987). Collision with automobiles has contributed to the decline of bank swallow populations. Juveniles are more likely to be killed by vehicles then older bank swallows. However, loss of nesting habitat is the primary cause of decline of the species. For

example, California has lost most of its central and southern nesting habitat to flood and erosion control projects along streams and rivers (Garrison *et al*. 1987, Small 1994).

Status with respect to Recovery

In 1987, it was estimated that California had 111 colonies, with an estimated total population of 25,180 pairs. The Breeding Bird Survey estimated that between 1966 and 1991, North American bank swallow populations were stable. However, California nesting populations were reported to be declining at the same time (Humphrey and Garrison 1987).

A Recovery Plan for the Bank Swallow has been written in California. Along the Sacramento River, artificial banks and enhanced banks were built. In 1986, burrows were dug with a hand auger on the Sacramento River (Schlorff 1992, Garrison 1991).

Environmental Baseline

There are 171 known bank swallow occurrences in California (CNDDB 2001). One of these occurrences is extirpated. There are 35 bank swallow occurrences (all presumed extant) in Sutter County and seven occurrences in Sacramento County (all presumed extant). Although there is no suitable nesting habitat in the Natomas Basin, bank swallows from nearby nesting colonies have the potential to forage in the Natomas Basin and foraging could also occur during migration to nesting sites north of the Natomas Basin. The Natomas Basin supports about 43,000 acres of potential bank swallow foraging habitat including alfalfa (371 acres), grassland (886 acres), nonrice crops (61,686 acres), pasture (674 acres), ponds and seasonally wet areas (96 acres), rice (22,693 acres), riparian (124 acres), and canals (1,778 acres)(Table 11).

Northwestern Pond Turtle

The northwestern pond turtle (*Clemmys marmorata marmorata*) is a subspecies of the Pacific pond turtle (*C. marmorata*) and is a member of the family Emydidae (box and water turtles). It is considered a Species of Concern by Service and is a state Species of Special Concern. In 1993, the Service reviewed the status of the pacific pond turtle and found that listing was not warranted (Service 1993b). Both subspecies of the pacific pond turtle, however, are considered Species of Concern.

Description

The pacific pond turtle is a small (9-19 cm) aquatic turtle characterized by an olive, dark brown, or black shell with a spotted head and neck (Stebbins 1985). Ventrally, it is yellowish, sometimes with dark blotches in centers of the plasteral shield (Storm *et al.* 1995). The northern pacific subspecies is defined on the basis of its mottled head and neck coloration and a relatively high frequency of inguinal shields. The southern subspecies is defined on the basis of its light head and neck coloration with more prominent markings in these areas, and a reduced frequency of occurrence of large inguinal shields. The two subspecies of pacific pond turtle can be slightly

distinguished morphologically. *C. m. marmorata* has a pair of well-developed triangular inguinal scutes on the bridge and its brown or grayish neck and head are well marked with dark dashes. *C. m. pallida* has poorly developed inguinal scutes (missing in 60 percent of individuals) and its throat and neck are a uniform, light color (Ernst *et al.* 1994).

In both subspecies, the pacific pond turtle demonstrates sexual dimorphism at maturity. Holland (1994) noted over 20 different dimorphic characteristics between adult male and female turtles, although their gender can usually be identified by utilizing just a few. The degree of dimorphism is variable for each character and each individual, but generally adult males tend to have a flatter carapace, concave plastron posteriorly, thicker tail base with the cloacal opening at or beyond the margin of the carapace, larger head with a longer nose and pointier snout, and a larger neck with yellow or whitish chin and throat (Ashton 1997). The characteristics should be viewed in concert to determine gender, versus pinpointing a single characteristic. Juvenile males and females usually resemble adult females, but are smaller in size with relatively long tails.

The diet of pacific pond turtles is comprised primarily of small aquatic invertebrates, including crustaceans, insects and occasionally annelids (Holland 1994, Bury 1986). They may also consume small vertebrates, including fish and amphibians (Holland 1985, Bury 1986). Feeding on carrion of mammals, birds, reptiles, amphibians and fish is common (Evenden 1948; Carr 1952; Holland 1985, 1994; Bury 1986), but live prey is preferred (Bury 1986). Prey is ingested in the water, as the turtles are apparently unable to swallow in air (Holland 1991). Turtles infrequently forage on plants such as pond lily (*Nuphar polysepalum*), inforescences, willow and alder catkins and ditch grass inflorescences (Holland 1994), although post-partum females have been observed ingesting large amounts (up to 8.5 g) of tule (*Scirpus* sp.) and cattail (*Typha latifolia*) roots (Holland 1985).

Historical and Current Range

Fossil evidence indicates that pacific pond turtles have existed in the western United States since at least the late Pliocene (Hay 1908). In California, remains discovered at archaeological sites indicate that Indians ate them (Ernst *et al.* 1994). The northwestern pond turtle historically and currently ranges from Puget Sound, Washington, south through Oregon, generally west of the Sierra-Cascade crest, to the American River drainage in central California. The southern pacific subspecies ranges from the vicinity of Monterey Bay, California, south through the coast ranges to Baja California Norte, Mexico. The area of the Central Valley of California between the American River drainage and the Transverse Ranges is considered to be a zone of intergradation between the two subspecies (Seeliger 1945). Historically, the pacific pond turtle inhabited the vast permanent and seasonal wetlands on the Central Valley, with the Tulare Lake Basin being a stronghold for the species.

Records of *C. m. marmorata* from Grant County, Oregon, and British Columbia, Canada, are believed to represent introduced animals (Nussbaum *et al*. 1983, Storer 1937). Outlying populations of *C. m. marmorata* occur in Nevada primarily in the Truckee and Carson River

drainages.

Essential Habitat Components

The pacific pond turtle is found in fresh to brackish permanent to intermittent aquatic riparian habitats, including marshes, rivers, ponds, streams, and vernal pools. Pond turtles also may occur in man-made habitats, such as irrigation ditches, reservoirs, and sewage and mill ponds. Preferred aquatic habitat is characterized by slow moving or quiet water, emergent aquatic vegetation, deep pools with undercut banks for refugia, and partially submerged rocks and logs, open mud banks, matted floating vegetation, sandbars or warm water for thermoregulatory basking. Hatchling and young turtles (1 year) require shallow, slow-flowing water areas (less than 30 cm deep) dominated primarily by emergent aquatic reeds (*Juncus* sp.) and sedges (*Carex* sp.) (Holland 1991 and Reese and Welsh 1998). Pacific pond turtles have been located from brackish estuarine waters at sea level to mountains streams over 1,800 m in elevation.

Viable terrestrial habitat is nearly as important as sufficient aquatic habitat to the existence of pacific pond turtles. They have been documented as traveling on land during all times of the year (Reese and Welsh 1997). Even in the central and southern portions of its range where air temperatures are warmer, pacific pond turtles spend nearly four months a year on terrestrial sites (Rathbun *et al*. 2002). Characteristics of terrestrial habitats frequented by pacific pond turtles for basking, dispersal, nesting, overwintering and protection from predators are highly variable throughout its range, but some type of vegetative cover is required. Reese and Welsh (1998) found that the portions of the Trinity River in northwestern California containing nonvegetated shorelines were nearly absent of pacific pond turtles. Peak terrestrial activity occurs during nesting season for adult females and during an overwintering period for adults and hatchlings of both sexes. Reese and Welsh (1997) believe that the traditionally protected buffer zones along rivers is simply not adequate enough for the turtles. Holland (1994) advised 0.5 km from the known aquatic site of pacific pond turtles are needed to adequately protect nesting habitat and turtle populations. Rathbun *et al.* (2002) recommended that each site be assessed individually, due to the complex interaction of factors associated with terrestrial areas and behavioral flexibility of the pacific pond turtle.

Reproductive Ecology

The reproductive ecology of the pacific pond turtle remains poorly understood (Holland 1994). It is assumed that size and age determine first reproductive capability and it varies geographically and possibly altitudinally (Holland 1994). Most female turtles do not develop eggs until they achieve a carapace length of at least 120 millimeters (mm) (Holland 1994). The age of first reproduction is usually seven to nine years for the southern pacific pond turtle and ten to 14 years of age for the northwestern pond turtle (Holland 1994). Ashton (1997) reported that mating occurs underwater, typically in late April to early May, but may occur year-round (Holland

1994). Most females lay eggs in alternate years, although some females, particularly in southern and central California, oviposit annually (Holland 1994, Ashton 1997).

Known clutch size ranges from one to 13 eggs (average is four to seven), with larger females generally laying larger clutches (Holland 1985, 1991, 1994). Females may deposit more than one clutch a year (Rathbun *et al.* 1993, 2002; Scott *et al.* 2002; Lovich and Meyer 2002). The first clutch of 25 turtles studied in coastal streams of California had significantly more eggs than the second clutch with 27 to 43 days between each oviposit (Scott *et al.* 2002). From May through July, females move into upland habitat to nest, although observations of egg deposits have been recorded as early as late April and as late as early August (Storer 1930; Buskirk 1992; Rathbun *et al.* 1992, 1993; Holland 1994; Scott *et al.* 2002). Through hand palpation and x-radiography, Scott *et al.* (2002) and Lovich and Meyer (2002) reported that females carry shelled eggs from two to three weeks on average (recorded longest was 33 days) before oviposition.

Nest locations range from three to 585 m from aquatic habitat (Storer 1930, Holland 1994, Lovich and Meyer 2002). Nest sites are typically located in open areas dominated by sparse, low vegetation such as grasses and forbs, that allow long exposures to direct sunlight. Soils are dry and generally well drained with significant clay/silt content and have a low slope angle. Nests on sloping terrain often have a southern or southwestern exposure. Females empty the contents of their bladders to soften the soil, excavate their nests in the ground, deposit the eggs, and cover the nest by scraping soil and vegetation over the eggs. Time requirements for completion of the nest and oviposition varies from less than two hours to 86 hours (Holland 1994, Rathbun *et al.* 2002, and Lovich and Meyer 2002). Females tend to be very wary during overland nesting movements and may abandon nesting or delay attempts if even slightly disturbed (visually or audibly) or if they hit a rock or root during excavation (Holland 1991, 1994; Rathbun *et al*. 1992, 2002). Additionally, some female turtles have been observed producing one or more "false scrapes" in which they excavate a nest, but do not deposit eggs (Holland 1994). Incubation requires from 90 to 126 days in the wild with overall hatching rates at about 70 percent (Holland 1994). Hatching of the eggs occurs in the fall with hatchling sizes ranging from 23-31 mm in carapace length and 1.5-7 g (0.05-0.25 ounces) in weight with larger hatchlings occurring in the northern part of the range (Holland 1994). The majority of hatchlings remain in the nest throughout the winter and finally emerge in the spring. In southern and central California, a few records exist of some hatchlings emerging from the nest in late summer or early fall (Buskirk 1992, Holland 1994). Hatchlings that overwinter in the nest receive nourishment from an umbilical yolk sack (Holland 1994). Hatchlings double in size by the end of the first growing season (Holland 1991).

Survivorship in pacific pond turtles apparently is dependent on age. Hatchlings and first year juveniles are subject to low survivorship, averaging ten to 15 percent; survivorship may not increase significantly until turtles are four to five years old (Holland 1994). Once turtles achieve a carapace length of 120 mm, survivorship improves with an average adult turnover rate of three to five percent per year (Holland 1994). Under normal circumstances, pacific pond turtle populations consist of 55 to 70 percent adults. But in areas such as the Willamette Valley, Oregon where intense threats to juvenile survivorship exist, adult-bias populations average 90

percent (Holland 1994).

Movements and Habitat Use

In the majority of its range, pacific pond turtles are active from about March through October with the peak of activity in May and June in both aquatic and terrestrial habitats. Some turtles "overwinter" in aquatic sites such as the primary lake or pond they inhabit or other nearby ponds or pools. Turtles may also overwinter in undercut areas or holes in the banks of watercourses or move to upland habitat. It appears that most turtles that overwinter in aquatic habitats are found in lacustrine systems (lakes and ponds), whereas most turtles that overwinter in terrestrial sites are found in flowing-water systems (streams and rivers) (Holland 1994). Reese and Welsh (1997) suggested that the timing for turtles to overwinter was related to avoidance of flood conditions. An additional study supports that premise, but further surmises that subzero winter temperatures also regulated the timing of turtles seeking terrestrial refuge (Rathbun *et al.* 2002).

Turtles may move up to 260 m from aquatic habitat to overwinter under dense vegetation, logs or leaf litter (Holland 1994). Microhabitat characteristics of terrestrial overwintering sites are highly variable ranging from habitats of conifer to hardwood to woody shrubs. In northern California, Reese and Welsh (1997) studied 12 pacific pond turtles and determined that the turtles preferred terrestrial overwintering sites on relatively cool north- and east-facing slopes as opposed to south- and west-facing slopes. Rathbun *et al.* (2002) suggested the sites are a complicated interaction of factors involving elevation, moisture, slope, solar exposure and vegetative cover. Despite overwintering, most turtles still exhibit activity, although at a reduced level, including basking, foraging and moving between overwintering sites in subzero air and water temperatures (Rathbun *et. al* 2002, Reese and Welsh 1997, Holland 1994). Turtles may also engage in communal overwintering, with large numbers concentrated in a relatively small area (Holland 1994).

Bury (1972) found home ranges of pacific pond turtles to average 1 hectare (2.5 acres) for males, 0.3 hectare (0.7 acre) for females, and 0.4 hectares (1 acre) for juveniles. Within the northern California stream system studied by Bury (1972), males moved greater distances than females or juveniles. Turtles move significant distances (at least 2 km) if the local aquatic habitat changes (e.g., disappears), and adult turtles can tolerate at least seven days without water (Holland 1994). Nevertheless, dispersal abilities of juveniles and the recolonization potential of pacific pond turtles after extirpation of a local population are unknown.

Reasons for Decline and Threats to Survival

Adult males typically have a higher probability of survivorship than adult females, with skewed sex ratios observed as high as 4:1 males to females (Holland 1991). The most plausible explanation for these observed sex ratios is that females suffer higher rates of predation during overland nesting attempts (Holland 1991). Females display a rate of scarring on the shell up to six times greater than males, usually indicating attempted predation by mammals (Holland 1994). Adults are long lived, the maximum life span being approximately 40 years (Bury and

Holland unpubl. data).

Habitat loss and alteration are the primary factors that caused the historic decline of the pacific pond turtle throughout its range. In California, over 90 percent of historic wetlands have been diked, drained and filled primarily for agricultural development and secondarily for urban development (Frayer *et al*. 1989). Much of the wetland habitat lost, such as in the Tulare Lake basin, was prime habitat for the pacific pond turtle. Historic levels of pacific pond turtle populations in the Tulare Lake Basin and southern San Joaquin Valley were estimated at 3.35 million turtles (Holland 1991). Today, the pacific pond turtle remains in 90 percent of its historic range, but at greatly reduced numbers (Holland 1991).

Water projects in the mid 1900s, which accompanied agricultural growth, also had a negative effect on pond turtle populations. Construction of reservoirs directly eliminated pond turtle habitat and isolated or fragmented remaining populations. Historically, urbanization also has significantly altered or eliminated pond turtle habitat, with the greatest impact occurring in southern California within the range of the southern pacific pond turtle.

Records of harvesting pacific pond turtles for food date back to an account by Lockington (1879) of the commercial harvest of the species for the San Francisco market. At the time, commercial harvest had already depleted populations of the pacific pond turtle in the San Francisco area, resulting in commercial operations focusing on populations in the San Joaquin Valley, particularly Tulare Lake (Elliot 1883, Brown 1940). Over 18,000 pond turtles were offered for sale in San Francisco markets, presumably in one year in the 1890s (Smith 1895). This practice of large scale harvesting continued at least through the 1920s (Storer 1930).

A variety of factors working together continue to result in a significant decline of pacific pond turtle populations throughout 75 to 80 percent of its range (Holland 1991). These natural, introduced and human made factors include predators, exotic competitors, habitat destruction, alteration and degradation, parasites and disease, and drought.

The pacific pond turtle is preyed upon by a wide variety of native and introduced predators, including large and small mammals, raptors, herons, corvids, snakes, frogs and fish. Pacific pond turtles are relatively poor swimmers and rely on crypsis and use of refugia to escape predation (Reese and Welsh 1998). Of the native predators, the raccoon (*Procyon lotor*) is a ubiquitous and effective predator, taking animals of all sizes, including eggs and hatchlings. Raccoon populations, in particular, respond favorably to urban environments, where human refuse may support larger populations than normal. Larger populations of raccoons and other predators combined with reduced nesting habitat for pond turtles adjacent to aquatic habitat, results in concentrations of nests which are more easily detected by predators. In Oregon, over 99 percent of nests examined in 1991-1993 were destroyed by predators, most likely raccoons, spotted skunks (*Spilogale putorius*) or coyotes (*Canis latrans*) (Holland 1994).

Two introduced predators of particular concern are the bullfrog (*Rana catesbeiana*) and the largemouth bass (*Micropterus salmoides*). Both species were introduced into the western United

States in the latter part of the 19th century, and through range expansions, reintroductions, and transplants these species have become established across most of the western United States (Moyle 1973). Both species have been observed to feed on juvenile pacific pond turtles. When these introduced species occur in large numbers, they may effectively preclude any significant level of recruitment in some turtle populations (Holland 1994). In aquatic habitats containing largemouth bass, but no bullfrogs, a fringe of emergent vegetation around the pond edge may protect hatchling and juvenile pond turtles from predation by bass (Holland 1991).

Humans are also major predators on pacific pond turtles. Collection of pond turtles for food still exists today with numbers from 20 to over 100 known to be taken in a single instance (Holland 1991, 1994). A commercial pet market exists for pond turtles despite state prohibitions (Holland 1991). Indiscriminate shooting of pacific pond turtles can be a significant mortality factor, particularly in areas adjacent to urban development. Some sportsman shoot turtles as they incorrectly assume that turtles consume game fish and waterfowl. Turtles are also shot by private landowners that fear they may lose property rights if this species is granted federal threatened or endangered status (Ashton 1997). There are also reports of shooting turtles for target practice or sport (Milner 1986 and Holland 1994).

In some areas, humans also accidentally predate on pacific pond turtles from automobile, boat and off-road vehicle traffic, as well as incidental catch during fishing. A study of a pacific pond turtle population in the Willamette Valley indicated an annual actual or potential loss of three to five percent of the total population to automobile traffic (Holland 1994). Reese and Welsh (1997) noted that pacific pond turtles frequently cross roads in agricultural areas.

Off-road vehicle activity poses a threat to pacific pond turtles both directly and indirectly. Direct impacts include crushing of individual turtles or nests and access to remote populations of the turtle for the purposes of collection or shooting. Off-road vehicle activity indirectly impacts pond turtles by interfering with normal foraging and basking activities, and by altering or restricting overland or instream movements of turtles. Long-term impacts of off-road vehicle activity include increased soil erosion, soil compaction, vegetation removal, siltation of the watercourse, and alteration or loss of refugia. According to Holland (1991), pacific pond turtle populations located in off-road vehicle areas in California tend to be small and disjunct, and occur in very limited habitats. Poor habitat quality combined with a very low probability of maintenance or reestablishment by immigration, renders these populations highly susceptible to extirpation.

Incidental collection of pond turtles by fisherman may be a significant mortality factor in some areas. Approximately 3.6 percent of turtles captures by Holland (1991) at an Oregon site had ingested fish hooks. At a southern Sierra Nevada, California site, about six percent of captured turtles showed evidence of trauma related to removal of hooks, had hooks in place, or were found dead with hooks embedded in the esophagus or stomach (Holland 1991). Turtles captured by Holland (1991) in Oregon before and after ingestion of fish hooks had lost a significant amount of weight, suggesting that hooked turtles may eventually starve to death. Hooked turtles are often killed by fisherman, who mistakenly presume that pond turtles are competitors for fish

or consume ducklings (Holland 1991).

Another factor that may adversely affect pond turtle populations is the introduction of nonnative competitors. Numerous species of nonnative aquatic turtles have been observed within the range of the pacific pond turtle (Jennings 1987). These include the painted turtle (*Chrysemys picta*), red-eared slider (*Pseudemys scripta elegans*), common snapping turtle (*Chelydra serpentina*), spiny soft-shelled turtle (*Apalone spinifera*), alligator snapping turtle (*Macroclemys temmincki*), stinkpot (*Sternotherus odoratus*), diamondback terrapin (*Malaclemys terrapin*), and the Mississippi map turtle (*Graptemys kohni*). Most of these turtles represent animals imported for the pet or food trade that have been released or escaped captivity. In addition to competition for food, exotic turtles also may carry new pathogens and/or parasites for which pond turtles exhibit no immunity.

Additional exotic competitors of particular concern are carp (*Cyprinus carpio* and *Carassius auratus*), sunfish (*Lepomis* spp. and *Pomoxis* spp.), and crayfish (*Cambarus*, *Procambarus*, and *Pacifasticus*). Carp alter aquatic habitats by consuming emergent and floating vegetation. Their activities also produce turbid water conditions. These alterations of the aquatic habitat may have a significant impact on hatchling turtle habitat, may reduce the availability of invertebrate prey and decrease turtle foraging success as turtles rely primarily on vision to capture prey (Holland 1991). Sunfish, which are capable of reaching large population sizes in aquatic habitats may modify or compete for the available invertebrate prey base (Holland 1991). Although direct scientific data are unavailable to support this hypothesis, Holland (1991) noted that several sites lacking native or non-native fishes support the largest known pacific pond turtle populations. Crayfish, which also may prey on young pond turtles, may compete with pond turtles for both the invertebrate prey base and carrion (Holland 1991).

The pacific pond turtle has been described as an aquatic generalist as it occurs in a wide variety of aquatic habitats throughout its range (Holland 1991, 1994). Currently across its range, Ashton (1997) believes that loss of aquatic habitat through destruction, alteration or degradation is the greatest anthropogenic threat to pacific pond turtles. Reese and Welsh (1997) and Holland (1994) agree but charge that since pacific pond turtles are semi-terrestrial, finding protection not only for their aquatic habitat, but also adjacent uplands used for nesting, overwintering and dispersal purposes is of paramount importance to protecting pacific pond turtles. Conversion of wetlands to farmland, destruction of riparian area and uplands, urbanization, irrigation, channelization, water diversions, dams, grazing, mining, contaminants, roads, railroads and recreational activity all continue to have significant negative impacts on turtle populations.

Wetlands that have persisted are often indirectly affected by adjacent agricultural practices. Many of these aquatic habitats are utilized to convey or store agricultural water and, therefore, are subject to changes in the timing and amount of water flow. These wetlands often are channelized and periodically cleaned of aquatic vegetation rendering them unsuitable for pond turtles. Where pond turtles persist adjacent to agricultural lands, upland nesting opportunities may be limited or nonexistent because of the practice of farming up to the edge of the aquatic habitat. Because the pond turtle is long-lived, populations may persist in these areas long after

recruitment of young has ceased. According to Holland (1991), turtle populations in agricultural settings tend to be very small and heavily adult biased.

Another significant source of habitat alteration throughout the range of the pacific pond turtle is livestock grazing. Livestock have been documented as a major cause of excessive habitat disturbance in riparian areas (Behnke and Raleigh 1978, Kauffman and Krueger 1984). Cattle have a disproportionately greater adverse affect on riparian and other wetland habitats because they tend to concentrate in these areas, particularly during the dry season (Marlow and Pogacnik 1985). Cattle trample and eat emergent vegetation (Platts 1981) that serves as foraging habitat for turtles of all sizes and as critical microhabitat for hatchlings and first year animals. Streambanks also are trampled by cattle often resulting in the collapse of undercut banks (Platts 1981, Kauffman *et al*. 1983) that provided refugia for turtles. Cattle grazing results in increased erosion in the stream (Winegar 1977) which fills in deep pools, increases stream velocity, and adversely affects aquatic invertebrates (Behnke and Raleigh 1978, Platts 1981). Cattle may also crush turtles (Holland 1991).

Construction of roadways adjacent to pond turtle habitat adversely affects pond turtles in several ways. First, roads often present a partial or complete barrier to turtles traveling overland to nesting or overwintering sites. In studies in California, Oregon and Washington, pacific pond turtles have been observed crushed on roadways (Holland 1985, 1992), with the majority of these being gravid or post-partum females. In addition to hampering access to nesting areas, the road bed itself reduces the area of potential nesting. Roads constructed on south-facing slopes adjacent to the Umpqua River in Oregon probably eliminated both existing and potential nesting habitat (Holland 1992).

Parasites known to use pacific pond turtles as a host include trematodes, helminths, nematodes, lungworms and leeches (Holland 1994). Leeches were found on 7 to 10 percent of turtles studied from several sites in northern California (Holland 1991). Substantial numbers of nematodes have been found in the guts of northern pacific pond turtles from northern California (Bury 1986).

Status with Respect to Recovery

Northwestern pond turtle recovery efforts have been limited. In Washington, long-term recovery efforts are underway. Lands containing remaining populations have been preserved through purchase by the state of Washington or other non-profit organizations. The pacific pond turtle habitat on these lands have been enhanced by elimination of grazing, addition of basking materials, removal of non-native predators (bullfrogs and warm water fish), removal of invasive plant species, and planting of native shrubs (Washington Dept. of Fish and Wildlife 2000). A captive breeding program formally initiated in 1990 through the partnering of the Washington Department of Fish and Wildlife, Woodland Park Zoo and Center for Wildlife Conservation resulted in the release of 38 juvenile turtles in the Columbia River Gorge Puget Sound lowlands between 1991 and 1998 (Washington Dept. of Fish and Wildlife 2000). Since the program informally started (i.e., prior to 1990), 490 juvenile turtles have been released back into the wild

in Washington, with at least 90 percent surviving.

A similar "head start" program was implemented for the Kern River Preserve in 1992, 1993 and 1995 by the Audubon Society with consultation from the Woodland Park Zoo. The program successfully released and gave a head start to 53 turtles onto the Kern River Preserve. Recapture studies indicate the released turtles appeared healthy in 1993 with future studies forthcoming to determine exact survival rate and long-term success of the program (Overtree and Collings 1997). Additionally, the Service is developing long range management plans for the National Wildlife Refuges in the Columbia River Gorge (Pierce, Franz and Steigerwald) to support the recovery efforts.

Status within the Action Area and Environmental Baseline

CNDDB (2002) lists 14 pond turtle occurrences in Sacramento County and two pond turtle occurrences in Sutter County. Although no CNDDB occurrences have been recorded in either the Natomas Basin, the species is known to occur there. The species has been observed at Fisherman's Lake (NBHCP EIR 2002) as well as along the Natomas Main Drain (May & Associates 2001). The Natomas Basin probably supports a limited pond turtle population; however, no systematic surveys have been conducted.

Environmental Baseline

The canals and drains throughout the Natomas Basin are considered potential aquatic habitat for pond turtles. The species has been observed at Fisherman's Lake (NBHCP EIR 2002) as well as along the Natomas Main Drainage Canal (May & Associates 2001). Currently, there are about 250 miles of canals and drains in the Basin. Fisherman's Lake is considered high-quality aquatic habitat for the pond turtle and turtles have been observed there. Because most of the basin is developed agricultural land or commercial/ residential development, many of the potential upland breeding habitats have been eliminated. Despite this, a limited amount of potential breeding habitat probably occurs along many of the canals and aquatic habitats.

The Natomas Basin supports approximately 24,691 acres of potential pond turtle habitat (Table 12). Of that, approximately 96 acres are ponds and seasonally wet areas, 22,693 acres are rice, 124 acres are riparian, and 1,778 acres are canals. Although the importance of rice habitat to the turtle has not been documented, rice fields likely provide some foraging opportunities. The Basin's ponds and seasonally wet areas and its extensive system of drainage and delivery canals likely provide more suitable aquatic and upland habitat for the turtle.

Midvalley Fairy Shrimp

The midvalley fairy shrimp is considered a Species of Concern by the Service. The Service is currently conducting a status review of the species, and will issue a 12-month finding to determine if a petition to list it as endangered is warranted (68 **FR** 22724). The midvalley fairy shrimp has not been designated any special status by the State.

Description

The midvalley fairy shrimp (*Branchinecta mesovallensis*) was described by Belk and Fugate in June, 2000. The species was named for its limited range in the Central Valley of California. The type locality is on the Virginia Smith Trust land in Merced County, California (Belk and Fugate 2000). Midvalley fairy shrimp specimens were collected as early as 1989.

Male midvalley fairy shrimp are most similar in appearance to the Conservancy fairy shrimp (Belk and Fugate 2000). These species are distinguished by the shape of the tip of their antennae. The midvalley fairy shrimp's antennae is bent such that the larger hump of two humps possessed by both species is anterior, whereas this same hump is posterior in the Conservancy fairy shrimp. Females of these two species differ in the shape of their brood pouches. The brood pouch of the midvalley fairy shrimp is pyriform and extends to below segments 3 and 4. The brood pouch of the Conservancy fairy shrimp is fusiform and extends to below segments 5 and 7. Midvalley fairy shrimp females also closely resemble the vernal pool fairy shrimp, except that vernal pool fairy shrimp females have a pair of dorsolateral processes on each side of thoracic segment 3, whereas the midvalley fairy shrimp does not have any dorsolateral processes on this thoracic segment.

Historic and Current Range

Although the historic distribution of the midvalley fairy shrimp is unknown, vernal pool habitats in the regions where it is currently known to occur have been dramatically reduced since pre-agricultural times (Holland 1998). The habitat of the midvalley fairy shrimp may have been even more severely reduced than other vernal pool habitats, since it can occur in swales and short-lived pools that may escape detection in dry years or during the dry season (Helm 1999, Belk and Fugate 2000).

The midvalley fairy shrimp is endemic to a small portion of California's Central Valley. Helm (1998) found midvalley fairy shrimp in less than 0.5 percent of the vernal pools he examined. Based on the few known occurrences, the species' distribution is limited to the Southeastern Sacramento, Southern Sierra Foothill, San Joaquin, and Solano-Colusa vernal pool regions. In the Southeastern Sacramento region, most occurrences are clustered around the City of Sacramento and Mather Air Force Base in Sacramento County. In the Southern Sierra Foothills and San Joaquin vernal pool regions, the midvalley fairy shrimp has been documented in the vicinity of the Virginia Smith Trust property in Merced County and from isolated occurrences in San Joaquin, Madera, and Fresno counties. However, because this species was described only

recently, it is likely additional occurrences will be found in the future.

Life History and Reproductive Ecology

The life cycle of the midvalley fairy shrimp is well suited to the unpredictable conditions of vernal pool habitats. The midvalley fairy shrimp can mature and reproduce very rapidly; it has been observed to reach maturity in as little as eight days and reproduction was observed in as few as 16 days after hatching (Helm 1998). Under the culturing conditions described in Helm (1998), the midvalley fairy shrimp lived for 147 days, about as long as other Central Valley species observed. Multiple hatchings of the midvalley fairy shrimp have been observed in a single rainy season as its vernal pool habitat repeatedly fills and dries. Helm (1998) found the midvalley fairy shrimp to be very tolerant of warm water, occurring in pools with water temperatures ranging from 5 to 32˚C . This temperature is higher than that measured for any other Central Valley fairy shrimp collected, except for the California fairy shrimp. Little is known about the midvalley fairy shrimp's tolerance to variations in water chemistry, but it has been found in some relatively alkaline pools (Helm 1998).

Essential Habitat Components

The midvalley fairy shrimp has been found in small, short-lived vernal pools and grass-bottomed swales ranging from 1.2 to 202 m^2 in area and averaging less than 10 cm in depth (Helm 1998). The species has been collected from pools on a volcanic mudflow landform of the Merhten Formation in Pentz Gravelly Loam and Raynor Clay soils. The midvalley fairy shrimp has also been found on San Joaquin Silt Loam soils on the Riverbank formation on Low Terrace landforms. At the time the type specimens were collected, the dominant macrophytes in the pool were the wetland grasses *Lolium multiflorum, Hordeum maximum gussoneanum,* and *Deschampsia danthanoides*, species that are characteristic of extremely short-lived pools and swales.

The midvalley fairy shrimp has only been collected with one other fairy shrimp, the vernal pool fairy shrimp, on three occasions (Eriksen and Belk 1999). It may occupy habitats that are not inundated for a sufficient period of time for other species to inhabit.

Reasons for Decline and Threats to Survival

As with all vernal pool species that occur in the Central Valley, suitable habitat for the midvalley fairy shrimp has declined dramatically over the past century, and pressure to develop remaining lands in the Central Valley are increasing rapidly. Holland (1998) estimated that only 25 percent of vernal pool habitats remain in the Central Valley, including the Southeastern Sacramento Valley and San Joaquin vernal pool regions where the species is currently known to occur.

Because the midvalley fairy shrimp occupies very small pools and was only recently recognized as a separate species, it may actually be at greater risk than the species already protected under the Act. These small depressions require less preparation prior to conversion to urban or agricultural uses because they are already relatively level, and thus may be more attractive to developers. Even during the wet season, they may not contain water continuously, even when nearby larger pools are full. Under these conditions, midvalley fairy shrimp pools may not be surveyed at all, and conversion allowed. Continued conversion of the grassland-vernal pool ecosystem matrix to urban or agricultural uses is the largest threat to survival of the midvalley fairy shrimp. The largest number of known locations is in Sacramento County, around the City of Sacramento, which is growing rapidly. Urban expansion in this area poses a threat to the majority of the midvalley fairy shrimp populations known to exist today.

Environmental Baseline and Status within the Action Area

There are 52 reported occurrences of midvalley fairy shrimp in California, 12 of which are reported from Sacramento County (CNDDB 2002). The midvalley fairy shrimp has not been recorded from Sutter County or the proposed action's action area. However, as stated above, this may be due to the short time that the midvalley fairy shrimp has been recognized as a distinct species. Potential midvalley fairy shrimp habitat occurs in the vernal pools on the east side of the Basin, in grasslands north of Del Paso Road. Additional potential habitat occurs in other ponds and seasonally wet areas in the Basin. No potential midvalley fairy shrimp habitat is located within 76 m (250 ft.) of any of MAP's proposed action activities.

Potential midvalley fairy shrimp habitat of approximately 21.3 acres occurs in the vernal pools on the east side of the Basin, in 886 acres of grasslands primarily north of Del Paso Road. This estimate of vernal pool acreage is based upon assessments of the amount of vernal pool habitat in grasslands in Sacramento County and probably greatly overestimates the actual amount of vernal pool habitat in the Basin (K. Fuller, pers. comm.). Additional potential habitat occurs in 96 acres of other ponds and seasonally wet areas in the Basin. Once again, this estimate greatly overestimates the amount of potential vernal pool habitat in the Basin, as most of the ponds and seasonally wet areas do not have the hydrology sufficient to support vernal pool crustaceans.

Western Spadefoot Toad

The western spadefoot toad was listed as a Category 2 species by the Service in 1994 (Service 1994*b*). Due to a change in policy regarding candidate species, western spadefoot toads are now considered a Species of Concern (Service 1998). The western spadefoot toad was designated a Species of Special Concern by the State in 1994 (Jennings and Hayes 1994, CDFG 1998).

Description

Spadefoot toads are distinguished from the true toads (*Bufo* spp.) by their cat-like eyes (due to vertically elliptical pupils), the single black sharp-edged "spade" on each hind foot, teeth in the upper jaw, and rather smooth skin (Stebbins 1985). The parotid glands (large swellings on the

side of the head and behind the eye) are absent or indistinct on spadefoot toads. Their pupils are vertical in bright light but are round at night. Males may have a dusky throat and dark nuptial pads on the innermost front toes. Amplexus, the copulatory embrace by males, is pelvic (Stebbins 1985).

The western spadefoot toad ranges in size from 3.7 to 6.2 cm snout-vent length. It is dusky green or gray above and often has four irregular light-colored stripes on its back, with the central pair of stripes sometimes distinguished by a dark, hourglass-shaped area. The skin tubercles (small, rounded protuberances) are sometimes tipped with orange or are reddish in color, particularly among young individuals (Storer 1925, Stebbins 1985). The iris of the eye is usually a pale gold. The abdomen is whitish without any markings. Spadefoot toads have a wedge-shaped, glossy black "spade" on each hind foot. The call of western spadefoot toads is hoarse and snore-like, and lasts about one-half to one second (Stebbins 1985).

Historical and Current Range

The western spadefoot toad is nearly endemic to California, and historically ranged from the vicinity of Redding in Shasta County southward to Mesa de San Carlos in northwestern Baja California, Mexico (Stebbins 1985). In California, western spadefoot toads ranged throughout the Central Valley, throughout the Coast Ranges, and the coastal lowlands from San Francisco Bay southward to Mexico (Jennings and Hayes 1994).

The western spadefoot toad is no longer present throughout most of the lowlands of southern California (Stebbins 1985). The species also is believed to be extirpated from many historic locations within the Central Valley (Jennings and Hayes 1994, Fisher and Shaffer 1996). According to Fisher and Shaffer (1996), western spadefoot toads have suffered a severe decline with virtually complete extirpation from the Sacramento Valley, and a reduced density of populations in the eastern San Joaquin Valley. Declines in abundance have been more modest in the Coast Ranges. This species occurs mostly below 900 m (Stebbins 1985), but can occur up to 1363 m (Morey 1988). However, the average elevation of sites where the species still occurs is significantly higher than the average elevation for historical sites; this suggests that declines have been more pronounced in lowlands.

Jennings and Hayes (1994) examined 832 museum and sighting records from 346 locations and concluded that western spadefoot toads occurred in 18 California counties: Alameda, Amador, Butte, Kern, Madera, Mariposa, Monterey, Orange, Riverside, Sacramento, San Benito, San Diego, San Joaquin, San Luis Obispo, Santa Barbara, Stanislaus, Tehama, and Tulare. Based on these same records, they concluded that western spadefoot toads may no longer occur in six counties: Calaveras, Fresno, Los Angeles, San Bernardino, Shasta, and Yolo. Fisher and Shaffer (1996) conducted field surveys of 315 sites in the Sacramento Valley, San Joaquin Valley, and Coast Ranges from 1990 to 1992. These surveys confirmed the presence of western spadefoot toads in Alameda, Calaveras, Glenn, Kern, Madera, Merced, Monterey, Sacramento, San Benito, San Luis Obispo, Santa Barbara, Stanislaus, and Tulare Counties. Western spadefoot toads were not found at sites surveyed in Amador, Butte, Fresno, Mariposa, San

Joaquin, Shasta, Tehama, and Yolo Counties.

Essential Habitat Components

According to Stebbins (1985), western spadefoot toads are primarily a species of lowland habitats such as washes, floodplains of rivers, alluvial fans, playas, and alkali flats. However, they also occur in the foothills and mountains. Western spadefoot toads prefer areas of open vegetation and short grasses, where the soil is sandy or gravelly. They are found in the valley and foothill grasslands, open chaparral, and pine-oak woodlands.

Western spadefoot toads require two distinct habitat components in order to meet life history requirements, and these habitats probably need to be in close proximity. As mentioned previously, spadefoot toads are primarily terrestrial. They require upland habitats for feeding and constructing burrows for their long dry-season dormancy. Typical of amphibians, wetland habitats are required for reproduction. Western spadefoot toad eggs and larvae have been observed in a variety of permanent and temporary wetlands including rivers, creeks, pools in intermittent streams, vernal pools, and temporary rain pools (CDFG 2000). This indicates a degree of ecological plasticity. However, it appears that vernal pools and other temporary wetlands may be more optimal for breeding due to the absence of or at least reduced abundance of both native and non-native predators, many of which require more permanent wetlands.

Western spadefoot toads also have exhibited a capacity to breed in altered wetlands as well as man-made wetlands. Spadefoot toads, including eggs and larvae, have been observed in vernal pools that have been disturbed by activities such as earthmoving, disking, intensive livestock use, and off-road vehicle use. Spadefoot toads, again including eggs and larvae, also have been observed in artificial ponds, livestock ponds, sedimentation and flood control ponds, irrigation and roadside ditches, roadside puddles, tire ruts, and borrow pits (Fisher and Shaffer 1996, CDFG 2000). This again exhibits a degree of ecological plasticity and adaptability. However, although western spadefoot toads have been observed to inhabit and breed in wetlands altered or created by man, survival and reproductive success in these pools have not been evaluated relative to that in unaltered natural pools.

Reproductive ecology

Western spadefoot toads breed from January to May in temporary pools that form following winter or spring rains. Water temperatures in these pools must be between 9 and 30˚C for western spadefoot toads to reproduce (Brown 1966, 1967). During breeding, highly vocal aggregations of more than 1,000 individuals may form (Jennings and Hayes 1994). Breeding calls are audible at great distances, which serves to bring individuals together at suitable breeding sites (Stebbins 1985).

Females deposit their eggs in numerous small irregularly cylindrical clusters of ten to 42 eggs (average = 24) (Storer 1925) and may lay more than 500 eggs in one season (Stebbins 1951). Eggs are deposited on plant stems or pieces of detritus in temporary rain pools, or sometimes

pools in ephemeral stream courses (Storer 1925, Stebbins 1985). Oviposition does not occur until water temperatures reach the required minimum of 9˚C (Jennings and Hayes 1994). Depending on the temperature regime and annual rainfall, oviposition may occur between late February and late May (Storer 1925, Burgess 1950, Feaver 1971, Stebbins 1985).

Depending on temperature, western spadefoot toad eggs hatch in 0.6-6 days (Brown 1967). At relatively high water temperatures (e.g., 21ºC), Storer (1925) noted that about half of the western spadefoot toad eggs had failed to develop, possibly due to a fungus that thrives in warmer water and invades toad eggs. Larval development can be completed in three to 11 weeks (Burgess 1950, Feaver 1971), depending on food resources and temperature. In eight vernal pools examined by Morey (1998), the average duration to complete larval development (hatching to metamorphosis) was 58 days (range 30-79 days). Longer periods of larval development were associated with larger size at metamorphosis. Larval development must be completed before pools dry. Morey (1998) stated that vernal pools must persist for at least five weeks for western spadefoot toads to successfully breed. Pools that persist for longer periods permit longer larval development resulting in larger juveniles with great fat reserves at metamorphosis (Morey 1998), and these larger individuals have a higher fitness level and survivorship (Pfennig 1992). Recently metamorphosed juveniles emerge from water and seek refuge in the immediate vicinity of natal ponds. They spend several hours to several days near ponds before dispersing. Weintraub (1979) reported that toadlets of plains spadefoot toads seek refuge in drying mud cracks, under boards, and under other surface objects including decomposing cow manure. Annual reproductive success probably varies with precipitation levels, success being lower in drier years (Fisher and Shaffer 1996). Metamorphosing larvae may leave the water while their tails are still relatively long (greater than 1 cm) (Storer 1925). Age at sexual maturity is unknown, but considering the relatively long period of subterranean dormancy (eight to nine months), individuals may require at least two years to mature (Jennings and Hayes 1994).

Movements and Habitat Use

Western spadefoot toads are almost completely terrestrial and enter water only to breed (Dimmitt and Ruibal 1980). However, typical of amphibians, toads require a certain level of moisture to avoid dessication, which can be a challenge in the arid habitats occupied by spadefoot toads. Spadefoot toads have behavioral and physiological adaptations that facilitate moisture retention.

During dry periods, spadefoot toads construct and occupy burrows that may be up to 0.9 m (3 ft.) in depth (Ruibal *et al*. 1969). Toads may remain in these burrows for 9-10 months. While in these burrows, they are completely surrounded by soil and appear to enter a state of torpor. Typical of amphibians, spadefoot toads have very permeable skin, which allows them to absorb moisture from the surrounding soil. Spadefoot toads may retain urea to increase the osmotic pressure within their bodies. This prevents water loss to the surrounding soil and even facilitates water absorption from soils with relatively high moisture tensions (Ruibal *et al*. 1969, Shoemaker *et al*. 1969). Spadefoot toads appear to construct burrows in soils that are relatively sandy and friable, as these soil attributes facilitate both digging and water absorption (Ruibal *et al*. 1969).

Spadefoot toads emerge from burrows to forage and breed following rains in the winter and spring. The factors that stimulate emergence are not well understood. In Arizona, spadefoot toads emerged after as little as 0.25 cm of precipitation, which barely wet the soil surface and obviously did not soak down to burrows (Ruibal *et al*. 1969). Sound or vibration from rain striking the ground appears to be the primary emergence cue used by spadefoot toads, and even the vibrations of a motor can cause toads to emerge (Dimmitt and Ruibal 1980). Spadefoot toads may move closer to the surface prior to precipitation and may even emerge to forage on nights with adequate humidity.

Above-ground activity is primarily nocturnal, presumably to reduce water loss. Even when exposed to artificial light, spadefoot toads will immediately move away or begin burrowing underground (Storer 1925, Ruibal *et al*. 1969). During the day, toads dig and occupy relatively shallow burrows 2-5 cm in depth (Ruibal *et al*. 1969) and may even use small mammal burrows. In addition to breeding during periods of above-ground activity, spadefoot toads must acquire sufficient energy resources prior to reentering dormancy (Seymour 1973).

Reasons for Decline and Threats to Survival

The principal factors contributing to the decline of the western spadefoot toad are loss of habitat due to urban development and conversion of native habitats to agricultural lands, the introduction of non-native predators, and stochastic events that particularly impact small, isolated populations (e.g., Morey 1998). The species likely suffered dramatic reductions in the mid to late 1900s when urban and agricultural development was rapidly destroying natural habitats in the Central Valley and southern California (Jennings and Hayes 1994). According to Jennings and Hayes (1994), over 80 percent of the habitat once known to be occupied by the western spadefoot in southern California (from the Santa Clara River Valley in Los Angeles and Ventura counties southward) has been developed or converted to uses that are incompatible with successful reproduction and recruitment. In northern and central California, loss of habitat has been less severe, but nevertheless significant; it is estimated that over 30 percent of the habitat once occupied by western spadefoot toads has been developed or converted (Jennings and Hayes 1994). Regions that have been severely affected include the lower two-thirds of the Salinas River system and much of the areas east of Sacramento, Fresno, and Bakersfield. Many of the remaining suitable rainpool or vernal habitats, which are concentrated on valley terraces along the edges of the Central Valley floor, have disappeared or been fragmented (Jennings and Hayes 1994).

Another reason for decline in the population of western spadefoot toads is the introduction of non-native predators, specifically bullfrogs, crayfish, and fish (Hayes and Warner 1985, Hayes and Jennings 1986, Fisher and Shaffer 1996). All of these were introduced into California in the late 1800s and early 1900s, and through range expansions, additional introductions, and transplants, have become established throughout most of the state. Fisher and Shaffer (1996) reported an inverse relationship between the presence of western spadefoot toads and that of non-native predators. They further reported that non-native predators may have displaced western spadefoot toads at lower elevations resulting in the toads being found primarily at higher

elevation sites where these predators apparently are less abundant.

Habitat loss and fragmentation results in populations that are small in size and increasingly isolated. This reduces movements by individuals and genetic exchange between populations. Small populations are more likely to go extinct due to catastrophic or stochastic events. Isolation reduces the potential for recolonization of areas where toads have disappeared. This results in lower overall abundance and population viability.

Fisher and Shaffer (1996) also discussed the possible role of ultraviolet radiation in the declines of native amphibians in the Central Valley. However, they concluded that there is no evidence that ultraviolet radiation is a significant factor in amphibian declines at this time.

Habitat loss and fragmentation remain significant threats to the vernal pool ecosystems that support western spadefoot toads (Service 1994*a*). This loss is a result of urban, industrial, and agricultural development. Many remaining vernal pools and wetlands are suffering from habitat degradation resulting from disking, intensive livestock grazing and trampling, off-road vehicle use, and contaminant runoff. In addition to contaminant problems, run-off from adjacent developed areas also could change hydrologic regimes by converting temporary pools to more permanent wetlands. This increases the likelihood of invasion and colonization by non-native predators.

The continued presence and proliferation of non-native predators is a significant threat to western spadefoot toads. Western spadefoot toads have evolved with natural predators such as snakes and wading birds. Non-native species may increase predation pressure beyond natural levels, thereby causing western spadefoot toads to decline in abundance.

Fisher and Shaffer (1996) assessed native amphibian populations in the Coast Ranges, Sierra foothills, and Central Valley. They predicted that widespread declines of western spadefoot toads will occur if non-native species continue to spread into low-elevation Coast Range habitats. However, in the San Joaquin Valley, they found that although there were relatively few introduced exotics, native amphibians have still declined significantly. The San Joaquin Valley is intensively farmed and has been subject to extensive habitat loss, degradation, and fragmentation (Service 1998). Adverse impacts from these activities as well as isolation from other western spadefoot toad populations may have caused the observed declines.

Another threat to western spadefoot toads is roads. This threat likely will increase in significance as new roads are built and existing roads are expanded. Roads can result in direct mortality, habitat loss and fragmentation, disturbance, and contaminants, as well as inducing urban growth. Mortality on roads could particularly be a problem during dispersal when toads are more likely to encounter roads. Morey and Guinn (1992) reported road mortality among spadefoot toads in San Joaquin County, and Jennings (1998) reported road mortality at all seven sites that he surveyed in Kings and Alameda Counties. Three CNDDB (2000) occurrences report observations of western spadefoot toads killed by vehicles in San Joaquin, San Luis Obispo, and Santa Barbara Counties. The impact of road mortality on populations of western

spadefoot toads is unknown. Roads can be a barrier to movements and effectively isolate populations. Roads were found to be significant barriers to gene flow among common frogs (*Rana temporaria*) in Germany and this has resulted in genetic differentiation among populations separated by roads (Reh and Seitz 1990). Contaminants from road materials, leaks, and spills also could adversely impact toads by contaminating the water in wetlands.

Activities that produce low frequency noise and vibration in or near habitat for western spadefoot toads may be detrimental to the species. Dimmitt and Ruibal (1980) determined that spadefoot toads were extremely sensitive to such stimuli; toads were caused to break dormancy and emerge from their burrows. Disturbances that cause spadefoot toads to emerge at inappropriate times could result in detrimental effects such as mortality or reduced productivity.

A less-visible but equally important threat to smaller populations of western spadefoot toads is the decrease in vigor and viability sometimes observed in small populations of animals. Small, isolated populations have an increased risk of detrimental effects from stochastic genetic and demographic changes. One such impact is inbreeding, which can result in an increase in incidence of birth defects, slower growth, higher mortality, and lower fecundity.

Status with Respect to Recovery

Vernal pools and other wetlands now are recognized as both sensitive and ecologically important, and efforts are being made to conserve these habitats. A number of sites with suitable habitat for western spadefoot toads already are being protected in national wildlife refuges, state parks, state ecological reserves, private preserves, habitat mitigation banks, and conservation easements. Additionally, 23 vernal pool species are now Federally protected including 18 plants and five animals. This will result in habitat conservation and management efforts that will contribute to the conservation of western spadefoot toads.

Status within the Action Area and Environmental Baseline

The western spadefoot toad has not been reported from within the proposed action's action area or Sutter County (CNDDB 2002). Five occurrences have been reported from eastern Sacramento County; the closest reported occurrence in Sacramento County is approximately 15 miles from the Basin. The closest overall spadefoot occurrence to the Basin is from Placer County and is approximately six miles from the Basin.

Potential toad habitat of approximately 21.3 acres occurs in the vernal pools on the east side of the Basin, in 886 acres of grasslands primarily north of Del Paso Road. This estimate of vernal pool acreage is based upon assessments of the amount of vernal pool habitat in grasslands in Sacramento County and probably greatly overestimates the actual amount of vernal pool habitat in the Basin (K. Fuller, pers. comm.). Additional potential habitat occurs in 96 acres of other ponds and seasonally wet areas in the Basin. Once again, this estimate greatly overestimates the amount of potential vernal pool habitat in the Basin, as most of the ponds and seasonally wet areas do not have the hydrology sufficient to support the toad. No potential toad habitat is

located within 76 m (250 ft.) of any of MAP's proposed action activities. Based upon the toad's limited distribution and distance form the Basin, it is very unlikely that the toad would be found in the Basin (K. Fuller, pers. comm. to C. Aubrey 2003).

California Tiger Salamander

In 1994, the Service issued a 12-month warranted but precluded finding for the California tiger salamander (59 **FR** 18353). Subsequently, the Service issued its final rule listing the Santa Barbara County distinct population segment of the species as endangered (65 **FR** 57242). The Sonoma County distinct population segment of the California tiger salamander was listed as endangered on an emergency basis under the Act on July 22, 2002 (67 **FR** 47726). The California tiger salamander throughout the remainder of its range, including Fresno County, is a Federal candidate species. The Service proposed to list the Central California Distinct Population Segment of the California Tiger Salamander as threatened and reclassify the Sonoma County and Santa Barbara County Distinct Populations of the salamander from endangered to threatened on May 23, 2003 (68 **FR** 28647). The State considers the California tiger salamander a Species of Special Concern.

Description

The California tiger salamander is a large, stocky, terrestrial salamander with a broad, rounded snout. Adults may reach a total length of 207 mm (8.2 in). California tiger salamanders exhibit sexual dimorphism; males tend to be larger than females. Coloration of the California tiger salamander is white or yellowish markings against black. As adults, California tiger salamanders tend to have the creamy yellow to white spotting on the sides with much less on the top, whereas other tiger salamanders have brighter yellow spotting with more on the top.

Historic Range

Historically, the California tiger salamander inhabited low elevation grassland and oak savanna plant communities of the Central Valley, adjacent foothills, and the inner coast ranges in California (Storer 1925, Shaffer *et al.* 1993) from sea level up to about 460 m (1500 ft). Along the coast ranges, the species occurred from the Santa Rosa area of Sonoma County south to the vicinity of Buellton in Santa Barbara County. In the Central Valley and surrounding foothills, the species occurred from northern Yolo County southward to northwestern Kern County and northern Tulare County. Today, the species is found in grasslands and oak savannah in the Sierra Nevada foothills, Central Valley, Bay Area, and the coast ranges in central California. Populations in areas such as Santa Barbara County and Sonoma County are now considered endangered.

Essential Habitat Components

California tiger salamanders require both wetland and adjacent upland habitat to complete their life cycle (Shaffer *et al.* 1993). Subadult and adult California tiger salamanders spend the dry

summer and fall months of the year aestivating (a state of dormancy or inactivity in response to hot, dry weather) in the burrows of small mammals, such as California ground squirrels (*Spermophilus beecheyi*) and Botta's pocket gopher (*Thomomys bottae*) (Storer 1925; Loredo and van Vuren 1996; 1998; Trenham 1998a). During estivation, California tiger salamanders eat very little (Shaffer *et al.* 1993). Once fall or winter rains begin, they emerge from the upland sites on rainy nights to feed and to migrate to the breeding ponds (Stebbins 1985, 1989; Shaffer *et al.* 1993). Historically, the California tiger salamander utilized vernal pools, but it also currently breeds in stockponds. Occurrence of California tiger salamanders is significantly associated with occurrence of ground squirrels (Seymour and Westphal 1994). Active ground burrowing rodent colonies probably are required to sustain California tiger salamanders because inactive burrow systems become progressively unsuitable over time. Loredo *et al.* (1996) found that ground squirrel burrow systems collapsed within 18 months following abandonment by or loss of the mammals; although California tiger salamanders used both occupied and unoccupied burrows, they apparently did not use collapsed burrows. California tiger salamanders cannot persist without upland habitat.

Reproductive Ecology, Life History

Adult California tiger salamanders may migrate up to 2 km (1.2 mi) from their upland sites to the breeding ponds (S. Sweet, University of California, Santa Barbara, *in litt*. 1998), which may be vernal pools, stockponds, or other seasonal water bodies. The distance between the upland sites and breeding pools depends on local topography and vegetation, and the distribution of ground squirrel or other rodent burrows (Stebbins 1989). Males migrate before females (Twitty 1941; Shaffer *et al.* 1993; Loredo and Van Vuren 1996; Trenham 1998b). Males usually remain in the ponds for an average of about six to eight weeks, while females stay for approximately one to two weeks. In dry years, both sexes may stay for shorter periods (Loredo and van Vuren 1996; Trenham 1998b). Marked salamanders have been recaptured at the pond where they were initially captured; in one study, approximately 80 percent were recaptured at the same pond (Trenham 1998b). The rate of natural movement of salamanders among breeding sites depends on the distance between the ponds or complexes of ponds and on the intervening habitat (e.g., salamanders may move more quickly through sparsely covered and more open grassland than densely vegetated lands)(Trenham 1998a). As with migration distances, the number of ponds used by an individual over its lifetime will be dependent on landscape features and environmental factors.

Adult salamanders mate in the breeding ponds, after which the females lay their eggs in the water (Twitty 1941; Shaffer *et al.* 1993; Petranka 1998). Females attach their eggs singly, or in rare circumstances, in groups of two to four, to twigs, grass stems, vegetation, or debris (Storer 1925, Twitty 1941). In ponds with no or limited vegetation, they may be attached to objects, such as rocks and boards on the bottom (Jennings and Hayes 1994). After breeding, adults leave the pool and return to the small mammal burrows (Loredo *et al.* 1996; Trenham 1998a), although they may continue to come out nightly for approximately the next two weeks to feed (Shaffer *et al.* 1993). In drought years, the seasonal pools may not form and the adults can not breed (Barry and Shaffer 1994).

Salamander eggs hatch in ten to 14 days with newly hatched salamanders (larvae) ranging from 11.5 to 14.2 mm (0.45 to 0.56 in) in total length (Petranka 1998). The larvae are aquatic. They are yellowish gray in color and have broad fat heads, possess large, feathery external gills, and broad dorsal fins that extend well onto their back. The larvae feed on zooplankton, small crustaceans, and aquatic insects for about six weeks after hatching, after which they switch to larger prey (J. Anderson 1968). Larger larvae have been known to consume smaller tadpoles of Pacific treefrogs (*Pseudacris regilla*) and California red-legged frogs (*Rana aurora*) (J. Anderson 1968; P. Anderson 1968). The larvae are among the top aquatic predators in the seasonal pool ecosystems. They often rest on the bottom in shallow water, but also may be found at different layers in the water column in deeper water. The young salamanders are wary and when approached by potential predators, will dart into vegetation on the bottom of the pool (Storer 1925).

The larval stage of the California tiger salamander usually last three to six months, as most seasonal ponds and pools dry up during the summer (Petranka 1998). Amphibian larvae must grow to a critical minimum body size before they can metamorphose (change into a different physical form) to the terrestrial stage (Wilbur and Collins 1973). Individuals collected near Stockton in the Central Valley during April varied from 47 to 58 mm (1.88 to 2.32 in) in length (Storer 1925). Feaver (1971) found that larvae metamorphosed and left the breeding pools 60 to 94 days after the eggs had been laid, with larvae developing faster in smaller, more rapidly drying pools. The longer the ponding duration, the larger the larvae and metamorphosed juveniles are able to grow, and the more likely they are to survive and reproduce (Pechmann *et al.* 1989; Semlitsch *et al.* 1988; Morey 1998; Trenham 1998b). The larvae will perish if a site dries before metamorphosis is complete (P. Anderson 1968, Feaver 1971). Pechmann *et al.* (1988) found a strong positive correlation with ponding duration and total number of metamorphosing juveniles in five salamander species. In Madera County, Feaver (1971) found that only 11 of 30 pools sampled supported larval California tiger salamanders, and 5 of these dried before metamorphosis could occur. Therefore, out of the original 30 pools, only six (20 percent) provided suitable conditions for successful reproduction that year. Size at metamorphosis is positively correlated with stored body fat and survival of juvenile amphibians, and negatively correlated with age at first reproduction (Semlitsch *et al.* 1988; Scott 1994; Morey 1998)

In the late spring or early summer, before the pools dry completely, metamorphosed juveniles leave their pools and settle in small mammal burrows at the end of their nightly movements (Zeiner *et al.* 1988; Shaffer *et al.* 1993; Loredo *et al.* 1996). Like the adults, juveniles may emerge from these retreats to feed during nights of high relative humidity (Storer 1925; Shaffer *et al.* 1993) before settling in their selected upland sites for the dry, hot summer months. Juveniles have been observed to migrate up to 1.6 km (1 mi) from breeding pools to upland areas (Austin and Shaffer 1992). An estimated 83 percent of the salamanders rely on rodent burrows for shelter (Petranka 1998). Mortality of juveniles during their first summer exceeds 50 percent (Trenham 1998b). Unseasonable emergence from uplands in hot dry weather occasionally results in mass mortality of juveniles (Holland *et al.* 1990). Juveniles do not typically return to the breeding pools until they reach sexual maturity at several years of age (Trenham 1998b; L. Hunt, *in litt*. 1998). Trenham (1998b) estimated survival from metamorphosis to maturity at his study site at less than five percent (well below an estimated replacement level of 18 percent). Adult survivorship varies greatly between years, but is a crucial determinant of whether a population is a source or sink (i.e., whether net productivity exceeds the level necessary to maintain the population).

Lifetime reproductive success for California and other tiger salamanders is low. Trenham *et al.* (2000) found the average female bred 1.4 times and produced 8.5 young that survived to metamorphosis per reproductive effort. This resulted in roughly 11 metamorphic offspring over the lifetime of a female. Two reasons for the low reproductive success are the preliminary data suggest that most individuals of the California tiger salamanders require two years to become sexually mature, but some individuals may be slower to mature (Shaffer *et al.* 1993); and some animals do not breed until they are four to six years old. While individuals may survive for more than ten years, many breed only once, and in some populations, less than 5 percent of marked juveniles survive to become breeding adults (Trenham 1998b). With such low recruitment, isolated populations are susceptible to unusual, randomly occurring natural events as well as from human caused factors that reduce breeding success and individual survival. Factors that repeatedly lower breeding success in isolated pools can quickly extirpate a population.

Reasons for Decline and Threats to Survival

California tiger salamanders are imperiled by a variety of human activities. Current factors associated with declining populations of the salamander include continued degradation and loss of habitat due to agriculture and urbanization, non-native plants, hybridization with non-native tiger salamanders, and introduced predators. Fragmentation of existing habitat and the continued colonization of existing habitat by non-native tiger salamanders may represent the most significant current threats to California tiger salamanders, although populations are likely threatened by more than one factor. Isolation and fragmentation of habitats within many watersheds have precluded dispersal between sub-populations and jeopardized the viability of metapopulations (broadly defined as multiple subpopulations that occasionally exchange individuals through dispersal, and are capable of colonizing or “rescuing” extinct habitat patches).

Although no systematic, range-wide studies have been conducted, it is known that significant

numbers of California tiger salamanders are killed by vehicular traffic while crossing roads (Hansen and Tremper 1993; S. Sweet, *in litt*. 1993). For example, during a 1-hour period on a road bordering Lake Lagunita on the Stanford University campus, 45 California tiger salamanders were collected, 28 of which had been killed by cars (Twitty 1941). More recently, during one 15-day period in 2001 at a Sonoma County location, 26 road-killed California tiger salamanders were found (D. Cook, pers. comm. 2002). Overall breeding population losses of California tiger salamanders due to road kills have been estimated to be between 25 and 72 percent (Twitty 1941; S. Sweet *in litt*. 1993; Launer and Fee *in litt*. 1996). Mortality may be increased by associated roadway curbs and berms as low as nine to 12 cm (3.5 to 5 in), which allow California tiger salamanders access to roadways but prevent their exit from them (Launer and Fee 1996; S. Sweet *in litt*. 1998).

In a recent study along a 1.05 km (0.7 mi) high-vehicular-use (21,450 vehicles per day) section of the Trans-Canadian Highway in Alberta, Canada, Clevenger *et al.* (2001) recorded 183 road-killed tiger salamanders (*Ambystoma tigrinum*) in 30 days and concluded it was likely that very little of the local population had survived. In California, vehicular-use levels along various State, interstate, and secondary roads commonly far exceed the level of use reported in the Alberta study. Vehicular usage on California roads is also increasing rapidly and directly with human population and urban expansion. During November 2002, California's estimated total vehicular travel on State highway system roads alone was 23 billion km (14.27 billion mi)(this figure and subsequent vehicular-use data from California Department of Transportation's Internet website, January 2, 2003). From 1972 to 2001, State highway system total vehicular usage rose steadily from 108.6 km to 270 km (67.11 to 167.81 billion mi) annually. For the 23 California counties in which the California tiger salamander may occur, State highway system total annual vehicular usage in 1999, 2000, and 2001 was 53.27, 55.85, and 57.21 billion miles (86, 90, and 92.1 billion km), respectively. The steady increase of vehicular use is thus continuing. We believe such figures illustrate (1) the general growth in vehicular usage that has been, and is still, occurring in many parts of the California tiger salamander's range, and (2) that additional increments of road-kill losses, which are already a potentially serious problem for the species, are likely occurring.

The most overwhelming threat to the California tiger salamander is from continuing habitat destruction, degradation, and fragmentation. Secondary threats exist from predation and competition from introduced exotic species; possible commercial overutilization; disease; hybridization with non-native salamanders; various chemical contaminants; road-crossing mortality; and certain unrestrictive mosquito and rodent control operations. The various primary and secondary threats are not currently being offset by existing Federal, State, or local regulatory mechanisms. The California tiger salamander also is vulnerable to chance environmental or demographic events, to which small populations are particularly vulnerable. The combination of its biology and specific habitat requirements makes the animal highly susceptible to random events, such as drought, disease, and other occurrences.

Environmental Baseline, Status within the Action Area

The proposed action is closest to the Central Valley population of the California tiger salamander. This population occupies Yolo County, Solano, Sacramento County south of the Cosumnes River, northeastern Contra Costa County, eastern San Joaquin County, western Amador County, western Calaveras County, western Tuolumne County, eastern Stanislaus County, Merced, western Mariposa County, and northwestern Madera County. Six percent (42) of the known California tiger salamander localities are in this population (CNDDB 2002). Ten localities in Calaveras, Contra Costa, Madera, Merced, Sacramento, Solano, Stanislaus, and Yolo counties are considered extirpated (CNDDB 2002). The species historically occurred as far north as Butte County, but has not recently been documented north of the Cosumnes River. The remaining sites inhabited by the California tiger salamander occur in the low elevation foothills on the eastern side of the Central Valley (Shaffer *et al.* 1993). Urban development and agriculture have eliminated much of the grassland and vernal pools. From 1996 to 1998, 14361 ha (35487 ac) of native habitat were converted to urban and agricultural uses in Yolo, Solano, Contra Costa, Stanislaus, Merced, Sacramento, San Joaquin, Stanislaus, Merced, and Madera counties. There are 361,761 acres of habitat for the California tiger salamander in the Central Valley.

Of 127 California tiger salamander localities where wetland type was identified, 26 percent (33) were in vernal pools. The Central Valley population of California tiger salamanders occurs within the Southeastern Sacramento Valley and Southern Sierra Foothills Vernal Pool Regions (Keeler-Wolf 1998). Vernal pools in both regions are threatened by conversion of grasslands and grazing land to housing developments and intensive agriculture.

California tiger salamander localities in the Central Valley population may be affected by proposed or recently implemented development projects, including a vineyard (Borden Ranch, Launa Creek Partnership), housing developments (Mueller Ranch, Liberty Hills Community), and highway construction (Oakdale Bypass). These development projects would destroy upland estivation habitat and wetland breeding habitat, thereby killing salamanders and reducing the viability of subpopulations at the affected localities. Vineyards planted in areas such as Borden Ranch along the San Joaquin-Sacramento County line have degraded and destroyed habitat for California tiger salamanders (Service files). The now-closed Rancho Seco nuclear power plant site in southeast Sacramento County has been converted to a public park, which could degrade or eliminate potential habitat for the nearby California tiger salamander subpopulation.

In Yolo and Solano counties, the major impacts to California tiger salamander populations have been agricultural. Portions of the California tiger salamander subpopulation at Jepson Prairie in Solano County is protected by the University of California Natural Reserve System and the Solano Land Trust. However, some estivation habitat may have been disrupted by construction of a PG&E natural gas pipeline in the vicinity of the reserve. California tiger salamanders also were found at the proposed Calpine power plants near Jepson Prairie. Vernal pool and upland habitat at this site was partially disced and planted to winter wheat in 1992, potentially killing salamanders and reducing the viability of the habitat (C. Nagano, Service, pers. obs).

In Stanislaus County, California tiger salamanders were considered extirpated until they were found by biologists surveying a potential route for the Oakdale Bypass near Oakdale (California Department of Transportation 2001). This route threatens the only known population of California tiger salamanders in the Oakdale area.

A total of 671 California tiger salamander species occurrence have been recorded in California (CNDDB 2002). Of these, eight occurrence have been recorded in Sacramento County. No salamanders have been recorded in either Sutter County generally or within the proposed action's action area. The closest salamander record is from Yolo County and is approximately 12 miles from the Basin. However, this location is considered extirpated. The closest extant occurrence is from Yolo County, approximately 20 miles west of the Basin.

Legenere

The Service classifies legenere as a Species of Concern. The species has no special state status. It has been included on California Native Plant Society lists of rare and endangered species for 25 years (Powell 1974) and is currently on List 1B because it is "endangered throughout its range" (Skinner and Pavlik 1994).

Description

Legenere is an inconspicuous annual. The entire plant is hairless. The main stems are 10 to 30 cm (3.9 to 11.8 in.) long and decumbent, although many branches are erect. Extra roots often arise from the lower nodes. The leaves, which are produced underwater, are 1 to 3 cm (0.4 to 1.2 in.) long and narrowly triangular; they fall off the plant before flowers appear. The egg-shaped or oval bracts are 6 to 12 mm (0.24 to 0.47 in.) long and remain throughout the flowering period. A single flower arises above each bract. Legenere flowers may or may not have corollas, and a single plant can produce both types of flowers. When present, the corollas are white or yellowish, 3.5 to 4 mm (0.14 to 0.16 in.) long, and two-lipped. The upper two corolla lobes are narrower than the lower three, and the corolla tube is slit on the upper side. The stamens are joined to form a tubular structure. The flower stalks are very slender and elongate as the fruit matures, reaching a final length of as much as 3 cm (1.2 in.). Legenere has a cylindrical capsule 6 to 10 mm (0.24 to 0.39 in.) long, which splits open only at the tip. Each capsule contains up to 20 seeds, which are approximately 1 mm (0.04 in.) long, brown, smooth, and shiny (McVaugh 1943, Mason 1957, Abrams and Ferris 1960, Holland 1984, Morin 1993). The chromosome number of legenere has not been determined.

The genera most likely to be confused with legenere are *Howellia, Downingia*, *Lobelia,* and *Porterella*. Both *Howellia* and *Downingia* have capsules that split along the sides, whereas legenere's capsule opens at the tip. Moreover, *Downingia* flowers are not stalked. The *Lobelia* species in California have either red or blue flowers and spherical fruits, as opposed to the whitish flowers and cylindrical fruits of legenere. *Porterella* has showy blue flowers with yellow or white marks at the base of the corolla lobes, and it occurs at higher elevations than legenere (Morin and Niehaus 1977, Holland 1984, Morin 1993).

Historical and Current Range

Between 1890 and 1984, legenere had been reported from 12 sites in eight counties encompassing six vernal pool regions. The historical counties of occurrence were Solano (three sites, including the type locality), Lake and Sacramento (two sites each), and Napa, Placer, San Mateo, Sonoma, and Stanislaus counties (one site each) (Hoover 1937, Mason 1957, Rubtzoff and Heckard 1975, Holland 1984). These sites were located in the Central Coast, Lake-Napa, Santa Rosa, Solano-Colusa, Southeastern Sacramento Valley, and Southern Sierra Foothills vernal pool regions (Keeler-Wolf *et al*. 1998). As of 1984, the only three populations believed to remain extant were in Napa, Placer, and Sacramento counties (Holland 1984).

Since 1984, legenere has been rediscovered at several historical sites and has been found at numerous new locations. During that time, the type locality and six other occurrences have been extirpated. Among the 42 occurrences presumed to be extant, 20 are in Sacramento County, including nine in the vicinity of Elk Grove and six in the vicinity of the former Mather Air Force Base. Another area of concentration, with ten extant occurrences, is near Dozier in Solano County. Other counties where this species is presumed to remain are Lake, Napa, Placer, San Joaquin, San Mateo, Shasta, and Tehama (Skinner and Pavlik 1994, CNDDB 2000).

The vernal pool regions (Keeler-Wolf *et al*. 1998) where legenere remains extant are Lake-Napa, Northeastern Sacramento Valley, Northwestern Sacramento Valley, Santa Rosa, Solano-Colusa, and Southeastern Sacramento Valley. It has been extirpated from the Southern Sierra Foothills Vernal Pool Region. The Central Coast Vernal Pool Region occurrence in San Mateo County has not been rediscovered since 1906 but is presumed to be extant because suitable habitat remains in the area (CNDDB 2000).

Reproductive Ecology and Demography

Legenere seeds germinate between late February and April. The specific conditions necessary for seed germination are unknown. The plants grow through the standing water; as the water evaporates or recedes, legenere stems may collapse onto the lake bottom or become caught on taller, stronger plants (Holland 1984). Legenere flowers during April, May, or June (Morin and Niehaus 1977, Holland 1984, Skinner and Pavlik 1994). Pollination in legenere has not been studied, but the small, inconspicuous flowers suggest that it may be self-pollinated (Holland 1984). By late June, each plant typically produces six to ten capsules containing several hundred seeds each. Seed dispersal agents are unknown but may include gravity, water, and waterfowl. Most populations contain densities of less than one plant per square meter (10.8 $ft.^2$) (Holland 1984). Legenere is even more variable than are other vernal pool annuals; entire populations have disappeared for decades, then reappeared (Holland 1984, CNDDB 2000). Thus, a persistent soil seed bank most likely exists. Survival rates and other aspects of demography have not been investigated.

Habitat and Community Associations

Legenere grows in a variety of habitats including vernal pools, vernal marshes, artificial ponds, and floodplains of intermittent streams. Occupied vernal pool types include Northern Basalt Flow, Northern Claypan, Northern Hardpan, Northern Volcanic Ashflow, and Northern Volcanic Mudflow (Sawyer and Keeler-Wolf 1995). The surrounding plant community may be grassland,

open woodland, or hardwood forest containing oaks (*Quercus* spp.) or California buckeye (*Aesculus californica*). At one site, legenere grows in both a vernal pool and the adjacent grassland (CNDDB 2000). The vernal pools and lakes supporting legenere vary in size from approximately 4 m^2 (43 $ft.^2$) to 41 hectares (100 acres) (Holland 1984, CNDDB 2000). When it occurs in large pools and vernal lakes, legenere grows only in the shallower areas (less than 20 cm [8 in.] deep) (Holland 1984). Substrates in occupied areas may have been deposited by streams or volcanic flows. Soils underlying the pools themselves typically are shallow, acidic clays with few stones (Holland 1984). Legenere has been reported from elevations ranging from 3 m (10 ft.) in Solano County to 884 m (2,900 ft.) in Lake County (CNDDB 2000).

Legenere occurs most often with smooth goldfields and pale spikerush, and to a lesser extent with Boggs Lake hedge-hyssop and dwarf downingia (CNDDB 2000 and unprocessed data).

Reasons for Decline and Threats to Survival

Of the four occurrences of legenere known to be extirpated, two were destroyed by conversion to agriculture, one by changes in hydrology, and one by urban development (Holland 1984, CNDDB 2000). Several sites where the species still occurs have been degraded by discing or other agricultural practices, inappropriate livestock grazing, dirt biking, and trash dumping (CNDDB 2000). The San Mateo County site has been subjected to logging and hydrological changes; legenere has not been observed there in over 90 years (Holland 1984). Legenere occurred at Boggs Lake in the 1950's but has not been seen there since (Rubtzoff and Heckard 1975, Holland 1984, CNDDB 2000), even though suitable habitat remains.

Approximately one-third of the extant occurrences of legenere are in areas slated for commercial or residential development (Holland 1984, CNDDB 2000). In fact, some of the populations extant in 1983 already may have been destroyed by development, but they have not been visited since that time. More than one-third of populations are subject to livestock grazing (CNDDB 2000), but few appear to be declining. Holland (1984) indicated that “light” grazing during the winter and early spring did not seem to be detrimental to legenere. Competition from lippia (*Lippia* spp.) is a threat at one Solano County site (CNDDB 2000).

Status with Respect to Recovery

Holland (1984) conducted a status survey of legenere in 1983 with funding from the County of Sacramento, R.C. Fuller Associates, and The Nature Conservancy. He confirmed that several historical populations no longer persisted. New populations of this species were discovered during pre-project surveys and during searches by The Nature Conservancy volunteers (Holland 1984, CNDDB 2000).

Sixteen occurrences of legenere are (or were) on nature preserves or publicly-owned lands. Five occurrences are known currently from the Jepson Prairie Preserve in Solano County, two from the nearby Calhoun Cut Ecological Reserve, and two from the Dales Lake Ecological Reserve. Legenere was known from Boggs Lake before the preserve was established, but it has not been rediscovered in that area for over 40 years (Holland 1984). Two occurrences, at Hog Lake and on the Stillwater Plains, are on property administered by the U.S. Bureau of Land Management. Sacramento County owns land supporting three occurrences of legenere; one is at a wastewater treatment plant, and the other two are in county parks. Finally, one occurrence is on land owned

by the Sacramento Municipal Utility District (CNDDB 2000). However, mere occurrence on public land is not a guarantee of protection. Only the preserves and the U.S. Bureau of Land Management occurrences are managed to promote the continued existence of legenere and other rare species. As of 1991, one Sacramento County developer had plans to preserve several pools containing legenere when he developed the property (CNDDB 2000).

Status within the Action Area and Environmental Baseline

A review of CNDDB (2002) revealed that legenere had been reported 57 times in California. Legenere has not been recorded from Sutter County or the Basin. However, it has been reported 20 times from Sacramento County. The closest reported Legenere occurrence to the Basin is approximately two miles away.

The Natomas Basin supports limited amounts of potential Legenere habitat. Potential legenere habitat of approximately 21.3 acres occurs in the vernal pools on the east side of the Basin, in 886 acres of grasslands primarily north of Del Paso Road. This estimate of vernal pool acreage is based upon assessments of the amount of vernal pool habitat in grasslands in Sacramento County and probably greatly overestimates the actual amount of vernal pool habitat in the Basin (K. Fuller, pers. comm.). Additional potential habitat occurs in 96 acres of other ponds and seasonally wet areas in the Basin. Once again, this estimate greatly overestimates the amount of potential vernal pool habitat in the Basin, as most of the ponds and seasonally wet areas do not have the hydrology sufficient to support legenere. No potential legenere habitat is located within 76 m (250 ft.) of any of MAP's proposed action activities.

Boggs Lake Hedge-Hyssop

Boggs Lake hedge-hyssop has no federal listing status. It was listed as endangered in California in 1978 (CDFG 1991) and is a candidate for listing in Oregon (Skinner and Pavlik 1994). It was included in the first California Native Plant Society list of rare and endangered plants (Powell 1974) and is now on List 1B (Tibor 2001). The U.S. Forest Service formerly considered Boggs Lake hedge-hyssop to be "sensitive" but has reclassified it as a "special interest plant" because it is more abundant than previously thought (Corbin in litt. 2000). The U.S. Bureau of Land Management classifies Boggs Lake hedge-hyssop as a "special status" species (Corbin *et al*. 1994).

Description

Boggs Lake hedge-hyssop is a an erect annual with hollow stems two to ten cm (0.8 to 3.9 in.) tall. The stems are mostly hairless, except for a few glandular hairs in the inflorescence. The leaves are opposite and have entire margins. Leaves near the base of the stem are 1 to 2 cm (0.4 to 0.8 in.) long and lance-shaped, but the leaves become shorter, wider, and blunt-tipped farther up on the stem. The 6 to 8 mm (0.23 to 0.31 in.) long flowers are borne singly in the upper leaf axils. Each corolla has two lips; the tube and upper lip are yellow, whereas the lower lip is white. However, the flowers appear yellow from a distance. The calyx is 4 to 6 mm (0.16 to 0.24 in.) long and has five sepals of differing lengths and shapes, giving rise to the specific epithet, heterosepala (meaning different sepals). The upper three sepals are united for approximately one-third of their length; the center sepal is longer than the others. The two lower sepals are separate and have notched tips, in contrast to the blunt tips of the upper sepals. The fruit of Boggs Lake

hedge-hyssop is a small, dry, pear-shaped capsule that is approximately the same length as the calyx. The tiny seeds are oblong and have narrow lengthwise ridges (Mason and Bacigalupi 1954, Mason 1957, Wetherwax 1993).

Boggs Lake hedge-hyssop is most similar to bractless hedge-hyssop (*G. ebracteata*). However, in bractless hedge-hyssop, the sepals are longer, pointed, and are separate almost all the way to their bases; all five corolla lobes are white; and the seeds have both lengthwise and crosswise ridges. The other California species, common American hedge-hyssop (*G. neglecta*), has bracts below the calyx, purplish corolla lobes, and a corolla at least twice as long as the calyx (Mason 1957, Wetherwax 1993).

Historical and Current Range

Boggs Lake hedge-hyssop was first collected in Lake County in 1923. The exact collection site is uncertain, but probably was Boggs Lake, where the species also was collected in 1929 and 1953 (Mason and Bacigalupi 1954). Another site was found in Madera County in 1961, then one in Sacramento County in 1977 (CNDDB 2000). During the 1980's, 20 additional occurrences were discovered in California, plus one in Lake County, Oregon (CDFG 1987). These additional California occurrences included nine in Shasta County; three each in Fresno, Placer, and Sacramento counties; and one each in Lake and Modoc counties (CNDDB 2000). Thus, the historical range included the Lake-Napa, Modoc Plateau, Southeastern Sacramento Valley, and Southern Sierra Foothills vernal pool regions (Keeler-Wolf *et al*. 1998).

Currently, Boggs Lake hedge-hyssop is known from 86 extant occurrences in California (CNDDB 2002) plus one in Oregon. Only one of the historical occurrences is believed to have been extirpated; it was in Sacramento County. In addition to the four vernal pool regions where it was known historically, Boggs Lake hedge-hyssop is now known from the Northeastern and Northwestern Sacramento Valley and the Solano-Colusa vernal pool regions (Keeler-Wolf *et al*. 1998). Additional counties of occurrence are Merced, San Joaquin, Solano, and Tehama (CNDDB 2000, Witham in litt. 2000).

Reproductive Ecology and Demography

Most of the life history information regarding Boggs Lake hedge-hyssop comes from an intensive study of the Oregon population by Kaye *et al*. (1990). California plants are morphologically similar to those in Oregon and grow in similar habitats; therefore, the life history of Boggs Lake hedge-hyssop is presumed to be similar in the two states.

The seeds of Boggs Lake hedge-hyssop most likely germinate in response to autumn or winter rains (Kaye *et al*. 1990, Corbin *et al*. 1994). By the time the water recedes the plants already are in bud or in flower; flowering can begin when as much as 5 cm (2.0 in.) of water remains (Kaye *et al*. 1990, Corbin *et al*. 1994). Throughout the range of the species flowers are open between April and August, with those at the highest elevations flowering later (Corbin *et al*. 1994). Each plant typically produces only one or two flowers (Kaye *et al*. 1990, Corbin *et al*. 1994), which mature into fruits within one to two weeks after flowering begins. The plants disappear quickly after seed-set (Corbin *et al*. 1994).

Kaye *et al*. (1990) determined that Boggs Lake hedge-hyssop is self-compatible and does not require insects for pollination. During their one-season study in Oregon, plants set equal amounts of seed whether or not insects were excluded. Moreover, insects were not observed visiting the flowers in natural settings (Kaye *et al*. 1990). The Oregon population averaged approximately 150 seeds per fruit, but the number of fruits per plant was not reported. The fruits showed no insect damage (Kaye *et al*. 1990). Seed dispersal agents are not known, and seed longevity in the soil has not been tested. However, seeds in one population on the Lassen National Forest (Shasta County) apparently remained dormant for three years, which was the interval between observations of growing plants (Corbin *et al*. 1994).

California populations of Boggs Lake hedge-hyssop range in size from only a few individuals to over one million (CNDDB 2000). As observed with other vernal pool annuals, population numbers fluctuate greatly from year to year (Corbin *et al*. 1994). The Boggs Lake population declined from 1,000 individuals in 1981 to zero in 1989 and remained at zero (Serpa 1993, CNDDB 2000) until 1997, when five plants were found (R. Bittman personal communication). The plants were widely scattered at Boggs Lake historically, with individuals growing isolated from each other (Mason and Bacigalupi 1954). At the one Vina Plains occurrence, the density of Boggs Lake hedge-hyssop was 67.4 plants per square meter (6.3 per square foot) in 1995 (Alexander and Schlising 1997).

Habitat and Community Associations

Boggs Lake hedge-hyssop occurs in vernal pools and in marshy areas on the margins of reservoirs and lakes, as well as in man-made habitats such as borrow pits and cattle ponds (Kaye *et al*. 1990, Corbin *et al*. 1994, CNDDB 2000). It has been found in several types of vernal pools, including Northern Basalt Flow, Northern Claypan, Northern Hardpan, Northern Volcanic Ashflow, and Northern Volcanic Mudflow (Sawyer and Keeler-Wolf 1995). Occupied wetlands are amongst annual grassland, oak woodland, juniper (*Juniperus* spp.) woodland, or conifer forest (CDFG 1987, Kaye *et al*. 1990, Corbin *et al*. 1994, CNDDB 2000).

Although Boggs Lake hedge-hyssop most often occurs on the margins of lakes and pools where water does not become too deep (Corbin *et al*. 1994), it also has been found in the beds of deeper vernal pools (CNDDB 2000). Clay is the most frequently encountered soil underlying occupied habitats, although loam and loamy sand also have been noted. Most sites are underlain by an impermeable layer (Corbin *et al*. 1994, CNDDB 2000). Kaye *et al.* (1990) noted that in juniper woodlands, Boggs Lake hedge-hyssop occurred on acidic soils with a pH of approximately 5. Some northern California sites are on slightly acidic soils, but soil pH has not been tested in other areas (Corbin *et al*. 1994). Known Boggs Lake hedge-hyssop sites in California range in elevation from 8 m (25 ft.) in Solano County to at least 1,576 m (5,170 ft.) in Modoc County (CNDDB 2000, Corbin in litt. 2000). A reported occurrence of Boggs Lake hedge-hyssop at North Emerson Lake Modoc County is at 2,400 m (7,900 ft.) in elevation (CNDDB 2000), but several species experts have revisited the site and found only bractless hedge-hyssop (Corbin in litt. 2000, Schoolcraft in litt. 2000). The elevation of the Lake County, Oregon, occurrence is 1,634 m (5340 ft.) (Kaye *et al*. 1990).

The most frequent associate of Boggs Lake hedge-hyssop is bractless hedge-hyssop (CNDDB 2000); the latter may form dense colonies containing only a few individuals of Boggs Lake hedge-hyssop (Mason and Bacigalupi 1954). Other typical associates, in order of frequency, are

vernal pool popcorn flower, two-horned downingia (*Downingia bicornuta*), slender Orcutt grass, and pale spikerush (CNDDB 2000, Corbin in litt. 2000).

Reasons for Decline and Threats to Survival

Habitat conversion for housing was responsible for the extirpation of one Boggs Lake hedge-hyssop population in Sacramento County (CNDDB 2000). Cattle trampling destroyed many immature plants at the Oregon occurrence (Kaye *et al*. 1990). Four occurrences have been disturbed but not extirpated by hydrological alterations such as excavation and damming, and another three by surface disturbances such as discing and grading (CNDDB 2000).

Urban growth through residential development, shopping center construction, and landfill expansion threatens seven of the populations in Placer and Sacramento counties (CNDDB 2000). Competition from medusahead (*Taeniatherum caput-medusae*) potentially threatens the species at five sites on the Modoc Plateau (Corbin *et al*. 1994). Nine of the extant occurrences contain fewer than 100 individuals at their maximum, and several are undergoing rapid declines (CNDDB 2000). These populations are sufficiently small that they are in danger of extirpation from chance events (Menges 1991).

Livestock grazing may or may not pose a threat to the survival of Boggs Lake hedge-hyssop. Although 48 California occurrences are subject to grazing by cattle, sheep, horses, or feral pigs (Corbin *et al*. 1994, CNDDB 2000, Corbin in litt. 2000), only 6 of those were reported to have heavy grazing or severe trampling (CNDDB 2000). Trampling and herbivory can be detrimental if they occur before seed set or if use is concentrated in a small area. However, moderate grazing is believed to be a compatible use if it occurs after Boggs Lake hedge-hyssop sets seed (Mason and Bacigalupi 1954, CDFG 1987). Directed research is necessary to establish appropriate use levels and seasons. The 47 occurrences administered by the U.S. Forest Service and the U.S. Bureau of Land Management potentially are subject to disturbance or destruction from livestock grazing and trampling, activities associated with logging, assorted recreational uses, hydrological alterations, road construction, fire suppression, weed competition, and herbicide drift (Corbin *et al*. 1994, California Natural Diversity Data Base 2000). However, management guidelines proposed by the agencies (Corbin *et al*. 1994) would mitigate such disturbances.

Status with Respect to Recovery

Twelve (14 percent) of the known occurrences of Boggs Lake hedge-hyssop are in nature reserves. Seven of those are on ecological reserves operated by CDFG, including four at Dales Lake in Tehama County, two at Thomes Creek in Tehama County, and one at Big Table Mountain in Fresno County. Nature reserves owned by private conservation organizations support another five occurrences, including two at Big Table Mountain Preserve in Fresno County (one of which is partially on federal land) and one each at Boggs Lake Preserve in Lake County, Vina Plains Preserve in Tehama County, and Jepson Prairie Preserve in Solano County. When The Nature Conservancy managed the Boggs Lake Preserve, they erected fences around colonies of Boggs Lake hedge-hyssop to keep out horses and deer (Serpa 1993). Volunteers conduct annual monitoring and searches for Boggs Lake hedge-hyssop and other rare plants at the Boggs Lake, Jepson Prairie, and Vina Plains preserves (Baldwin and Baldwin 1991, California Natural Diversity Data Base 2000).

Forty-seven (57 percent) of Boggs Lake hedge-hyssop occurrences are on federal land, which does not necessarily mean that they are protected from disturbance. Among the occurrences on federal land, 32 are on the Lassen and Modoc National Forests in Lassen, Modoc, and Shasta counties. Two of these are in areas with special designations, the Murken Botanical Special Interest Area and the South Warner Wilderness, where many uses are restricted (Corbin *et al*. 1994). Another 15 occurrences are at least partially on lands administered by the U.S. Bureau of Land Management in five different resource areas. These include six occurrences in Tehama County, five in Shasta County, two in Fresno County (one of which is partially on a private nature reserve), and one each in Lassen County, California, and Lake County, Oregon (Kaye *et al*. 1990, Corbin *et al*. 1994, California Natural Diversity Data Base 2000, Corbin in litt. 2000). Four of the occurrences on U.S. Bureau of Land Management property are in wilderness study areas (Corbin *et al*. 1994) and may be afforded additional protection if Congress designates those areas as official wilderness.

The U.S. Forest Service and the U.S. Bureau of Land Management developed a formal conservation strategy for Boggs Lake hedge-hyssop (Corbin *et al*. 1994) on lands they administer in northeastern California. Their goal was to protect 90 percent of the plants and sites from direct disturbance and hydrological alterations over a ten-year period. Additional conservation measures identified in the plan were comparisons of grazed and control areas, monitoring, surveys, and acquisition through land exchanges. However, due to funding priorities and the reclassification from "sensitive" status, intensive monitoring has been discontinued (Corbin in litt. 2000). The agencies have fenced several sites in northeastern California (Corbin *et al*. 1994, Corbin in litt. 2000) and in Fresno County (CDFG 1991, Franklin in litt. 1993) to prevent cattle from trampling Boggs Lake hedge-hyssop. Boggs Lake hedge-hyssop also may benefit from a grazing-management experiment being conducted at Big Table Mountain in Fresno County.

Status within the Action Area and Environmental Baseline

A review of CNDDB (2002) revealed that Boggs Lake hedge-hyssop had been reported 86 times in California. Boggs Lake hedge-hyssop has not been recorded from Sutter County, Area or the Basin. However, it has been reported eleven times from Sacramento County. The closest reported Boggs Lake hedge-hyssop occurrence to the Basin is approximately three miles away. However, that occurrence is presumed extirpated; the site has been developed). The next closest reported occurrence is from Sacramento County, approximately 12 miles from the Basin.

The Natomas Basin supports limited amounts of potential Boggs Lake hedge-hyssop habitat. Potential Boggs Lake hedge-hyssop habitat of approximately 21.3 wetted acres occurs in the vernal pools on the east side of the Basin, in 886 acres of grasslands primarily north of Del Paso Road. This estimate of vernal pool acreage is based upon assessments of the amount of vernal pool habitat in grasslands in Sacramento County and probably greatly overestimates the actual amount of vernal pool habitat in the Basin (K. Fuller, pers. comm.). Additional potential habitat occurs in 96 acres of other ponds and seasonally wet areas in the Basin. Once again, this estimate greatly overestimates the amount of potential vernal pool habitat in the Basin, as most of the ponds and seasonally wet areas do not have the hydrology sufficient to support vernal pool plants. No potential Boggs Lake hedge-hyssop habitat is located within 76 m (250 ft.) of any of MAP's proposed action activities.

Sanford's Arrowhead

The Service considers Sanford's arrowhead a Species of Concern and the California Native Plant Society includes it on List 1B (Tibor 2001). The State has not designated the species any special status.

Description, Reproductive Ecology

Sanford's arrowhead is a perennial herbaceous plant belonging to the water-plantain family (Alismataceae). It is one of five species of arrowhead and is endemic to California. Sanford's arrowhead plants are immersed aquatic plants that grow from underground tubers or heavy rhizomes. When mature, three-sided, erect, lance-shaped leaves develop to a height of 30.5 to 99 cm (12 to 39 in.) (Mason 1957). White flowers occur in several small whorls and appear from May through October (Tibor 2001). The lower flowers are female, occur in a group of three at a node and rarely have functional stamens. The upper flowers are usually male, recurved, and subtended by a triangular bract. Seedling establishment is rarely observed, as this species normally reproduces asexually from tubers.

Historic and Current Range, Habitat Types

Sanford's arrowhead was historically found throughout California, from Tehama and Shasta County in the north to Ventura and Orange County in the south. It is now extirpated from southern California and is rare throughout the rest of its range. Sanford's arrowhead is currently found from Shasta to Kern County (Tibor 2001).

Sanford's arrowhead occurs in slow, shallow assorted freshwater habitats, such as marshes and swamps in the Central Valley. Many populations have been lost to urban development and conversion to agriculture (Tibor 2001). No information regarding ecological niche requirements, genetics, pollinators, competition with other aquatic plants, or potential transplant site suitability criteria is available.

Reasons for Decline and Threats to Survival

Populations of Sanford's arrowhead are variously threatened by application of herbicides, competition from non-native plants, urban development, foot traffic and trampling, improper livestock grazing, surface water diversion and channel alteration, and illegal dumping (CNDDB 2001, Tibor 2001).

Environmental Baseline and Status within the Action Area

In 1980, a status review was conducted of the 36 historical sites in the Central Valley containing Sanford's arrowhead. Only five extant populations were found and 31 populations were determined to be extirpated due to habitat losses from urban development or agricultural practices. This review prompted future additional searches for the species. Currently, Sanford's arrowhead is known from 50 populations in Butte, Del Norte, Fresno, Kern, Madera, Merced, Sacramento, San Joaquin, and Tehama counties. The species is extirpated from Orange and Ventura counties. Sanford's arrowhead is known from two populations in San Joaquin County, one last seen in 1994 and the other last seen in 1940. The location of the population found in

1940 was revisited in 1980 but no plants were found. The single relocated population of Sanford's arrowhead covers an estimated area in excess of 46.5 m^2 (500 $ft.^2$) within a 5 acre-area of private land. Although occurring along the shoreline of an eroding island 1.5 m (5 ft.) above sea level, the extant population is considered to be in excellent condition and the condition of the other one is unknown. No status or trend information is available for any population of Sanford's arrowhead (CNDDB 2001).

A review of CNDDB (2002) revealed that Sanford's arrowhead had been reported 50 times in California. It has not been recorded from Sutter County or the Basin. However, it has been reported 27 times from Sacramento County; one record is less than one mile from the Basin. Several records are from along the American River within the City of Sacramento's City Limits.

Habitat classes identified in the EIR that may support Sanford's arrowhead in the Basin include ponds and seasonally wet areas (96 acres) and canals (1,778 acres)(Table 15). Of the total ponds and seasonally wet areas, seven acres are in the City's proposed Permit Area, four acres are in MAP's Permit Area, and ten acres are in Sutter's Permit Area. Of the total canals, 117 acres are in the City's proposed Permit Area, 72 acres are in MAP's Permit Area, and 215 acres are in Sutter's Permit Area.

Delta Tule Pea

Species description and life history

Delta tule pea is perennial herbaceous vine-like plant in the pea family (Fabaceae). Delta tule pea plants are entirely smooth (lacking hairs) and generally robust. Semi erect to prostrate stems arise from underground rootstocks. The stems have a flattened appearance due to the broad wings along the margins of the stems. Tangled masses of stems can grow as a group from 1.0-2.5 m (39-98 in.) tall. The compound leaves are composed of ten to 14 lance-like to semi-elliptical leaflets. Individual plants are difficult to distinguish from one another when growing in masses. Clusters of ten to 20 crimson to rose-purple flowers appear in May and June. Delta tule pea occupies slough edges and marsh lands and can form colonies on the slightly drier uplands sites, typically 0-2.7 m (0-9 ft.), adjacent to freshwater and brackish marshes. Little to no information is available regarding reproductive strategy, ecological niche requirements, salt tolerance, competitors, pollinators, genetics or why the species occurs as many small patches even though apparent suitable habitat is available for expansion.

Reasons for decline

Agricultural land conversion, bank protection (rip-rap), improper livestock grazing, recreational uses, accelerated soils erosion, use of herbicides, and competition from non-natives variously threaten the species (CNDDB 2001).

Distribution, Status Within the Action Area, and Environmental Baseline

Delta tule pea is known from numerous locations in freshwater and brackish marshes throughout much of the San Francisco Bay and upper delta. Although the total population and occupied habitat of Delta tule pea has been reduced historically by extensive diking and draining of wetlands, the species is known from 119 populations in Contra Costa, Napa, Sacramento, San

Joaquin, and Solano counties (CNDDB 2002). Delta tule pea has also been reputed to occur in Alameda, Fresno, Marin, San Benito, San Mateo, Santa Clara, and Tulare counties. The material from these counties is not currently considered to be delta tule pea. The Service has no information of any populations from these seven counties. Over half of the known populations are in Solano County. Land ownership where populations of Delta tule pea occur are mostly unknown. CDFG owns four populations, California Department of Parks and Recreation owns two populations, the Department of Defense owns seven populations.

Delta tule pea is known from nine locations in southern Sacramento County (none north of Paintersville), all of them presumed to be extant (CNDDB 2002). The species is not known from Sutter County or the Basin. The closest occurrence to the Basin is in southern Sacramento County, approximately 20 miles south of the Basin. The species is not anticipated to be in the Basin (see effects analysis). However, if the species were found in the Basin, habitat classes identified in the EIR that may support the species in the Basin include ponds and seasonally wet areas (96 acres) and canals (1,778 acres)(Table 15). Of the total ponds and seasonally wet areas, seven acres are in the City's proposed Permit Area, four acres are in MAP's Permit Area, and ten acres are in Sutter's Permit Area. Of the total canals, 117 acres are in the City's proposed Permit Area, 72 acres are in MAP's Permit Area, and 215 acres are in Sutter's Permit Area.

Although CDFG, the California Department of Parks and Recreation, the Department of Defense, and the Service have populations of Delta tule pea under their ownerships and management, most populations occur on private lands and are unprotected. Little has been accomplished on the ground to promote the survival or enhance populations of Delta tule pea.

Effects of the Proposed Action

The effects of the issuance of the proposed ITPs to the City, Sutter, and Conservancy are analyzed below. The effects of the issuance of an ITP to MAP were analyzed in the January 16, 2002, biological opinion for that project (Service File # 1-1-01-F-0302). However, because the development authorized by the MAP project is considered part of the total 17,500 acres considered in the NBHCP, development authorized by MAP is considered in this effects analysis. Some differences may exist between the acreage totals used in this biological opinion as compared to the MAP biological opinion. However, after completing the effects analysis, these acreage differences do not change any determinations regarding jeopardy to any of the proposed Covered Species.

The NBHCP proposes to investigate the possible intentional (re)introduction of several Covered Species (i.e., California tiger salamander, delta tule pea, Sanford's arrowhead, Bogg's Lake hedge-hyssop, Sacramento Orcutt grass, slender Orcutt grass, Colusa grass, legenere) that are not currently found in the proposed action's action area. Reintroduction, as defined in the NBHCP, is not the intentional introduction of Covered Species into the Basin from outside the Basin. Instead, it refers to the relocation of Covered Species from either: (1) one Conservancy reserve to another; or (2) from an urban development site to a Conservancy reserve. The effects analyses also consider potential colonization of the Basin by several species (i.e., Sanford's arrowhead, Bogg's Lake hedge-hyssop, Sacramento Orcutt grass, slender Orcutt grass, Colusa grass, legenere). In these cases, the Service believes that the species are in close enough proximity to the Basin for dispersal to the Basin to occur. The Service does not believe that either the

California tiger salamander or the delta tule pea have the potential to occur in the Basin (discussed below).

Direct and Indirect Effects

Direct effects are the immediate effects of the proposed project on the species or its habitat and include the effects of interrelated actions and interdependent actions. Interrelated actions are those actions that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those actions that have no independent utility apart from the proposed action (50 CFR §402.02). Indirect effects are those effects that are caused by or will result from the proposed action and are later in time, but are still reasonably certain to occur (50 CFR §402.02).

Threatened Vernal Pool Fairy Shrimp, Endangered Vernal Pool Tadpole Shrimp, and Midvalley Fairy Shrimp

Issuance of the proposed ITPs to the City, Sutter, and Conservancy will likely have minimal adverse effects on covered vernal pool crustaceans. Suitable potential habitat exists in the Permit Areas and the vernal pool fairy shrimp and vernal pool tadpole shrimp have been identified in the Basin. The midvalley fairy shrimp has not been identified in the proposed action's action area. However, the species has been identified approximately 11 miles southeast of the Basin in Sacramento County (and consequently, likely close enough for dispersal by birds) and has only recently been recognized as being a distinct species. So, the midvalley fairy shrimp may either already exist in the action area or may reasonably occur during the life of the proposed Permits. Furthermore, the midvalley fairy shrimp appears to inhabit pools that would not stay inundated long enough to support other vernal pool crustaceans, which may make the small vernal pools characteristic of the eastern Natomas Basin more likely to support the species. When present in the proposed Permit Areas, vernal pool crustaceans will likely be taken through the destruction of their habitat by development activities.

As stated in the species descriptions, the applicants did not quantify the amount of suitable vernal pool crustacean habitat in the Basin. The Basin is not known to contain substantial numbers of vernal pools and is not considered to be essential to recovery of the shrimp species by the Service; the proposed action's action area is not included in the Service's proposed vernal pool critical habitat rule (67 FR 59884). The vernal pool fairy shrimp and vernal pool tadpole shrimp have only been identified once in the Basin. The midvalley fairy shrimp has not been identified there. Based upon estimates derived from data gathered in Sacramento County (see Environmental Baseline for details), the Basin's 886 acres of grasslands would contain at the most 21.3 acres of vernal pools. Additionally, some portion of the Basin's 96 acres of ponds and seasonally wet areas may be suitable for vernal pool crustaceans. However, this estimate greatly overestimates the actual amount of vernal pool habitat in the Basin because grasslands in the Basin have a lower density of vernal pools than surrounding areas of Sacramento County (see Environmental Baseline) and most of the ponds and seasonal wetlands do not have appropriate hydrology to support covered vernal pool species. Of the total 886 acres of grasslands in the Basin, 427 are in the City's Permit Area and 134 are in Sutter's Permit Area (Table 14). This equates to 10.2 and 3.26 acres of vernal pools in the City and Sutter's Permit Areas, respectively. Of the total 96 acres of ponds and seasonally wet areas in the Basin, seven are in the City's Permit Area, four are in the MAP Permit Area, and ten are in Sutter's Permit Area (Table 14). Most of the potential

habitat that will be lost is located in the eastern portion of the City's Permit Area. As stated above and in the species descriptions, ponds and seasonally wet area acreages almost certainly vastly overestimate the actual potential vernal pool crustacean acreage in the Basin, as most of the ponds and seasonally wet areas do not have the appropriate hydrology to support vernal pool-associated species. Ponds and seasonally wet areas located in the MAP Permit Area do not have the appropriate hydrology to support vernal pool crustaceans and no other potential habitat is located within 76 m (250 ft.) of any of MAP's proposed action activities (Service 2002).

Issuance of the proposed ITP to the Conservancy will likely have little effect on vernal pool crustaceans in the Natomas Basin. The majority of potential suitable habitat is located in the Land Use Agencies' Permit Areas and therefore, will not likely be acquired by the Conservancy. Any other potential suitable habitat in the Basin that the Conservancy may acquire would likely be considered potential foraging habitat for the Swainson's Hawk (because vernal pools are often found in upland areas such as grasslands) and therefore, most-likely not considered for conversion to other land uses such as managed marsh. The most likely forms of direct effects caused by the Conservancy would be management activities such as grazing and invasive plant control. However, if done properly, these activities should actually benefit vernal pool species.

The conservation measures proposed by the Permittees will minimize the effects of the proposed ITPs on vernal pool crustaceans. If potential vernal pool crustacean habitat is located within a proposed development site in the City's or Sutter's Permit Area, applicants will be required to survey for vernal pool crustaceans. If covered vernal pool crustaceans are observed, measures have been proposed to avoid, minimize and mitigate the impacts to the species. Applicants will be required to consult with the Service to determine how to best avoid and minimize the take of vernal pool crustaceans. Measures that will be applied as appropriate are: (1) preserving the occupied pool(s) and surrounding uplands on site; (2) temporary avoidance and relocation of resources; or (3) payment into a Service-approved conservation bank. Off-site mitigation lands require mitigation ratios different from those used for other Covered Species (i.e., 0.5:1 used for snake, hawk, etc...)(see Table 3). If the vernal pool tadpole shrimp is identified within a proposed development site, the Wildlife Agencies may require the developer to avoid and preserve the vernal pool resource. In these cases, the Conservancy would be tasked with managing the vernal pools. Management activities such as grazing and invasive plant control could likely affect vernal pool crustaceans. For example, disturbance to wetted vernal pools could affect water quality and therefore, any vernal pool crustaceans in the water. However, the SSMPs developed by the Conservancy would be designed to protect the species and their vernal pool habitat.

Indirect effects to Covered vernal pool crustaceans may occur if upland areas surrounding potential crustacean habitat is altered. For example, if the upland area adjacent to an occupied vernal pool is graded, the hydrology of the vernal pool could be changed, thereby affecting the crustaceans that inhabit it. However, given the limited extent of vernal pool habitat, the extremely limited documented occurrences of Covered vernal pool crustaceans in the permit areas and the take avoidance and minimization measures in the plan, the level of indirect impacts to the three vernal pool shrimp species will be low to non-existent.

Overall, the proposed action should have little effect on the vernal pool fairy shrimp, vernal pool tadpole shrimp, and midvalley fairy shrimp. The vernal pool fairy shrimp and vernal pool tadpole shrimp have only been identified once in the Basin and the midvalley fairy shrimp has not been identified there. There is very little suitable habitat and the Permittees have proposed

suitable measures that minimize mitigate the impacts. The Natomas Basin represents a small portion of the range of these three species and does not contain habitat essential for the recovery of the species. Because the proposed action is unlikely to have much, if any, effect on the species locally, it is not anticipated to affect either the Southeastern Sacramento Valley Vernal Pool Region (as defined by Keller-Wolf *et al.* 1998) or the species as a whole.

Threatened Giant Garter Snake

The giant garter snake is found throughout the proposed action's action area and suitable snake habitat exists in each of the proposed permit areas. Implementation of the proposed action will have direct effects on the snake throughout the project's action area by authorizing the City, Sutter, Conservancy, and MAPPOA[4] to participate in and authorize activities that directly result in the disturbance, wounding, and death of snakes throughout the Permit Areas and on the Conservancy's reserves. In addition, project-related activities will likely result in the take of the snake through the destruction of 8,512 acres of its habitat (Table 4). This is approximately one-third of the existing snake habitat in the Basin (total = 24,567 acres) and much of the habitat that will be affected is likely important to the snake in the Basin because it is used for movement, foraging, or important activities. Examples of possible direct effects on the snake caused by the proposed action include: (1) injury and death of snakes as a result of being crushed or entombed during construction activities; (2) injury and death of snakes as a result of vehicles striking snakes while accessing construction sites; (3) displacement of snakes from their habitat to areas of less suitable habitat; and (4) loss of prey items on or downstream of the project sites due to silting, fill, or spill of oil or other contaminants. However, there are numerous conservation measures incorporated into the plan that will minimize the effects of the proposed action on the snake such as construction work windows, surveys, and dewatering requirements.

Issuance of an ITP to the City of Sacramento. Issuance of the proposed ITP to the City will result in the loss of 1,094 acres of potential snake habitat (7 acres of ponds and seasonally wet areas, 970 acres of rice, and 117 acres of canals). Some snake habitat in geographic Areas 2 and 3 (southwest and east, respectively) (Figure 5), as described by Brode and Hansen (1992), will be lost. The most important snake habitat in Area 2 to be affected is Fisherman's Lake. Numerous CNDDB (2002) records are known from Fisherman's Lake and the City's Permit Area abuts the eastern side of the lake. The Conservancy has already acquired reserves (i.e., Natomas Farms and Cummings tracts) on the western side of Fisherman's Lake. Additionally, an as yet to be determined buffer between development in the City's Permit Area along the eastern side of the lake and the lake will likely minimize some of the effects of development near the lake. This buffer will: (1) minimize human intrusion into the habitat; (2) help minimize the number of domestic animals that prey upon snakes; (3) reduce the effects of run-off from urban development; and (4) reduce the disturbance of snakes from surrounding development. However, since it appears that the buffer will be a multiple-use area (i.e., accessible by local residents for walking, etc.), the effectiveness of the buffer for the snake will be less than that if the area were

[4]Reminder: Activities associated with the MAP project were analyzed and authorized under the biological opinion (Service File no. 1-1-01-F-0302) for that project. However, because the development authorized by the MAP project is included in the total 17,500 acres considered in the NBHCP, development authorized by MAP is considered in this effects analysis. Therefore, although the effects of the MAP project are re-analyzed here, activities associated with MAP have already been authorized.

isolated from all entry. By allowing the area to be accessed by the public, snakes will likely still be disturbed (although to a lesser extent) on an on-going basis. Although the buffer likely will provide some benefit, its ability to protect snakes will be limited because the area will not be solely managed for the benefit of snake or other Covered Species and the buffer may not include all of the snake's upland habitat. The majority of the City's effects on snake habitat in Area 3 occur in the northern portion of the City's Permit Area and will mostly result from the conversion of rice fields and their associated drainage/irrigation canals to development.

Development as a result of issuing the proposed ITP to the City will likely have little effect on the connectivity between Area 2 and Areas 1 and 3 (see Figure 5). With regard to movement between Areas 1 and 2 (northwest and southwest), although some delivery and drainage canals crossing under I-5 and SR-99/70 will likely be affected (especially east of Fisherman's Lake), other canals with the potential to provide movement corridors for the snake between the two geographic areas will remain after the issuance of the proposed ITP to the City. With regards to movement between geographic Areas 2 and 3 (southwest and east), it is unlikely that direct movement between these two geographic areas exists even today. The most probable movement corridor between Areas 2 and 3 would be the East Drainage Canal, which is surrounded by development. There is little or no upland buffer for the snake in this area and it is unlikely that the snake uses this canal as a movement corridor. Therefore, additional development along the East Drainage Canal will have little effect on the connectivity between Areas 2 and 3, as there is already considerable development along the canal that likely precludes its use by snakes. Other canals between geographic areas 2 and 3 probably provide for only very limited movement and dispersal between areas and may not represent a true movement corridor for the snake between geographic areas. It is unlikely that snakes would traverse through these types of culverts because of lack of suitable habitat within the culverts over several hundred feet or more. The culverts are extremely long, often do not have emergent vegetation near their entrances, and have little clearance (i.e., distance between the water's surface and the top of the culvert) during the snake's active season (May 1-October 1); the culverts lack the 2-3 foot clearance described by Brode and Hansen (1992) as typical for culverts that allow for snake passage. The use of larger culverts or free-standing bridges (best) that contain some of the minimum habitat characteristics of the snake (i.e., emergent vegetation up to the culvert entrances, burrows, prey) should provide improved passage opportunities for the snake.

Issuance of an ITP to Sutter County. Most of Sutter's proposed Permit Area is potential snake habitat and issuance of the ITP to Sutter will result in the loss of 5,802 acres of potential snake habitat (10 acres of ponds and seasonally wet areas, 5,577 acres of rice, and 215 acres of canals). As a result, development in Sutter's Permit Area will have a greater direct effect on the snake than development in the City's Permit Area. Some snake habitat in geographic Areas 1 and 3 (northwest and east, respectively) (see Figure 5), as described by Brode and Hansen (1992), will be lost. In Area 1, development will encompass portions of the North and East Drainage Canals and much of their extensive system of associated rice fields. In Area 3, development will occur in the northern portion of "Snake Alley," by encompassing the northern half of the North Main Canal and its system of associated rice fields and irrigation canals in the southeastern portion of the Permit Area. In addition, portions of the East Drainage Canal and the canal that parallels the east side of SR 99/70 between Elverta Road and the northern end of Snake Alley will also be lost. These areas were identified by Brode and Hansen (1992) as being important for the snake in the Basin. In addition, Wylie *et al.* (2002) described much of these areas as good snake habitat.

Sutter County drainage improvements associated with the proposed South Sutter County Specific Plan include expanding two existing drainage channels outside of the proposed Permit Area; the Montna Drain and the Natomas East Drain (East Drainage Canal) (Figure 2 and 3). These drainage improvements are included in the proposed action and widening these canals will likely directly affect the snakes. Both of these canals were described by Wylie *et al.* (2002) as good snake habitat and snakes have been observed in close proximity to where activities will occur. Based upon observations of Hansen and Brode (1993), it will take at least 3-5 years for the canals to be inhabited by snakes, if ever, following the improvements. The Montna Drain and the Natomas East Drain parallel the North Main Canal (commonly referred to as "Snake Alley") to the east and west, respectively, but will not affect Snake Alley outside of Sutter's Permit Area, except where the East Drainage Canal crosses Snake Alley at Elverta Road. It is anticipated that the proposed Sutter County drainage improvements will convert approximately 16.5 acres of existing agricultural land (rice) to drainage channel. This acreage is included in Sutter's total permitted acreage.

Issuance of the proposed ITP to Sutter will have no direct effect on the movement of snakes between Area 2 and Areas 1 and 3 because Area 2 is located completely within Sacramento County and is removed from Sutter County (Figure 5). However, issuance of the ITP to Sutter will affect the movement of snakes within Area 1 and may affect the movement of snakes between Areas 1 and 3. The Sutter Permit Area divides the available snake habitat in Area 1 in half. Some canals in Sutter's Permit Area that are likely used by the snake for connectivity in Area 1 will be lost. However, other opportunities for movement (e.g., canals) will be available if the proposed ITP is issued. For example, suitable movement corridors will remain in the Swainson's Hawk Zone west of Sutter's Permit Area. Sutter has committed in the NBHCP that the County will not allow development in the Swainson's Hawk Zone. In addition, Sutter will provide protective measures for the snake, such as fencing along the East and North Drainage Canals in its Permit Area to help ensure that snakes are able to move through these canals.

Some of the movement opportunities for snakes between Areas 1 and 3 will likely be affected by the issuance of the proposed ITP to Sutter because some canals will be closed or otherwise made unavailable to snakes. However, issuance of the proposed ITP to Sutter will not prevent movement of snakes between the two geographic areas because some connectivity corridors will remain. Protective measures (e.g., fencing and gaited access) have been provided for the North and East Drainage Canals where they traverse through Sutter's Permit Area and additional connectivity corridors will remain south of Sutter's Permit Area, in northern Sacramento County.

Issuance of an ITP to the Metro Air Park Property Owners Association. The effects of the issuance of an ITP to MAP were analyzed in the January 16, 2002, biological opinion for that project (Service File # 1-1-01-F-0302). Issuance of the ITP to MAPPOA will result in the loss of 1,617 acres of potential snake habitat (4 acres of ponds and seasonally wet areas, 1,541 acres of former rice lands, and 72 acres of canals). Some snake habitat in Area 1 (Figure 5), as described by Brode and Hansen (1992), will be lost. Numerous CNDDB (2002) snake records are known from the canals within and adjacent to MAP. Wylie *et al.* (2002) identified good snake habitat on site. Although MAP development will affect the snake and its habitat, extensive areas of snake habitat will remain in Area 1 following implementation of the proposed action.

As stated in the January 16, 2002, biological opinion for the MAP project, issuance of the MAP ITP will not affect the connectivity between Areas 1 and 2. Although the potential for Lone Tree

Canal to fully function as snake habitat will be reduced, it will remain suitable for foraging and passage to upstream and downstream areas. MAPPOA will install a snake road deterrent on Lone Tree Road and is required to maintain at least 12 inches of water in the canal between April and October. The connection between the Lone Tree Canal and the southwestern zone presently exists as a culvert beneath Interstate 5. This passage is currently ineffective, and will not be improved or worsened as a result of the activities within MAP or by the Conservancy. A snake-excluding fence will be constructed along Lone Tree Canal so that snake mortality in adjacent areas is not increased.

Issuance of an ITP to the Natomas Basin Conservancy. Issuance of an ITP to the Conservancy will result in both significant beneficial and only minor detrimental effects to the snake. Restoration, enhancement, maintenance, and farming activities that take place on Conservancy lands inhabited by snakes may directly result in the injury or death of snakes on those lands. As stated in the NBHCP, the Conservancy will be responsible for the preservation of 8,750 acres of land. Three quarters (6,562.5 acres) of the total acreage will be managed as either marsh (2,187.5 acres) or rice habitat (4,375 acres). All of the marsh and rice habitat is likely to be inhabited by snakes in the future. As there is very little existing marsh habitat in the project's action area, almost all of the marsh habitat managed by the Conservancy will be created through habitat enhancement and creation activities. Since most of the lands available for preservation are currently rice fields considered to be inhabited by snakes and the soils underlying rice fields are typically the best for managed marsh enhancement, habitat restoration and creation activities on these lands will likely result in injury and death of snakes. After habitat restoration and enhancement activities are completed, on-going maintenance activities will likely result in some injury to and death of snakes as a result of activities such as change/repair of water control structures and levee repairs. Management of Conservancy lands as rice fields will also likely result in the injury to and death of snakes. The remaining 2,187.5 acres of land that are not managed as marsh or rice fields will be managed as uplands. Although the uplands will be managed for the hawk and other upland-associated Covered Species, irrigation canals or ditches traversing the uplands and uplands within 61.0 m (200 ft.) of the aquatic resources could be inhabited by or used by snakes. Therefore, habitat restoration, enhancement, and maintenance activities in these upland areas could also result in the disturbance, harm, and death of these snakes.

The Conservancy plans to annually fallow 10 percent of its ricelands. Therefore, 10 percent (437.5 acres) of the total 4,375 acres of rice habitat will not be available to the snake each year. However, the actual loss of snake habitat due to rice field fallowing is likely to be much less than 400 acres per year because: (1) the extensive system of canals traversing the rice fields will still be available to the snake; and (2) the portions of fallowed rice fields within 61.0 m (200 ft.) of the snake's aquatic habitat will serve as upland habitat (although marginal) for the snake during the active season.

The adaptive management provisions of the NBHCP allow for the habitat management ratio to be increased from 25 percent marsh/ 50 percent rice/ 25 percent upland to up to 75 percent marsh/ 25 percent upland. If this occurs, then up to 6,562.5 acres of Conservancy lands may be restored, enhanced, and managed as marsh. However, since: (1) the ratio change is applied prospectively; (2) the Service has not issued a final recovery plan for the snake; and (3) the Conservancy has already acquired over 2,750 acres of land, the total amount of potential marsh habitat created would be much less than 6,562.5 acres.

Effects of the Proposed Conservation Measures on the Snake. The Land Use Agencies and the Conservancy have proposed a number of conservation measures that minimize the effects of the proposed action on the snake (see NBHCP, sections V.A.5. and V.B.4.). These measures are similar to those included in Appendix C of the Service's November 13, 1997, *Programmatic Formal Consultation for U.S. Army Corps of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter Snake within Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter and Yolo Counties, California* (Snake Programmatic Consultation). Examples of conservation measures include, but are not limited to: (1) construction windows (i.e., limiting construction to periods when snakes are least likely to be injured or killed); (2) dewatering; (3) snake surveys to minimize the potential that snakes are located on the project site when construction activities occur; and (4) environmental awareness training. These measures will all minimize direct effects to snakes. Additional conservation measures include provisions such as protecting the North and East Drainage Canals with fencing to ensure some connectivity remains between and within the system of habitat reserves.

The most important conservation measure proposed in the NBHCP is the development of a system of habitat reserves. Once complete, the Conservancy will have acquired/restored/ enhanced a minimum of 2,187.5 acres of marsh and 4,375 acres of rice habitat to be managed for the snake and other Covered Species in perpetuity. Managed marsh is at least equivalent and likely greater in habitat quality to the canals, ponds, and seasonally wet areas that will be destroyed as a result of issuing the ITPs to the Land Use Agencies. As such, a total of 2,187.5 acres of marsh will created and preserved for the 425 acres of canals, ponds, and seasonally wetted areas lost. This is equivalent to approximately five acres of habitat preserved for every acre habitat lost. Much of the uncertainty regrading the ability of created marsh habitat no longer exists. Data gathered by BRD on the Conservancy's reserves and at the Colusa National Wildlife Refuge demonstrate that snakes use created marsh habitat (Wylie and Martin 2002, Wylie *et al.* 2003). In fact, Wylie *et al.* (2003) stated that the enhanced areas at the Colusa Nation Wildlife Refuge are occupied by a healthy population of snakes. Managed marsh habitat, because it is interlaced with meandering channels, has lots of edge habitat. The snake often travels and hunts along these edges. They are also directly adjacent to upland habitat, where they can go to escape from predators. Snake rice habitat lost as a result of issuing the ITPs to the Land Use Agencies will be preserved at rate of approximately one acre for every two acres of rice lost. Additional benefits will be gained for the snake on Conservancy rice lands through the use of wildlife-friendly practices such as minimizing mowing on rice checks, berms, and other water control structures.

In order to mitigate for the loss of 1,094 acres of snake habitat resulting from the issuance of the proposed ITP to the City, the Conservancy will provide (with fees acquired by the City) 3018.8 acres of habitat for the snake. Of that, 1006.2 acres will be managed marsh and 2012.5 acres will be rice fields. However, as stated above, 10 percent of the total rice field habitat will be fallowed annually; therefore, the total acreage of rice field habitat is actually 1811.2 acres. In order to mitigate for the loss of 5,802 acres of snake habitat resulting from the issuance of the proposed ITP to Sutter, the Conservancy will provide (with fees acquired by Sutter) 2800.1 acres of snake habitat for the snake. Of that, 933.4 acres will be managed marsh and 1866.8 acres will be rice fields. However, as stated above, 10 percent of the total rice field habitat will be fallowed annually; therefore, the total acreage of rice field habitat is actually 1680.1 acres. In order to mitigate for the loss of 1,617 acres of snake habitat resulting from the issuance of the proposed ITP to MAPPOA, the Conservancy will provide (with fees acquired by MAPPOA) 743.6 acres of

snake habitat for the snake. Of that, 247.9 acres will be managed marsh and 743.6 acres will be rice fields. However, as stated above, 10 percent of the total rice field habitat will be fallowed annually; therefore, the total acreage of rice field habitat is actually 669.3 acres.

After implementation of the proposed action, the Conservancy will have acquired/restored/ enhanced a minimum of 2,187.5 acres of marsh and 4,375 acres of rice habitat to be managed for the snake and other Covered Species in perpetuity. Although this amount is less than that being impacted by the proposed action, the NBHCP adequately protects the snake because the effective mitigation ratio is greater than 0.5:1. Managed marsh habitat on the Conservancy's reserves is more valuable to the snake than the existing habitat in the Basin because: (1) the habitat will be protected in perpetuity; (2) the habitat is monitored and actively managed for the benefit of the snake and other Covered Species; (3) the habitat will not be subject to continuos disturbance caused by farming or canal maintenance activities; (4) the habitat will be available for the snake year-round whereas the Basin's rice habitat is only available during a portion of the year; (5) the habitat will not be periodically made unavailable to the snake as occurs with canal maintenance activities; and (6) the habitat will be relatively free of human intrusion. In short, managed marsh preserves will provide high-quality habitat that is not subject to most of the impacts that routinely adversely affect the snake and its existing habitat throughout the rest of the Basin. With regard to the Conservancy's rice reserves, Conservancy rice lands will be more advantageous for the snake because rice production practices will be more "snake-friendly." For example, the Conservancy will maintain rice checks, berms, and other water-control structures in as natural a state as practicable and maintain prey species (e.g., mosquito fish) in or near the rice fields. These rice fields will also be consistently available, regardless the market for water transfers, unlike non-Conservancy rice habitat in the Basin, which is available for water transfers.

Summary/Discussion of Direct Effects on the Snake. The proposed action is likely to directly affect the snake throughout much of the Basin. Some areas that have historically been known to be occupied by large numbers of snakes will be developed. In addition, some potential connectivity corridors between the Basin's three geographic areas will be compromised. However, after implementation of the proposed action, much of the potential snake habitat in the Basin will remain. Of over 24,000 acres of potential snake habitat in the Basin, over 16,000 acres will remain after implementation of the proposed action. These lands include areas in both Sutter and Sacramento County that are designated in land use plans as either agriculture or open space and are anticipated to be so in the future. Up to 6,500 acres of the remaining snake habitat in the Basin will be protected and enhanced as part of the Conservancy's system of reserves. Additionally, much of the habitat that has historically been and is currently known to be important for the snake will not be affected. For example, much of Snake Alley (the North Main Canal and its important surrounding matrix of irrigation/drainage canals and rice fields) will not be directly affected by the proposed action because it lies south of Sutter's proposed Permit Area in unincorporated Sacramento County. This area is designated as agricultural cropland and as discussed in the cumulative effects section (below), is not anticipated to change in the foreseeable future. Based upon the adopted land use plans for the area and the fact that much, if not all, of Snake Alley is located within the 100 year floodplain, Snake Alley is expected to remain in agricultural use and rice would be the most appropriate crop. Because rice farming is expected to persist, many of the irrigation canals are expected to persist. Because Based upon the historical literature (e.g., Brode and Hansen 1992), the observed density of snakes, and the amount, configuration, and quality of suitable snake habitat in the area (e.g., Wylie and Martin 2002; Wylie *et al.* 2002), Snake Alley appears to be important for the continuation of the snake in the

Basin. In another example, portions of the North Drainage Canal in the western Basin will not be affected because they are outside of Sutter's proposed Permit Area. Although development will get as close, or closer, than 61.0 m (200 ft.) to it, Fisherman's Lake, an important snake habitat area in Area 2, will be mostly protected. The Conservancy has already purchased lands on Fisherman's Lake's west bank (Figure 6) and the east bank will be partially protected from development. Lands in the northwestern corner of the Basin support snakes, will not be developed, and have been targeted by the Conservancy for some mitigation land acquisitions. Lastly, lands in northern Sacramento County between Snake Alley and the North Drainage Canal will not be developed because it is unincorporated land in Sacramento County which is outside the urban services boundary. These lands will allow movement between Snake Alley to the western and northwestern portions of the Basin.

Implementation of the proposed action will likely have some negative effects on connectivity. For example, development will surround the North and East Drainage Canals and other canals connecting the three geographic Areas will be lost. However, connectivity corridors will remain for the snake. Canals are required for flood control in the Basin and agriculture (which requires irrigation water) is anticipated to continue through the life of the Permits. The Land Use Agencies, through their adopted general plans, community plans, and specific plans, will promote compact urban development within limited portions of the Natomas Basin. Under the NBHCP, the Land Use Agencies are required to ensure connectivity (see NBHCP, Section IV.C.1.d.) and the Plan includes measures to help maintain connectivity. The Conservancy will consolidate reserve acquisitions during the 50-year life of the permits in order to build larger blocks of habitat reserve lands. Reducing the number of blocks reduces the number of connections to be maintained. Specific measures identified in the NBHCP to ensure viability of the reserve system include: (1) relocating reserve components; (2) MOAs; (3) easements; and (4)s outright purchases of land, which would be designed to ensure connectivity for the snake between Conservancy reserves. The NBHCP does not include the closure of canals as a Covered Activity and the Water Agencies have not applied for ITPs at this time. Therefore, in the event of a proposed canal closure, the Water Agency (or project sponsor for canal closure) would be required to comply with the Act.

The NBHCP requires that an annual assessment of connectivity within and between reserves be conducted. If an annual assessment determines that connectivity has been lost, it then must be reestablished. Otherwise, the Conservancy could have its permit suspended or revoked. Because the Conservancy, as the plan operator, acts on behalf of the Land Use Agencies, the agencies could also have their Permits suspended or revoked if connectivity is lost. Therefore, it is in the City's and Sutter's best interest to ensure connectivity for the snake in the Basin. The Final EIS/EIR provides detailed discussion regarding connectivity in the Basin.

Indirect Effects. Implementation of the proposed action is likely to have several indirect effects on the snake. Snakes displaced as a result of development activities could: (1) encounter intraspecific and interspecific competition in their new habitats; (2) be more susceptible to predation in their new, unfamiliar habitats; and (3) experience lower survivorship as they hunt in unfamiliar habitat. Development adjacent to snake habitat could: (1) result in decreased water quality in the snake's aquatic habitat through the introduction of pesticides, herbicides, petroleum products, heavy metals, polynuclear aromatic hydrocarbons, and other organic compound and nutrients in run-off; (2) introduce new snake predators (i.e., cats) to the snake's habitat; (3)

disrupt snake activities and behavior through noise and other disturbances; and (4) disturb the snake by increasing the number of snake-human interactions.

Perhaps the most important indirect effect potentially caused by the proposed action is the availability of irrigation/drainage canals for the snake. However, Natomas Mutual is a long-established privately held water company and as the Conservancy becomes a major land owner within the Basin, it will require substantial water deliveries that will assist Natomas Mutual with remaining an economically viable company. Additionally, substantial agricultural interests are anticipated to remain within the Natomas Basin throughout the life of the Permit(s). The NBHCP represents all reasonably foreseeable development in the Basin and except for some airport lands, adopted land use plans and policies designate the remaining areas of the Basin as either open space or agriculture. Natomas Mutual has provided irrigation water for over 80 years and there are no plans to discontinue service. As long as agricultural activities continue in the Basin, there will be a demand for Natomas Mutual's services. So, even if Natomas Mutual ceases to operate, there will likely be a demand for irrigation water, which would be met by some other provider. In addition to irrigation canals provided by Natomas Mutual, it is anticipated that drainage canals will remain throughout the life of the Permits. Figure 17 of the NBHCP identifies drainage channels within the Natomas Basin that are considered likely to be retained for flood control purposes for both existing agricultural uses and for Planned Development. Regardless of the type of uses within the Basin, whether agricultural or urban, major flood control channels are required to convey water through the Basin. These canals and their surrounding rice fields will continue to provide habitat and movement corridors for the snake.

Issuance of the proposed permits to the Permittees will provide the conditions necessary for the permanent maintenance of a stable, protected snake population in the Basin (and, consequently, for the continued viability of the snake in the Basin) for the following reasons: (1) the measures proposed by the City and Sutter, including pre-construction surveys and dewatering and fencing of important canals, will minimize the impacts to the snake; (2) the protection and enhancement/ restoration/creation 6,562.5 acres of higher quality managed marsh and rice reserves, and in particular, the creation of a minimum 2187.5 acres of managed marsh habitat in place of 425 acres of canals, ponds and other seasonally wetted areas that will be lost and that will result in an effective mitigation ratio of approximately 5 to 1 for this key snake habitat, will effectively mitigate the impacts resulting from the conversion of 8,512 acres (including MAP) of varying quality snake habitat to urban development; (3) essential connectivity among the Basin's three geographic areas will remain following project build-out; (4) after implementation of the proposed action, over 16,000 acres of snake habitat will remain, including many areas that are recognized as important to the viability of the snake in the Basin; and (5) the creation of year round, protected snake habitat that is specifically managed to benefit the snake will substantially reduce mortality sources such as farming activities (e.g., field preparation, harvest) and canal maintenance activities. The proposed action will not adversely affect snakes outside of the Natomas Basin. Therefore, because the proposed action will not affect the viability of the snake in the Basin or affect the snake outside the Basin, the viability of the American Basin population and the entire species will not be compromised.

Threatened Valley Elderberry Longhorn Beetle

Implementation of the proposed action will likely affect the beetle by authorizing the City, Sutter, Conservancy, and MAPPOA to participate in and authorize activities that result in direct effects

to any beetles inhabiting the Permit Areas or on the Conservancy's reserves. Although the beetle has not been observed in the Basin, it has been observed in close proximity to the Basin (i.e., across the Sacramento River from the Basin). Suitable beetle habitat is known to occur in the Basin and the Permittees have requested incidental take authorization in case beetles or their habitat is found in the Permit Areas. Take could be in the form of injury, or death of beetles. For example, beetles could be adversely affected if the elderberry shrub they inhabit is relocated. This is the most likely form of direct effects and would presumably injure or kill some beetles. The January 16, 2002, biological opinion that evaluated the potential effects of the proposed Metro Air Park project (Service File # 1-1-01-F-0302) found that the proposed action would not directly affect the beetle, as no elderberry shrubs were located on-site. However, suitable beetle habitat could grow in the MAP project site by time development occurs and therefore, incidental take coverage for direct effects to the beetle was granted.

The Conservancy's management and restoration activities may have a minor adverse effect on the beetle. Management activities may include mechanical treatment and removal of non-native shrubs and limited excavation to establish new plants. The Conservancy will avoid impacts to elderberry shrubs to the maximum extent practicable. However, it is reasonable to expect that in some instances, the Conservancy will have to conduct activities that affect the elderberry shrubs, and as a consequence, the beetles that inhabit them. For example, a berm on which an elderberry shrub is located could need repair. There may also be potential direct effects associated with the need to relocate shrubs that become established outside of riparian restoration areas, such as along irrigation ditches. However, because of the small number of elderberry shrubs in the Basin and Conservancy's goal to minimize impacts to the species, direct effects of the Conservancy's management activities on the beetle should be minimal.

As stated in the Environmental Baseline for the species, the amount of potential beetle habitat in the proposed action's action area has not been quantified. However, beetle habitat is more likely to be located in some habitat classes than others. Within the Basin, the habitat classes most likely inhabited by the beetle include oak groves, riparian, and tree groves. Of the total 98 acres of oak groves in the Basin, eight acres (City = 6, MAP = 2) will be lost (Table 13). Of the total 124 acres of riparian habitat in the Basin, 24 acres (City = 24) will be impacted. However, much of the 24 acres of affected riparian areas are located on the east side of Fisherman's Lake and will not be developed. Therefore, 24 acres overstates the actual amount of riparian habitat that will be lost. Of the total 106 acres of tree groves in the Basin, 33 acres (City = 10, MAP = 23) will be lost. It must be emphasized that: (1) loss of oak groves and riparian habitat overstates the amount of potential beetle habitat lost; (2) elderberry shrubs are likely located in some additional isolated areas of the Basin; and (3) there are no documented occurrences of the beetle in the basin.

The conservation measures proposed by the Land Use Agencies and the Conservancy will effectively minimize and mitigate the potential effects of the proposed action on the beetle. The Permittees will conduct surveys for the beetle and its habitat. When possible, Permittees will avoid beetle habitat. When this is not possible, shrubs will be transplanted during their dormant season (to minimize any potential adverse effects on the shrub and consequently, the beetle) and replacement seedlings will be planted. Beetles have observed emerging from shrubs after they were transplanted to conservation areas (B. Cordone, pers. comm. to Craig Aubrey, 2003) and beetles have been observed emerging from replacement seedlings in conservation areas (G. Sutter, pers. comm. to Craig Aubrey, 2003). The Land Use Agencies and Conservancy have

agreed to adhere to the Service's Beetle Guidelines, or any updated Guidelines, as they are updated in the future. This provision will help ensure that the NBHCP's beetle conservation strategy is consistent with the Service's most current conservation strategy for the species.

Indirect effects of the proposed action on the beetle should be minimal. The most likely potential indirect effect is the removal of elderberry shrubs with stems less than one inch diameter at ground level. When development activities occur, these shrubs will not be considered suitable beetle habitat (because their stems are not yet large enough) and will therefore, not be protected. Left alone, they would presumably grow to become suitable beetle habitat. Construction activities would preclude these shrubs from becoming suitable habitat for the beetle.

Overall, the effects of the proposed action on the beetle should be minimal. There are few elderberry shrubs in the Basin, limited areas where elderberry shrubs would be likely to occur, and the beetle has never been observed in the Basin. Impacts to the beetle are unlikely to occur on either a frequent or large-scale basis. The Permittees have proposed measures that minimize and mitigate the impacts such as requiring land owners/developers to mitigate according to the Service's Beetle Guidelines. Therefore, the proposed action is minimized and unlikely to affect the survival of the beetle in the Basin. Furthermore, because of the proposed action's minimal effects on the beetle and the Basin represents only a small portion of the beetle's current range, the proposed action is not likely to affect the survival or recovery of the species overall.

Threatened Colusa Grass, Threatened Slender Orcutt Grass, Endangered Sacramento Orcutt Grass, Legenere, and Boggs Lake Hedge-Hyssop

Issuance of the proposed ITP's to the City, Sutter and the Conservancy may adversely affect Colusa grass, slender Orcutt grass, Sacramento Orcutt grass, legenere, and Boggs Lake hedge-hyssop. The species have been reported from the vicinity of the proposed action's action area and potential habitat may occur in the proposed action's action area. However, none of these species has been observed in the Basin and the potential habitat is likely not suitable for three of the species: Colusa grass, slender Orcutt grass, and Sacramento Orcutt grass. The three species are known to occur inhabit large vernal pools that remain inundated for long periods of time. The Basin's vernal pools are typically small and do not remain inundated for long periods of time. In addition, because of the very limited amount of vernal pool resources in the proposed action's action area, the proposed action is likely to have very little, if any, effect on the five vernal pool species. MAPPOA did not request coverage for the Colusa grass, slender Orcutt grass, Sacramento Orcutt grass, legenere, or the Boggs Lake hedge-hyssop and it does not appear that suitable habitat for any of these species exists on the proposed MAP project site. Although four acres of ponds and seasonally wet areas exist on the proposed MAP project site, these wetlands do not appear to support vernal pool-associated species.

The most likely direct effect to Colusa grass, slender Orcutt grass, Sacramento Orcutt grass, legenere, and Boggs Lake hedge-hyssop resulting from the Land Use Agencies' activities would be direct mortality or destruction of the seed bank as a result of development, should any plants be found to exist in the permit areas, as a result of development. For example, construction equipment may kill plants by crushing them when it runs over them. Seeds could be destroyed or rendered unable to germinate when seasonal wetland areas they occupy are partially or wholly filled.

As stated in the species descriptions, the actual amount of suitable vernal pool habitat in the Basin was not quantified. The Basin is not known to contain substantial numbers of vernal pools and is not considered essential to the species' recovery or included in the Service's proposed vernal pool critical habitat rule (67 **FR** 59884). Based upon estimates in southern Sacramento County, the Basin's 886 acres of grasslands would contain at the most 21.3 acres of vernal pools. Additionally, some portion of the Basin's 96 acres of ponds and seasonally wet areas may be suitable for vernal pool plants. However, this estimate greatly overestimates the actual amount of vernal pool habitat in the Basin because grasslands in the Basin have a lower density of vernal pools than surrounding areas of Sacramento County (see Environmental Baseline) and most of the ponds and seasonal wetlands do not have correct hydrology to support covered vernal pool species. Of the total 886 acres of grasslands in the Basin, 427 are in the City's Permit Area and 134 are in Sutter's Permit Area (Table 14). This equates to 10.2 and 3.26 acres of vernal pools in the City and Sutter's Permit Areas, respectively. Of the total 96 acres of ponds and seasonally wet areas in the Basin, seven are in the City's Permit Area, four are in the MAP Permit Area, and ten are in Sutter's Permit Area (Table 14). Most of the potential habitat that will be lost is located in the eastern portion of the City's Permit Area. As stated in the species descriptions, ponds and seasonally wet areas acreages almost certainly vastly overestimate the actual potential vernal pool acreage in the Basin, as most of the ponds and seasonally wet areas do not have the correct hydrology to support vernal pool-associated species. Ponds and seasonally wet areas located in the MAP Permit Area do not have the correct hydrology to support vernal pool plants and no other potential habitat is located within 76 m (250 ft.) of any of MAP's proposed action activities (Service 2002).

Issuance of the proposed ITP to the Conservancy may result in the loss of Colusa grass, slender Orcutt grass, Sacramento Orcutt grass, legenere, and Boggs Lake hedge-hyssop, should any of these species be found on reserve lands. Plants could be harmed or killed during reserve restoration or maintenance activities. For example, plants could be crushed by construction equipment creating habitat on the Conservancy's reserves or grazed by cattle used for invasive weed abatement. However, because the plants have not been observed in the Basin and there is very little, if any, suitable habitat in the Basin, the chance of the Conservancy impacting the species is very small.

Implementation of the proposed conservation measures will minimize the potential effects of the proposed action on the Colusa grass, slender Orcutt grass, Sacramento Orcutt grass, legenere, and Boggs Lake hedge-hyssop. The Land Use Agencies have proposed to require developers to survey, using a Service-approved protocol, for vernal pool plants in potential habitat. If vernal pool plants are identified, developers will be required to avoid impacts or mitigate for any effects on the plants. Possible strategies include: (1) on-site avoidance and preservation of the vernal pool resource; (2) payment into a Service-approved conservation bank; or (3) relocation of vernal pool resources (another potential direct effect related to development).

Indirect effects to Covered vernal pool plants may occur if upland areas surrounding potential vernal pool plant habitat are altered. For example, if the upland area adjacent to an occupied vernal pool is graded, the hydrology (i.e., depth, frequency and length of inundation, etc.) of the vernal pool could be changed, thereby affecting the plants that inhabit it. However, the Land Use Agencies have proposed conservation measures that either avoid or minimize indirect effects to vernal pool species. For example, if either Sacramento Orcutt grass, slender Orcutt grass, or Colusa grass are identified on-site, the Wildlife Agencies may require the landowner/developer to

preserve the vernal pool resource. In other cases, the landowner/developer will be required to mitigate for the effects according to the Service's current vernal pool guidelines.

Overall, the proposed action should have little to no effect on the Colusa grass, slender Orcutt grass, Sacramento Orcutt grass, legenere, and Boggs Lake hedge-hyssop. There is very little (if any) suitable habitat in the Basin and none of the species have been identified there. The plan contains avoidance, minimization, and mitigation measures to eliminate or offset any impacts to this species should any be discovered during pre-construction surveys required under the plan. The proposed action will not adversely affect the species outside the Basin. Therefore, the proposed action will not affect the viability of the Colusa grass, slender Orcutt grass, Sacramento Orcutt grass, legenere, and Boggs Lake hedge-hyssop in the vicinity of the Natomas Basin or as species.

Swainson's Hawk

The Swainson's hawk is a common inhabitant of the Natomas Basin. In 2001, active hawk nests were located in the City's, MAPPOA's, and Conservancy's proposed permit areas. Although no nests were located in Sutter's proposed permit area, nests were located close (< 1 mile) from the permit area. The overwhelming majority of the Basin's hawk nests are in mature trees situated either on the banks of or near the Sacramento River. Suitable hawk foraging habitat exists throughout the Basin in each of the proposed permit areas and is well within the known foraging range of the hawk. Implementation of the proposed action will likely affect the hawk throughout the action area by authorizing the City, Sutter, Conservancy, and MAPPOA to participate in and authorize activities that result in adverse effects to hawks through loss of habitat within the Permit Areas and on the Conservancy's reserves. Hawks will be disturbed through the removal of their nest trees and foraging habitat.

Effects to Nesting Habitat

The majority of the Basin's potential nesting habitat will not be directly affected by the issuance of the ITPs to the Permittees. Most known hawk nests and potential nest trees are located in unincorporated Sacramento County along the Sacramento River and outside of the proposed Permit Areas. Additional nest sites are located on lands within the City adjacent to the Sacramento River. These areas, which are located within the one mile-wide swath of land abutting the Sacramento River in the Basin known as the Swainson's hawk zone, constitute the core nesting habitat for the hawk within the Basin. With the exception of 252 acres previously approved for development by the City within the Swainson's hawk zone, ,the Permittees have committed to avoid development within this area. Following implementation of the proposed action, at least 263 of the Basin's total 328 acres (80.1 %) of potential nesting habitat will remain. However, it is likely that closer to 287 acres (87.5 %) of nesting habitat will remain, as the riparian habitat bordering Fisherman's Lake will not be removed.

Issuance of the proposed ITP to the City will likely result in effects on 40 acres of potential Swainson's nesting habitat (Table 5). Most of the potential nesting habitat is comprised of riparian areas (24 acres). Other nesting habitat types include oak groves (6 acres) and tree groves (10 acres). Much of the 24 acres of affected riparian areas is located on the east side of Fisherman's Lake and will not be developed. Although this habitat will not be destroyed, indirect effects are still likely (see below).

According to Figure 13 of the NBHCP, six Swainson's hawk nest trees are located in the City's proposed Permit Area (excluding the nests adjacent to Fisherman's Lake). A seventh tree was removed in 1998. Four of the six nests were inactive in 2002 (Estep 2002). At least two of these are in areas that have already been developed. In addition to the six nests that are located in the City's proposed Permit Area, a single nest is located just west of the City's proposed Permit Area, north of El Camino and west of I-80 (Estep 2002). This nest was active in 2002 and will likely be indirectly affected (described below) by the issuance of the proposed ITP to the City. Hawks could be also be disturbed by construction noise or daily activities once the City's Permit Area is developed.

Issuance of the proposed ITP to Sutter will not result in the direct loss of any potential nesting habitat (Table 5). Additionally, there are no Swainson's nests in Sutter's proposed Permit Area.

The effects of issuing the proposed ITP to the MAPPOA were analyzed in the January 16, 2002, biological opinion for that project (Service File # 1-1-01-F-0302). Issuance of the ITP to MAPPOA has or will result loss of 25 acres of potential hawk nesting habitat (tree groves = 23 acres, oak groves = 2 acres). A single hawk nest tree will be removed. This tree was active in 2001 (NBHCP 2002) and inactive in 2002 (Estep 2002). Another inactive nest is located on Powerline Road between the airport and MAP (Estep 2002). Sufficient information was not available to determine if the nest tree will be removed by the MAP project. However, at the very least, because of its proximity to MAP, hawks in the nest tree will likely be disturbed by construction activities or by daily activities once MAP is completed. A single active nest tree is also located directly south of the MAP Permit Area (Estep 2002) and will likely be directly affected by the issuance of the proposed ITP to MAPPOA. For example, hawks nesting in the tree could be disturbed by construction activities or disturbed as the site is used once it is developed. Hawks in nest trees in urban areas have been shown to have lower reproductive success than those in rural areas (England *et al.* 1995) (see indirect effects section below). To mitigate for the loss of the nest tree on the MAP site and other Swainson's hawk habitat, MAPPOA will secure 200 contiguous acres, in perpetuity, via fee title or conservation easement and turn the lands over to the Conservancy to manage for the benefit of Swainson's hawk nesting. The nest tree conservation lands will be secured entirely within the Natomas Basin in the Swainson's hawk one-mile zone along the Sacramento River, or in the eastern portion of the Natomas Basin, including, but not limited to, areas near the levees and Natomas East Main Drain. Acquisition will focus on sites that provide upland foraging habitat, have potential for additional acquisition of adjoining properties, and are surrounded by agricultural lands. The nest tree conservation lands will be planted with a minimum of fifteen trees. MAPPOA will provide funding sufficient for monitoring the success of replacement trees for a period of 3 years and plant additional replacement trees at the rate of one additional replacement tree for every replacement tree lost prior to the end of the 3 year monitoring period. Trees planted to replace trees lost, will be monitored for an additional 3 year period to ensure survival until the end of the monitoring period.

The NBHCP requires that the City and Sutter replace any nest trees directly impacted by the proposed action. Therefore, in order to mitigate for impacts to hawk nesting habitat (effects on four nest trees not located in existing development), the City has proposed to plant 60 trees (5 gallon size) at a ratio of 15:1 within 14 months of the issuance of the proposed Permit (see section V.A.5.b. of the NBHCP). Trees will be maintained, monitored, and as needed, replaced, in accordance with section V.A.5.b. of the NBHCP. Although the City has not yet provided

funding for planting the 60 nest trees, the Conservancy has planted potential nesting habitat on its Betts, Kismat, and Sliva, Bennet South preserves. Additional plantings are planned for Bennet North and Lucich South in 2003. Sutter does not propose to plant additional nest trees if the proposed ITP is approved, as no nest trees will be affected within their proposed Permit Area.

The conservation measures that the Land Use Agencies have proposed will mitigate the proposed action's impacts to nest trees. Very few documented nest trees will be directly impacted by the proposed action and there appears to be a surplus of Swainson's nest trees in the Basin. According to Estep (2002), only 43 of the Basin's 70 nest territories were active in 2002.[5] The NBHCP and associated EIR/EIS also document the amount of potential nesting habitat lost. Although it appears that approximately 20 percent of the Basin's total 328 acres of potential nesting habitat will be lost, in actuality, this value is closer to 13 percent.

Based upon Estep (2002), even if all six nest trees located in the City's Permit Area become unsuitable following issuance of the proposed ITPs, sufficient nest trees will remain for the Basin's hawks. In addition, replacement nest trees are being planted at a ratio of 15:1 to replace the four nest trees to be impacted by new development. This indicates that sufficient nesting habitat will be available for the hawk both in the short- and long-term. In addition, the Conservancy is already conducting nest tree plantings in its reserve system. Loss of nesting habitat is not a concern of implementing the NBHCP.

Effects to Foraging Habitat

In contrast to the small loss of Swainson's nesting habitat, issuance of the proposed ITPs will result in a larger loss of foraging habitat. Approximately 40 percent, or 9,188 acres, of the Basin's total 22,051 acres of potential foraging habitat will be lost as a result of issuing the proposed ITPs to the City, Sutter, and MAPPOA. However, while the amount of potential foraging habitat that will be lost is substantial, the location and quality of that existing habitat reduces the impacts of its loss on the hawk. Almost all of this habitat is considered moderate-quality habitat and, importantly, is not available for foraging during the majority of the hawk's nesting season. As discussed in the April 2003, Technical Addendum, the amount of usable foraging habitat available to the hawk in the Basin varies considerably during the hawk's time in the Basin. While available foraging habitat is abundant in some periods such as late summer or early fall, much less habitat is available in April, May, and July. Swainson's hawks lay eggs in April; young fledge in July. Therefore, much less foraging habitat is available during the hawk's nesting period. Based upon the results of Estep (1989) and Bechard (1982), this lack of available foraging habitat during the nesting period likely leads to larger foraging ranges. The overwhelming majority of foraging habitat lost to urban development is also greater than one mile (the distance from nest to foraging considered by CDFG [1994] to be of most importance to the hawk) from the majority of the Basin's Swainson's nest trees. Studies have shown that reproductive success decreases as the distance required to forage from the nest increases (Woodbridge 1991, England *et al.* 1997). The effects of the loss of foraging habitat on the hawk are lessened because plentiful foraging habitat west of the Sacramento River is currently, and in

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[5] Estep's (2002) data included nest trees on both sides of the waterways [i.e., Sacramento River, American River, Natomas East Main Drainage Canal and Natomas Cross Canal] surrounding the Natomas Basin.

the future will remain, available to and used by Swainsons' hawks nesting in the Basin (discussed below).

Issuance of the proposed ITP to the City will likely result in the loss of 6,925 acres (31.4 percent) of the Basin's total foraging habitat (Table 5). Of that total, 675 acres are considered high-quality habitat, 5,098 acres are considered moderate-quality habitat, and 1,152 acres are considered low-quality habitat. Issuance of the proposed ITP to Sutter will likely result in the loss of 1,860 acres (8.4 percent) of the Basin's total foraging habitat. Of that, eight acres are considered high-quality habitat and 1,852 acres are considered moderate-quality habitat. Issuance of the ITP to MAPPOA will likely result in the loss of 403 acres (1.8 percent) of the Basin's total foraging habitat. Of that 50 acres are considered high-quality habitat, 349 acres are considered moderate-quality habitat, and four acres are considered low-quality habitat. An additional 119 acres of potential foraging habitat will be affected by construction of off-site drainage, sewer, and roadway improvement related to the MAP project. In addition to reductions in potential Swainson's foraging habitat for the habitat types listed above, implementation of the proposed action will result in the loss of approximately 8,000 acres of rice. When fallowed or otherwise not flooded, rice fields provide potential marginal to moderate-quality foraging habitat for hawks. Therefore, issuance of the proposed ITPs to the Permittees will likely result in a further loss of rice foraging habitat.

Indirect Effects of Urban Development

In addition to the direct effects posed by the proposed ITPs, implementation of the proposed action will indirectly affect the hawk. The most likely indirect effect is a potential decrease in reproductive performance associated with development in proximity to nest trees. In these instances, nest trees would not be removed, but nearby foraging habitat would be converted to non-appropriate Swainson's foraging habitat types. For example, three nest trees located along Fisherman's Lake will not be removed as a result of the proposed action. However, they will be located in close proximity (250 ft. or less along the eastern edge of the lake) to urban development. Swainson's nesting success in developed areas has been shown to be reduced in comparison to rural areas (England *et al*. 1995). In another example, seven Swainson's hawk nest trees (3 active) are currently either located in or directly adjacent to existing development. Issuance of the proposed ITP will allow further development near these nest trees, thereby decreasing the amount of available foraging habitat nearby. The increased energy required to forage over greater distances could lead to a decrease in reproductive performance, as described in England *et al.* (1995). For the same reasons discussed above, Swainson's hawks using two nest trees adjacent to MAP will likely have reduced reproductive success in comparison to hawks nesting in rural areas.

Effect of Issuing the Proposed ITP to the Conservancy

Issuance of the proposed ITP to the Conservancy will have negligible negative effects on the hawk. Nesting and foraging hawks could be disturbed as a result of the Conservancy's reserve restoration and management activities. However, these effects are temporary, and should be minimal since the Conservancy will manage the mitigation lands for the benefit of the Covered Species. Perhaps the largest potential negative effect of the Conservancy's activities on the hawk could be the destruction of hawk foraging habitat during the construction of wetland reserves. However, this is unlikely, given the fact that lands suitable for wetland restoration will most

likely be either rice or existing wetlands. The creation of wetlands from rice may remove some marginal hawk foraging habitat, but of the potential foraging habitat types affected in the Basin, rice is least beneficial to the hawk (Estep 1989). The upland component of the managed marsh reserves will continue to provide suitable foraging and nesting habitat for the hawk.

The main positive benefit of the issuance of the proposed ITP to the Conservancy will be the development of the Conservancy's reserve system. After implementation of the proposed action, 2,187.5 acres of high-quality upland foraging habitat will be created and/or preserved and protected in perpetuity for the hawk. As described in the NBHCP, the upland foraging habitat will be managed for the hawk and will include both nesting and foraging habitat. Proposed acquisition criteria will help ensure that these upland areas are in close proximity to nesting hawks.

In addition to the Conservancy's upland reserves, the hawk will benefit somewhat from the Conservancy's managed marsh reserves and rice habitat. Rice fields will provide foraging habitat after they have been drained and before they are filled. The Conservancy will also fallow ten percent of its rice fields annually, which will provide up to 437.5 acres of fallow rice habitat in any given year. Managed marsh reserves contain between 20 and 30 percent uplands, which will provide between 437.5 and 656.25 acres of additional upland habitat. Rice fields and managed marsh uplands will likely be less beneficial for the hawk than habitats in upland reserves because upland reserves will be managed to maximize the amount of available hawk prey.

In order to mitigate for its effects to 6,925 acres of mostly moderate-quality foraging habitat, the City will provide 1,509.3 acres of potential foraging habitat. Of that, 1006.2 acres will be high-quality foraging habitat on the Conservancy's upland reserves; 201.2 acres will be moderate-quality habitat provided in the form of fallowed rice habitat on the Conservancy's rice lands; and up to 301.9 acres of moderate-quality uplands will be provided in the upland component of the managed marsh reserves. In order to mitigate for its effects to 1,860 acres of Swainson's mostly moderate-quality foraging habitat, Sutter will provide up to 1400.1 acres of foraging habitat. Of that, 933.4 acres will be potential high-quality foraging habitat on the Conservancy's upland reserves; 186.7 acres will be provided in the form of moderate-quality fallowed rice habitat on the Conservancy's rice lands; and up to 280.0 acres of moderate-quality uplands will be provided in the upland component of the managed marsh reserves. In order to mitigate for its effects to 502 acres (403 acres from project footprint and 199 acres from off-site improvements) of mostly moderate-quality Swainson's foraging habitat, MAPPOA will provide up to 371.9 acres of potential foraging habitat. Of that, 247.9 acres will be high-quality foraging habitat on the Conservancy's upland reserves; 49.6 acres will be provided in the form of moderate-quality fallowed rice habitat on the Conservancy's rice lands; and up to 74.4 acres of moderate-quality uplands will be provided in the upland component of the managed marsh reserves. An additional 200 acres of high-quality foraging habitat will be provided by MAPPOA to mitigate for the loss of a Swainson's hawk nest tree and surrounding foraging habitat.

When the potential effects of the proposed action on potential foraging habitat and proposed mitigation are considered together, the proposed action may cause a net decrease of between 7,000.5 and 9,188 acres of potential foraging habitat in the Basin. The exact amount will be determined by the existing use of upland reserves at the time of acquisition. For example, if a reserve is acquired that already provides suitable habitat for the hawk, no new habitat is created. If, on the other hand, a reserve is acquired that does not provide habitat for the hawk and is

restored/managed so that it provides habitat for the hawk, then new habitat is created. Therefore, if only existing upland habitat is preserved, the net loss will be 9,188 acres. In contrast, if all preserved upland habitat is created following acquisition by the Conservancy, there will be a net decrease of 7,000.5 acres of foraging habitat.

Benefits obtained through the creation of the Conservancy's upland reserves are actually greater than those described in the preceding paragraph. The majority of the Basin's existing Swainson's foraging habitat (e.g., sugar beets, tomatoes, melons, etc.) is moderate in quality and is not available throughout the hawk's nesting season. In contrast, the Conservancy's upland reserves will be high-quality habitat that is available throughout the time hawks are in the Natomas area. Because of the priorities established for the acquisition of upland reserves, there will be an increase in the amount of high-quality foraging habitat in the vicinity of the majority of the Basin's hawk nesting territories which will be available to the hawks during the nesting season, which should result in a decrease in the distance required for hawks to forage and a potential increase in reproductive success.

Even though there will be a net loss of available foraging habitat in the basin, the Conservancy's reserve system will have several advantages over existing foraging opportunities in the Basin. These include: (1) the Conservancy's uplands will be managed for the hawk and other upland species in perpetuity; (2) priorities for acquiring upland reserves will help ensure that managed uplands are in close proximity to the majority of the Basin's nests thus increasing the amount of foraging habitat in close proximity to nests during the critical nesting season; (3) upland reserves and the upland component of managed marsh reserves will provide opportunities for the establishment of new nest trees; (4) the upland component of managed marsh reserves will provide additional moderate-quality potential foraging habitat in perpetuity; (5) Conservancy rice fields will provide additional moderate-quality potential foraging habitat in perpetuity; (6) the amount of high-quality hawk foraging habitat will increase; (7) foraging habitat will be made available for Swainson's hawks throughout their time in the Basin; and (8) no development will occur in the one-mile wide Swainson's Hawk Zone, except for a small amount of acreage previously authorized for development in the City's proposed Permit Area. These factors will help avoid, minimize, and mitigate the effects of the proposed action on the hawk's nesting and foraging habitat.

Effect of the Proposed Conservation Measures

Implementation of the proposed conservation measures (see Sections V.A.1-3 and V.A.5.b of the NBHCP) will minimize the potential adverse effects of the proposed action on the hawk. Except for lands approved for urban development in the North Natomas Community Plan in 1994, the City and Sutter will not approve development permits within the one-mile-wide Swainson's Hawk Zone, which is adjacent to the Sacramento River. MAP is not located within the Swainson's Hawk Zone. If the City or Sutter seek to expand development into the Swainson's Hawk Zone beyond that described above, granting of such coverage would require an amendment to the NBHCP and ITPs, which would be subject to review and approval by the Service and the CDFG in accordance with all applicable statutory and regulatory requirements. Approval of any Urban Development within the Swainson's Hawk Zone beyond that described above would constitute a significant departure from the Plan's OCP and would trigger a new effects analysis, potential amendments and/or revisions to the Plan and Permits, a separate conservation strategy and issuance of ITPs to the permittee for that additional urban development, and/or possible

suspension or revocation of the City's and/or Sutter's Permits. Neither the City nor Sutter control lands in the Swainson's Hawk Zone within the unincorporated portion of Sacramento County. However, on December 10, 2002, the City and Sacramento County entered in to the "Joint Vision," a Memorandum of Understanding, in which they acknowledged no future growth may occur in the Basin without first analyzing the impacts to protected species (see Cumulative Effects section below). Therefore, the City, Sutter, and Sacramento County have acknowledged that no additional development may occur in the Swainson's Hawk Zone without environmental review.

In addition to not developing in the Swainson's Hawk Zone, additional measures will minimize and mitigate the potential effects of the proposed action on the hawk. Potential disturbance of active nests will be minimized through the use of pre-construction surveys, avoidance buffers (until the young have fledged), timing restrictions, and monitoring (see Section V.D.5.b of the NBHCP). These measures will ensure that disturbance of active nesting hawks is minimized. The loss of nest trees will be minimized by preserving large trees wherever possible and avoiding construction activities near active nests. In addition, the Land Use Agencies will mitigate the loss of nest trees in its proposed Permit Area by replacing lost trees at a rate of 15:1. The City will plant 60 replacement trees within 14 months of issuance of the proposed ITPs. By planting these trees up front and selecting trees that are likely to become suitable for the hawk relatively quickly (accomplished through species selection, management, and size at planting), the City will minimize the potential temporal effects of removing nest trees.

Implementation of the proposed conservation measures by the Conservancy will also help minimize the effects of the proposed action on the hawk. The Conservancy's measures include: (1) minimizing disturbance of active nests; (2) minimizing the number of nest trees lost; (3) mitigating loss of nest trees; (4) maximizing the foraging potential of upland reserves; and (5) maximizing the amount of available nesting habitat in the Basin. In addition, criteria established for the acquisition of upland reserves will help maximize their potential benefit to the hawk. All of these benefits will have the effect of making the mitigation lands more valuable to the hawk than if the lands were simply preserved.

Discussion

Following implementation of the proposed action, between 13,000 and 15,000 acres of potential Swainson's foraging habitat (including high-quality mitigation lands) will remain in the Basin. Most of the foraging habitat remaining after implementation of the proposed action will be moderate-quality habitat, but as shown in Table 5, most of the Basin's existing potential foraging habitat is moderate-quality habitat. Both the City and Sutter have committed to not developing lands in the Swainson's Hawk Zone (without conducting additional analyses and obtaining appropriate permits) if the proposed ITPs are approved. Because of its proximity to the majority of the Basin's hawk nests, this area is critical for the area's hawks. This is also where much of the high-quality foraging habitat that is expected to produce prey throughout the hawk's nesting season will be created on the Conservancy's upland reserves because the upland reserve acquisition criteria have been established so that much of the upland reserves are acquired in the Swainson's Hawk Zone. In addition to the continuing availability of foraging lands in the Basin, large expanses of foraging habitat are available in Yolo County on the west side of the Sacramento River. In fact, according to the Technical Addendum, Yolo County supports more than 200,000 acres of non-rice agricultural crops, 40,000 acres of which are planted in alfalfa.

Much of Yolo County's available foraging habitat is within the Swainson's flight distance. Much of this habitat is located in the Yolo and Sutter bypasses and because the bypasses are flood control structures that are subject to annual flooding and the State Reclamation Board's floodway restrictions, is very likely to never be developed. It is very likely that hawks nesting in or adjacent to the Basin currently forage in Yolo County. Even with the loss of potential foraging habitat that will result from implementation of the proposed action, a large amount of foraging habitat will remain available to support the Basin's hawks.

The proposed action is not likely to affect the viability of the hawk in the Basin, Central Valley, or as a species. Overall, the proposed action is likely to result in a shift in the timing and quality of Swainson's foraging habitat and an increase in the amount of suitable nest trees. Although approximately 9,000 acres (including MAP) of mostly moderate-quality foraging habitat will be lost, approximately 13,000 acres of mostly moderate-quality foraging habitat will not be affected. Almost all of the lost habitat will be outside the 1-mile Swainson's Hawk Zone and therefore, more than one mile away from the majority of the Basin's nest trees. In addition, a total of 2,387.5 acres (including extra 200 acres for MAP) of high-quality foraging habitat will be enhanced/ managed for the benefit of the hawk. This habitat will help offset the effects of the proposed action on Swainson's foraging by providing a consistent source of abundant prey for hawks, including times of the year (e.g., nesting season) when foraging habitat is limited in the Basin and much of it will be in close proximity to the majority of the Basin's nest trees. Additional Swainson's foraging opportunities will be gained from the 10 percent of the Conservancy's rice reserves that will be fallowed annually (437.5 acres) and the 20-30 percent of managed marsh reserve habitat that will be comprised of upland habitat (437.5-656.2 acres). Tens of thousands of acres of foraging habitat are also available just across the Sacramento River in Yolo County; which will not be developed in the foreseeable future. Very few Swainson's nest trees will be affected by the proposed action and almost 40 percent of the available hawk nest territories are not being used (Estep 2002). This surplus of nest territories will minimize the temporal loss of those nest trees that are directly affected. Nest trees that are affected will also be replaced at a ratio of 15:1. This, in conjunction with other tree plantings on the Conservancy's reserves, will result in a substantial increase in the number of nest trees in the Basin. Because of the avoidance, minimization and mitigation measures proposed by the applicants, and the habitat conditions within and outside the Basin after implementation of the proposed action, the proposed action should not result in the significant injury or death of hawks that nest and forage in the Basin. The primary impact of the proposed action will be a net loss of potential Swainson's hawk foraging habitat; however, because of the varying quality of that habitat and its limited availability to the species during the nesting season, this loss will not result in significant adverse effects to the hawks in the basin. Substantial amounts of foraging habitat will remain in the basin as well as abundant foraging habitat in nearby Yolo County, and the proposed action will result in the addition of high-quality foraging habitat managed specifically to benefit the hawk (i.e., located in close proximity to nest trees, managed to produce mots of hawk prey, available throughout the hawk's time in the Basin, etc.). The environmental baseline combined with the conservation measures provided under the plan should continue to support a viable Natomas Basin Swainson's hawk population. Because significant adverse effects to the species are not anticipated locally, the Service does not anticipate adverse effects to either the Central Valley population or the species as a whole.

Aleutian Canada Goose

Implementation of the proposed action will likely affect the goose throughout the action area by authorizing the City, Sutter, Conservancy, and MAPPOA to participate in and authorize activities that directly result in the disturbance of geese throughout the Permit Areas and on the Conservancy's reserves. The goose is known to occasionally occur in the Basin during the winter and suitable goose foraging habitat will be altered/destroyed by each of the Permittees. Loud noises produced by construction activities on or adjacent to the goose's habitat in the winter will likely disturb geese.

In addition to disturbing the goose, implementation of the proposed action may result in minimal impacts to the goose through the destruction of 14,751 acres of potential winter habitat (Table 6). Although the total number of acres of goose habitat that will be lost is greater than that for species such as the snake, the goose is not constrained by such factors as connectivity and is only an occasional visitor to the Basin. Issuance of the ITP to the City will result in the loss of 4,663 acres of non-rice crops, 23 acres of pasture, and 970 acres of rice habitat. Issuance of the ITP to Sutter will result in the loss of 1,529 acres of non-rice crops, 101 acres of pasture, and 5,577 acres of rice habitat. The effects of the issuance of an ITP to MAP were analyzed in the January 16, 2002, biological opinion for that project (Service File # 1-1-01-F-0302). Issuance of the ITP to MAPPOA will result in the loss of 325 acres of non-rice crops, 22 acres of pasture, and 1,541 acres of rice habitat.

Issuance of an ITP to the Conservancy will have both beneficial and deleterious effects on the goose. Construction activities conducted in the goose's wintering habitat (e.g., non-rice crops) when the goose is in the Basin may disturb geese. The construction of up to 2,187.5 acres of managed marsh will further decrease the amount of available foraging habitat for the goose. However, the managed marsh may be used as loafing or roosting habitat. Hunting is being considered on Conservancy reserves and may also directly affect the goose. Geese may be injured or killed by hunting activities. However, hunting is not a covered activity and this should only happen rarely. Given the goose's limited use of the Basin, the fact that the species ranges from southern Oregon through the San Joaquin Valley, and the healthy increasing population, hunting's effects on the goose in the Basin should be negligible.

Implementation of the proposed goose conservation measures will minimize impacts to the goose. Most importantly, the establishment of the Conservancy's system of reserves will help provide a stable system of winter habitat for the goose. All of the Conservancy's 8,750 acres of rice reserves and 2,187.5 acres of upland reserves will serve as potential habitat for the species and uplands within the managed marsh reserves may be used as loafing or roosting habitat. In order to mitigate the loss of the 5,656 acres of goose habitat resulting from the issuance of the proposed ITP to the City, 2012.5 acres of rice habitat and 1006.2 acres of uplands will be preserved and managed in perpetuity. In order to mitigate the loss of the 7,207 acres of goose habitat resulting from the issuance of the proposed ITP to Sutter, 1866.8 acres of rice habitat and 933.4 acres of uplands will be preserved and managed in perpetuity. In order to mitigate the loss of the 1,888 acres of goose habitat resulting from the issuance of the proposed ITP to the MAPPOA, 495.8 acres of rice habitat and 247.9 acres of uplands will be preserved and managed in perpetuity. Additional potential foraging and loafing acreage will be gained through the development of the 2,187.5 acres of managed marsh reserves.

In addition to the Conservancy's reserves, disturbance effects of the proposed action on geese in rice fields will be minimized by the use of the May 1-October 1 snake construction window. Because of the work window, no geese should be in rice fields when construction activities occur.

Overall, the effects of the proposed action on the goose should be minimal. Considering the goose's limited use of the Basin, the very small amount of the goose's total wintering range occupied by the Basin, the overall health of the subspecies, and the abundant habitat throughout the Central Valley, the loss of habitat resulting from the proposed action is practically inconsequential to the goose. This subspecies most often winters in other areas of the Sacramento Valley, including the Sacramento, Colusa, Butte Sink, and Sutter National Wildlife Refuges and the agricultural fields that surround them. Outside of the Natomas Basin, there are hundreds of thousands of acres (just considering rice fields) of potential winter foraging habitat for the goose. Furthermore, the amount of foraging habitat does not appear to be a factor limiting the number of geese in the Basin and the Conservancy's reserve system will increase the amount of available loafing and roosting habitat. Based upon the baseline habitat of the goose, its use of the Basin, the health of goose populations, and benefits acquired from the Conservancy's reserve system, the amount of development planned in Natomas will not affect the viability of the goose in the Basin, Central Valley, or species as a whole.

Burrowing Owl

Implementation of the proposed action will likely affect the owl by authorizing the City, Sutter, Conservancy, and MAPPOA to participate in and authorize activities that result in direct effects to owls throughout the Permit Areas and on the Conservancy's reserves. The owl is known to occur in the proposed action's action area, nesting owls have been observed in each of the proposed permit areas, and suitable habitat will be altered/destroyed by each of the Permittees. Take could be in the form of disturbance, injury or death of owls. Examples of possible owl take include, but are not limited to: (1) owls could be disturbed by noise produced by construction activities or humans working within the owl's habitat; (2) owls could be killed if burrows are destroyed while inhabited by owls; (3) owls could be displaced if their burrows are destroyed while they are not in them; and (4) development conducted in foraging habitat adjacent to an owl's burrow could cause the owl to venture further for food or move to another burrow.

Approximately 700 acres of potential burrowing owl foraging habitat (alfalfa, grassland, pasture) (Table 7) and 64.5 (35.4 percent) of the total 246.8 miles of canals in the Basin will be lost as a result of the proposed action. Berms, banks, and levees bordering the canals are often used by ground squirrels and therefore, offer burrows for the owl. Some canals not lost as a result of development will also become unsuitable for the owl because they will be surrounded by development and therefore, no longer in proximity to suitable foraging habitat. On the other hand, some of the canals are surrounded by rice habitat (not suitable foraging habitat) and are therefore probably less likely to be inhabited by owls.

Issuance of the proposed ITP to the City will result in the development of 427 acres of grassland and 23 acres of pasture, which constitute suitable owl foraging habitat (Table 7). In addition, at least 19.3 miles of canals whose banks may be inhabited by ground squirrels (whose burrows are often used by owls) will be lost. Issuance of the proposed ITP to Sutter will result in the development of 134 acres of grassland and 101 acres of pasture, which constitute suitable owl foraging habitat. In addition, approximately 33.6 miles of canals whose banks may be inhabited

by ground squirrels will be lost. The effects of issuance of the ITP for the MAP project were analyzed in the January 16, 2002, biological opinion for that project. Issuance of the proposed ITP to the MAPPOA will result in the development of 22 acres of pasture, which constitute suitable owl foraging habitat. In addition, 11.6 miles of canals whose banks may be inhabited by ground squirrels will be developed.

Upon implementation of the proposed action, the Conservancy will create/restore and protect in perpetuity 8,750 acres of habitat preserves. Of that, approximately 2,187.5 acres will would be maintained as upland habitat and would be potential foraging habitat for the burrowing owl. However, the burrowing owl exhibits strong site fidelity and may not readily find newly created suitable habitat. Additional habitats made available to the owl as a result of implementing the Conservancy's reserve system include upland foraging habitat within the managed marsh component of the reserve system and irrigation/drainage canals on reserve lands. Approximately 20-30 percent (437.5-656.2 acres) of the total 2,187.5 acres of managed marsh reserves will be managed as dryland pasture or grasslands. In addition, those irrigation/drainage canals located on Conservancy lands not operated by Natomas Mutual or RD 1000 will be managed in a more ground squirrel-friendly manner, which should provide more burrows for the owl. Contiguity of marsh upland reserves will be important to help maintain larger groups of burrowing owls. In 1999, the Conservancy acquired the Betts-Kismat-Silva property, which is "probably home to the largest concentration of burrowing owls in the Natomas Basin" (Wildlands 2000). The Conservancy has also acquired the Ayala tract, which is inhabited by owls. These two reserves represent the only known owl occurrences within the Basin that are outside of the proposed Permit Areas.

In order to mitigate the loss of 450 acres of potential owl foraging habitat resulting from the issuance of the proposed ITP to the City, 1006.2 acres of potential upland foraging habitat will be created on the Conservancy's upland reserves. In addition, between 201.2 and 301.9 acres of potential upland foraging habitat will be created on the Conservancy's managed marsh reserves. In order to mitigate the loss of 235 acres of potential owl foraging habitat resulting from the issuance of the proposed ITP to Sutter, 933.4 acres of potential upland foraging habitat will be created on the Conservancy's upland reserves. In addition, between 186.7 and 280.0 acres of potential upland foraging habitat will be created on the Conservancy's managed marsh reserves. In order to mitigate the loss of 22 acres of potential owl foraging habitat resulting from the issuance of the proposed ITP to the MAPPOA, 247.9 acres of potential upland foraging habitat will be created on the Conservancy's upland reserves. In addition, between 49.6 and 74.4 acres of potential upland foraging habitat will be created on the Conservancy's managed marsh reserves.

As described in the effects analysis for the giant garter snake, a decrease or change in demand for irrigation water may lead to a change or decrease in the number of canals in the Basin. Canals removed from use may no longer support mammals such as the ground squirrels, whose burrows are used by owls in the Basin. Additionally, if canals are modified or moved, the burrows in the banks of the existing canals may be destroyed.

Implementation of the proposed conservation measures will avoid, minimize, and mitigate the effects of the proposed action on the owl. The Land Use agencies will not permit owls to be disturbed during the nesting season and owl relocation efforts will be made during the rest of the year. Studies are currently being conducted to evaluate the effectiveness of passive owl relocations (D. Gifford, pers. comm.). Relocation efforts in Canada and California have been

somewhat successful (Haug *et al.* 1993) and management efforts using artificial nets boxes in burrows in Sacramento County have led to habitual use by burrowing owls (SRCSD 2002). Conservation measures employed by the Conservancy will also minimize the effects of the proposed action on the owl.

The NBHCP's acquisition strategy and the SSMPs it develops for each of the reserves will reflect the needs of the owl and should provide effective measures to offset impacts to the owl resulting from development in the Permit areas. The Conservancy will consider the habitat and management requirements of burrowing owls when developing management plans for the upland reserves and upland components of managed marsh reserves.

Although burrowing owls will be impacted by the proposed action, proposed action activities will not affect the viability of the subspecies. Although owls in the Basin will be impacted, the Permittees have proposed conservation measures that mitigate the impacts. For example, relocation will be used to move owls from areas to be developed to Conservancy reserves. Once on the Conservancy's reserves, the owls will benefit from the stability of high-quality foraging and burrow habitat. The Conservancy's proposed conservation measures include measures to provide burrow and foraging habitat for the owl as well as minimize impacts to burrowing animals such as ground squirrels (whose burrows are used by the owl). In contrast, much of the Basin's existing potential habitat is subject to frequent disturbance that lessens its value to the species. The conservation measures provided under the plan should provide for the continued viability of the owl in the basin. In addition, because the Natomas Basin represents a very small portion of both the subspecies' and Central Valley population's population and range, and any negative impacts to the owl resulting from the proposed action will not compromise the viability of the Central Valley population, the subspecies, or the species as a whole.

Loggerhead Shrike

Implementation of the proposed action will likely affect the loggerhead shrike throughout the proposed project's action area by authorizing the City, Sutter, Conservancy, and MAPPOA to participate in and authorize activities that may result in the disturbance, injury or death of shrikes throughout the Permit Areas and on the Conservancy's reserves. The shrike is a non-migratory resident of the Natomas Basin, is known to breed in the Basin, and is observed regularly throughout Natomas Basin (Thomas Reid Associates 2000). Suitable shrike habitat will be altered/destroyed by each of the Permittees. In addition to disturbance, take of shrikes will likely occur in other forms. For example, shrike mortalities could occur as a result of increased vehicular traffic.

Habitat conversion will likely be the greatest effect to the shrike as a result of the proposed action. Land converted from compatible to incompatible habitat types will likely result in the displacement of birds, decreased nesting and foraging habitat and increased competition. Based on the habitat and land use analysis, potential shrike habitat would decline by about 9,000 acres. However, most of the potential habitat that would be lost would be nonrice crops which provide relatively poor habitat for loggerhead shrike because the shrike feeds predominantly on insects and intensive management of agricultural lands strives to reduce insect pests. Further, insecticides are used to control insect pests, and insecticide use is believed to contribute to the decline of loggerhead shrike populations (Kaufman, 1996).

Issuance of the proposed ITP to the City will result in the loss of 427 acres of grassland habitat, 4,663 acres of non-rice crop habitat, six acres of oak groves, 13 acres of orchards, 23 acres of pasture, seven acres of ponds and seasonally wet areas, 24 acres of riparian habitat, 1,137 acres of ruderal areas, 46 acres of rural residential, ten acres of tree groves, and 117 acres of canals (Table 8). Issuance of the proposed ITP to Sutter will result in the loss of 134 acres of grassland habitat, 1,539 acres of non-rice crop habitat, 101 acres of pasture, 10 acres of ponds and seasonally wet areas, 88 acres of ruderal areas, and 215 acres of canals. The effects of issuance of the ITP for the MAP project were analyzed in the January 16, 2002, biological opinion for that project. Issuance of the proposed ITP to the MAPPOA will result in the development of 325 acres of non-rice crop habitat, two acres of oak groves, 22 acres of pasture, four acres of ponds and seasonally wet areas, six acres of ruderal areas, ten acres of rural residential, 23 acres of tree groves, and 72 acres of canals.

Issuance of the proposed ITP to the Conservancy will have both beneficial and deleterious effects on the shrike. Potential negative effects include, but are not limited to: (1) construction activities conducted in or near the shrikes's foraging habitat may disturb shrikes; and (2) conversion of habitat on Conservancy reserves may inadvertently make that habitat less suitable for shrike nesting or foraging. However, since the Conservancy must consider the needs of all Covered Species when designing SSMPs, adverse effects should be minimal. Once completed, the Conservancy's habitat reserves will provide 2,187.5 acres of high-quality upland habitat for the shrike in perpetuity. This habitat will be more stable in quality and location and may encourage the establishment and long-term persistence of a breeding population in the Natomas Basin. Specifically to attract and maintain loggerhead shrikes, the Conservancy will encourage development and maintenance of perching and nesting sites on habitat reserves. Riparian habitat and some of the managed marsh on the reserves may provide additional nesting opportunities and foraging perch sites.

In order to mitigate the loss of potential shrike foraging habitat resulting from the issuance of the proposed ITP to the City, 1006.2 acres of potential foraging habitat will be created on the Conservancy's upland reserves. In order to mitigate the loss of potential shrike foraging habitat resulting from the issuance of the proposed ITP to Sutter, 933.4 acres of potential upland foraging habitat will be created on the Conservancy's upland reserves. In order to mitigate the loss of potential shrike foraging habitat resulting from the issuance of the proposed ITP to the MAPPOA, 247.9 acres of potential upland foraging habitat will be created on the Conservancy's upland reserves.

Implementation of the proposed conservation measures will minimize the adverse effects of the proposed action on the shrike. Active shrike nests will be avoided by at least 30.5 m (100 ft.), thereby decreasing disturbance of nesting shrikes. The use of pre-construction surveys should also minimize the take of shrikes.

Loss of canal habitat (see snake discussion) and predation are two potential indirect effects of the proposed action. Development authorized as a result of this HCP could result in the future loss of irrigation/drainage canals in the Basin. As stated in the species description, suitable shrike nesting habitat may grow along canals. Cats are known to prey upon the San Clemente Loggerhead Shrike. Indirect effects of predation will be minimized by acquiring preserves no closer than
800 feet from development.

Issuance of the proposed ITPs to the Permittees is not likely affect the viability of the shrike in the Basin, Central Valley, or as a species. After implementation of the proposed action, over 14,000 acres of shrike foraging habitat will remain in the Basin and additional nesting and perching opportunities will be available. Continued use of the Basin by the shrike is very likely. The species is not considered to be subject to any identifiable threat in the State and populations in the western United States appear to be stable. Shrikes are common throughout lowland California and the Natomas Basin represents a very small fraction of the species' range.

Tricolored Blackbird

Implementation of the proposed action will likely affect the tricolored blackbird throughout the project's action area by authorizing the City, Sutter, Conservancy, and MAPPOA to participate in and authorize activities that directly result in the disturbance of blackbirds throughout the Permit Areas and on the Conservancy's reserves. Tricolor nesting colonies occur in the Basin and suitable tricolor habitat (especially foraging habitat) will be altered/destroyed by each of the Permittees. Displacement of tricolors will also result from loss of potential nesting and foraging habitat.

A total of 449 acres of potential nesting habitat (404 acres of canals, 21 acres of ponds and seasonally wet areas, and 24 acres of riparian) would be converted to urban development as a result of implementing the proposed action (Table 9). However, the actual acreage of nesting habitat lost may be lower than this because: (1) most of the 24 acres of riparian habitat lost is actually located within the buffer area adjacent to Fisherman's Lake (it is not known whether the limited buffer provided at the Lake will fully protect the tricolor); and (2) much of the canal acreage is open water and therefore, not nesting habitat. Nesting habitat would likely be limited to the vegetated margins of the canals. Implementation of the proposed action would result in the loss of 15,311 acres of potential tricolor foraging habitat (non-rice crops = 6,517 acres, grassland = 560 acres, pasture = 147 acres, and rice = 8,087 acres)(Table 9).

Issuance of the proposed ITP to the City would result in the loss of approximately 148 acres of potential tricolor nesting habitat (ponds and seasonally wet areas = 7 acres, riparian = 24 acres, canals = 117 acres) and 6,083 acres of potential tricolor foraging habitat (non-rice crops = 4,663 acres, grassland = 427 acres, pasture = 23 acres, and rice = 970 acres) (Table 9). Issuance of the proposed ITP to Sutter would result in the loss of 225 acres of potential nesting habitat (ponds and seasonally wet areas = 10 acres and canals = 215 acres) and 7,341 acres of potential foraging habitat (non-rice crops = 1,529 acres, grassland = 134 acres, pasture = 101 acres, and rice = 5,577 acres). The effects of issuance of the ITP for the MAP project were analyzed in the January 16, 2002, biological opinion for that project. Issuance of the proposed ITP to the MAPPOA would result in the loss of 76 acres of potential nesting habitat (ponds and seasonally wet areas = 4 acres, canals = 72 acres) and 1,888 acres of potential foraging habitat (non-rice crops = 325 acres, pasture = 22 acres, and rice = 1,541 acres).

Issuance of the proposed ITP to the Conservancy will have both beneficial and deleterious effects on the tricolor. Potential adverse effects include, but are not limited to: construction activities conducted in or near the tricolor's foraging and nesting habitat may disturb tricolors. However, overall, the beneficial effects of issuing the ITP to the Conservancy will far out-weigh the deleterious effects.

Once completed, the Conservancy's habitat reserves will provide up to 8,750 acres of habitat for the tricolor in perpetuity. Potential nesting habitat will be created in the 2,187.5 acres of managed marsh. With the limited amount of marsh habitat currently available in the Basin, this is a substantial increase the amount of potential nesting habitat available to the Basin's tricolors. Potential foraging habitat will also be created on the Conservancy's 4,375 acres of rice and 2,187.5 acres of upland reserves. The NBHCP's requirement that the Conservancy consolidate reserves will help ensure that abundant potential foraging habitat is in close proximity to nesting habitat. According to DeHaven (2003, pers. comm, with Craig Aubrey), suitable insect prey bases in close proximity to breeding substrates is important for the tricolor.

In order to mitigate the loss of potential tricolor foraging habitat resulting from the issuance of the proposed ITP to the City, 3018.8 acres of potential foraging habitat (rice and uplands) will be created/managed on the Conservancy's upland and rice reserves. In order to mitigate the loss of tricolor nesting habitat resulting from the issuance of the proposed ITP to the City, 1006.25 acres of potential nesting habitat will be created on the Conservancy's managed marsh reserves. In order to mitigate the loss of potential tricolor foraging habitat resulting from the issuance of the proposed ITP to Sutter, 2,800.1 acres of potential foraging habitat (rice and uplands) will be created on the Conservancy's upland and rice reserves. In order to mitigate the loss of potential tricolor nesting habitat resulting from the issuance of the proposed ITP to the City, 933.4 acres of potential nesting habitat will be created on the Conservancy's managed marsh reserves. In order to mitigate the loss of potential tricolor foraging habitat resulting from the issuance of the proposed ITP to the MAPPOA, 743.7 acres of potential foraging habitat (rice and uplands) will be created on the Conservancy's upland and rice reserves. In order to mitigate the loss of tricolor nesting habitat resulting from the issuance of the proposed ITP to the MAPPOA, 247.9 acres of potential nesting habitat will be created on the Conservancy's managed marsh reserves.

Implementation of the proposed conservation measures will minimize the adverse effects of the proposed action on the tricolor. The Land Use Agencies and Conservancy will avoid active tricolor nests by at least 152 m (500 ft.), thereby decreasing disturbance of nesting tricolors and preventing the destruction of active nests. The use of pre-construction surveys should also minimize the take of tricolors. The Conservancy has also proposed to avoid, to the maximum extent possible, foraging habitat in the vicinity of currently or historically active nests, which may help increase survivorship of young. Lastly, the tricolor should indirectly benefit from conservation measures proposed or the snake such as: (1) timing restrictions; (2) dewatering requirements; and (3) vegetation control management because these measures should minimize the disturbance of tricolors.

Potential indirect effects of the proposed action is the loss of canal habitat (see snake discussion) and predation by feral or domestic animals. Development authorized as a result of this HCP could result in the future loss of irrigation/drainage canals in the Basin, which may result in additional losses of potential nesting habitat. Indirect effects of predation will be minimized by acquiring preserves no closer than 800 feet from development.

Overall, the tricolor should benefit from the Plan. Construction of the Conservancy's managed marsh reserves will increase tricolor nesting habitat in proximity to foraging habitat, which is currently limited in the Basin and the Central Valley as a whole. Even though over 15,000 acres of foraging habitat will be converted to urban uses as a result of issuing the ITPs, over 25,000 acres of foraging habitat will remain after issuance of the proposed ITPs. This remaining

foraging habitat, coupled with the created high-quality nesting habitat should increase the value of the Basin to the tricolor. As stated earlier, tricolor numbers have declined in Sacramento County. An increase in nesting habitat and numbers of tricolor in the Basin could result in a small boost (given the species' range and population size) to the species overall.

White-Faced Ibis

Implementation of the proposed action will likely affect the white-faced ibis throughout much of the proposed action's action area by authorizing the City, Sutter, Conservancy, and MAPPOA to participate in and authorize activities that directly result in the disturbance of wintering ibis throughout the Permit Areas and on the Conservancy's reserves. Although the ibis does not nest in the Basin (there is a lack of potential nesting habitat), the species does winter and forage there and suitable foraging habitat will be altered/destroyed by each of the Permittees.

The greatest source of potential take associated with the implementation of the proposed action is the loss of approximately one-third (8,512 acres) of the available potential foraging and wintering habitat in the Basin, the overwhelming majority of which is comprised of rice. Of the total ibis habitat lost in the Basin, 95 percent (8,087 acres) is rice, 0.25 percent (21 acres) is ponds and seasonally wet areas, and 4.75 percent (404 acres) is canals (Table 10).

Issuance of the proposed ITP to the City will result in the loss of 1,097 acres of potential ibis habitat (Table 10). Of that, 970 acres will be rice, seven acres will be ponds and seasonally wet areas, and 117 acres will be canals. Issuance of the proposed ITP to Sutter will result in the loss of 5,802 acres of potential ibis habitat. Of that, 5,577 acres will be rice, ten acres will be ponds and seasonally wet areas, and 215 acres will be canals. The effects of issuance of the ITP for the MAP project were analyzed in the January 16, 2002, biological opinion for that project. Issuance of the proposed ITP to the MAPPOA will result in the loss of 1,617 acres of potential ibis habitat. Of that, 1,541 acres will be rice, four acres will be ponds and seasonally wet areas, and 72 acres will be canals.

Issuance of the ITP to the Conservancy will have both negative and positive direct effects on the ibis. Examples of possible negative effects on the ibis include, but are not limited to: (1) disturbance as a result of construction and maintenance activities on Conservancy reserves; and (2) the loss of rice foraging habitat due to conversions to other habitat types. However, the Conservancy's overall effects on the ibis will be almost overwhelmingly positive. Rice production practices on Conservancy lands should prove to be more "ibis friendly" and more importantly, the development of the managed marsh component of the reserve system should provide nesting and roosting opportunities for the ibis, which are currently limited in the Central Valley and virtually non-existent in the Natomas Basin. The potential benefit of the managed marsh as nesting and roosting habitat should increase through time, as the reserve system increases in size and individual reserves are consolidated.

In order to mitigate the loss of potential ibis foraging habitat (alfalfa, ponds and seasonally wet areas, rice canals) resulting from the issuance of the proposed ITP to the City, 2012.5 acres of potential rice foraging habitat (rice and uplands) will be managed by the Conservancy in perpetuity. In addition, 1006.2 acres of potential foraging, nesting, and roosting habitat will be created on the Conservancy's managed marsh reserves. In order to mitigate the loss of potential ibis foraging habitat (alfalfa, ponds and seasonally wet areas, rice canals) resulting from the

issuance of the proposed ITP to Sutter, 1866.8 acres of potential rice foraging habitat (rice and uplands) will be managed by the Conservancy in perpetuity. In addition, 933.4 acres of potential foraging, nesting, and roosting habitat will be created on the Conservancy's managed marsh reserves. In order to mitigate the loss of potential ibis foraging habitat (alfalfa, ponds and seasonally wet areas, rice canals) resulting from the issuance of the proposed ITP to the MAPPOA, 495.8 acres of potential rice foraging habitat (rice and uplands) will be managed by the Conservancy in perpetuity. In addition, 247.9 acres of potential foraging, nesting, and roosting habitat will be created on the Conservancy's managed marsh reserves.

Implementation of the proposed conservation measures by the Permittees should minimize the effects of the proposed action on the ibis. Avoidance of developed areas by at least 244 m (800 ft.) by the Conservancy's reserves will help minimize exposure of ibis to development-related effects. Measures included for the avoidance of active ibis nests should benefit the ibis, if and when ibis use lands in the Basin for nesting. Lastly, the ibis should benefit from conservation measures proposed for the snake. For example, limiting construction activities in snake habitat to the snake's active season will limit the destruction of ibis wintering habitat to times when the majority of ibis are not in the Basin.

Potential indirect effects of the proposed action include predation and the additional closure of canals. Development authorized as a result of this HCP could result in the future loss of irrigation/drainage canals in the Basin (see snake discussion), which may result in additional losses of potential nesting habitat. Indirect effects of predation will be minimized by acquiring preserves no closer than 800 feet from development.

Issuance of the proposed ITPs to the Permittees should benefit the ibis. Although about 1/3 of the ibis' foraging habitat in the Basin will be converted to urban uses, over 16,000 acres of ibis foraging habitat will remain after implementation of the proposed action. More importantly, the Conservancy's system of managed marsh reserves will provide potential nesting habitat for the ibis. Ibis nesting habitat is limited throughout the Central Valley; foraging habitat is not. The species is precluded from nesting in the Basin because no nesting habitat occurs there. Therefore, although there will be an overall decrease of foraging habitat in the Basin, the species should benefit because of the opportunities created for the breeding portion of its life cycle.

Bank Swallow

Implementation of the proposed action will likely affect the bank swallow throughout the project's action area by authorizing the City, Sutter, Conservancy, and MAPPOA to participate in and authorize activities that directly result in the disturbance of swallows throughout the Permit Areas and on the Conservancy's reserves. Although the swallow does not nest in the Basin, the species does nest nearby and could forage in the Basin. Potential foraging habitat will be altered/ destroyed by each of the Permittees. In addition to disturbance, once completed, implementation of the proposed action will result in the conversion of approximately 15,760 acres of potential swallow foraging habitat.

Issuance of the proposed ITP to the City will result in the loss of 6,231 acres of potential swallow foraging habitat. Effected habitat types include: grassland (427 acres), nonrice crops (4,663 acres), pasture (23 acres), ponds and seasonally wet areas (7 acres), rice (970 acres), riparian

(24 acres), and canals (117 acres) (Table 11). Issuance of the proposed ITP to Sutter will result in the loss of 7,566 acres of potential swallow foraging habitat. Effected habitat types include: grassland (134 acres), nonrice crops (1,529 acres), pasture (101 acres), ponds and seasonally wet areas (10 acres), rice (5,577 acres), and canals (215 acres). The effects of issuance of the ITP for the MAP project were analyzed in the January 16, 2002, biological opinion for that project. Issuance of the proposed ITP to the MAPPOA will result in the loss of 1,964 acres of potential swallow foraging habitat. Effected habitat types include: nonrice crops (325 acres), pasture (22 acres), ponds and seasonally wet areas (4 acres), rice (1,541 acres), and canals (72 acres).

Issuance of the proposed ITP to the Conservancy would have both positive and negative effects on the swallow. Swallows could be disturbed by construction or management activities on Conservancy reserves. Additionally, swallow foraging habitat may be temporarily disturbed or converted to other types during the implementation of SSMP's. Although some negative effects would likely occur to the swallow as a result of issuance of the proposed ITP to the Conservancy, the overall effects of issuing the ITP to the Conservancy would be overwhelmingly positive. Construction of the Conservancy's reserves would ensure a permanent source of swallow foraging habitat in the Basin. In addition, the diversity of habitat types on the Conservancy's reserves would help provide varying prey types at different times of year.

All of the Conservancy's rice, managed marsh, and upland reserves will provide potential foraging habitat for the swallow. In order to mitigate the loss of potential swallow foraging habitat resulting from the issuance of the proposed ITP to the City, 4025 acres of potential foraging habitat will be created on the Conservancy's managed marsh, rice, and upland reserves. In order to mitigate the loss of potential swallow foraging habitat resulting from the issuance of the proposed ITP to Sutter, 3733.5 acres of potential foraging habitat will be created on the Conservancy's managed marsh, rice, and upland reserves. In order to mitigate the loss of potential swallow foraging habitat resulting from the issuance of the proposed ITP to MAPPOA, 991.5 acres of potential foraging habitat will be created on the Conservancy's managed marsh, rice, and upland reserves.

If swallows begin to nest in the Basin (unlikely, given the absence of suitable nesting habitat), implementation of the proposed conservation measures by the Permittees will help minimize direct effects to the bank swallow. In addition, the Conservancy is proposing to use CDFG's swallow recovery plan, which should assist the Conservancy's efforts to manage the species on its lands.

Potential indirect effects of the proposed action include predation and the additional closure of canals (see snake discussion). Development authorized as a result of this HCP could result in the future loss of irrigation/drainage canals in the Basin, which may result in additional losses of potential nesting habitat. Indirect effects of predation will be minimized by acquiring preserves no closer than 800 feet from development.

Overall, the impacts of issuance of the proposed ITPs to the Permittees should be negligible. Although the vast majority of California's bank swallows are found on the Sacramento River, most nesting colonies are found upstream of the confluence of the Sacramento and Feather Rivers (Garrison *et al.* 1987, Laymon *et al.* 1988) and there is little potential nesting habitat (i.e., vertical banks) in the vicinity of the Natomas Basin (R. DeHaven, pers. comm., to Craig Aubrey, 2003). Much of the river bank in the vicinity of Sacramento and the Natomas Basin is covered in riprap

or otherwise is not suitable for bank swallow nesting habitat. Although about one-third of the Basin's potential foraging habitat will be converted to urban uses, over 27,000 acres (not considering the Conservancy's reserves) will remain after implementation of the proposed action. Development is precluded from the Swainson's Hawk Zone, which is the portion of the Basin closest to the Sacramento River (where swallow nesting colonies would occur). This is especially important during the breeding season, when swallows forage in close proximity to their nests. Because of the upland reserve acquisition criteria, much of the lands in close proximity to the river will be protected in perpetuity after implementation of the proposed action.

Northwestern Pond Turtle

Implementation of the proposed action will likely affect the turtle throughout the proposed action's action area by authorizing the City, Sutter, Conservancy, and MAPPOA to participate in and authorize activities that directly result in the death, harm, or injury of turtles throughout the Permit Areas and on the Conservancy's reserves. The turtle is known to occur throughout the Basin and each of the Permittees will destroy potential turtle habitat within their Permit Areas. Take of turtles is likely to result from each of the Permittees actions and the greatest potential source of direct effects is the loss of approximately 8,500 acres of potential turtle aquatic and upland habitat (ponds and seasonally wet areas = 21 acres, rice = 8,087 acres, riparian = 24 acres, canals = 404 acres)(Table 12). Additionally, turtles could be disturbed, injured, or killed by construction activities. For example, grading activities could crush turtles or their nests. The construction of new roads could present a barrier to turtle movements.

Issuance of the proposed ITP to the City will result in the loss of 1,118 acres of potential turtle habitat. Of that, 970 acres will be rice, seven acres will be ponds and seasonally wet areas, 24 acres will be riparian, and 117 acres will be canals. Issuance of the proposed ITP to Sutter will result in the loss of 5,802 acres of potential turtle habitat. Of that, 5,577 acres will be rice, ten acres will be ponds and seasonally wet areas, and 215 acres will be canals. The effects of issuance of the ITP for the MAP project were analyzed in the January 16, 2002, biological opinion for that project. Issuance of the proposed ITP to the MAPPOA will result in the loss of 1,617 acres of potential turtle habitat. Of that, 1,541 acres will be rice, four acres will be ponds and seasonally wet areas, and 72 acres will be canals. Based solely upon the fact that more rice habitat is in Sutter's Permit Area than any of the other permit areas, issuance of the proposed ITP to Sutter will result in the majority of the direct effects to the turtle.

In order to mitigate the loss of potential turtle habitat resulting from the issuance of the proposed ITP to the City, 1006.25 acres of potential foraging/nesting/basking/overwintering habitat will be created/managed on the Conservancy's managed marsh reserves. In addition, 2012.5 acres of rice foraging habitat will be preserved/managed in perpetuity. In order to mitigate the loss of potential turtle habitat resulting from the issuance of the proposed ITP to Sutter, 933.4 acres of potential foraging/nesting/basking habitat will be created/managed on the Conservancy's managed marsh reserves. In addition, 1866.8 acres of rice foraging habitat will be preserved/managed in perpetuity. In order to mitigate the loss of potential turtle habitat resulting from the issuance of the proposed ITP to the MAPPOA, 247.9 acres of potential foraging/nesting/basking habitat will be created/managed on the Conservancy's managed marsh reserves. In addition, 495.8 acres of rice foraging habitat will be preserved/managed in perpetuity. Conservancy upland reserves in proximity (less than 2 km) to turtle aquatic habitat may provide additional nesting and overwintering opportunities for the turtle.

Issuance of the ITP to the Conservancy will have both negative and positive direct effects on the turtle. Examples of possible negative effects on the turtle include, but are not limited to disturbance by construction activities on Conservancy reserves or the loss of rice habitat due to conversions to other habitat types. However, the Conservancy's overall effects on the turtle will be almost overwhelmingly positive. Rice production practices on Conservancy lands should prove to be more "turtle friendly" and more importantly, the development of the managed marsh component of the reserve system should provide foraging, nesting, overwintering, and basking opportunities for the turtle. Most importantly, habitat reserves will provide upland habitat opportunities for the turtle. Upland habitat is currently limited for the turtle in the Basin and most of that which currently exists is regularly disturbed.

The turtle will likely benefit from conservation measures proposed by the Permittees for the snake. For example, dewatering of habitat prior to construction should encourage turtles to seek suitable aquatic habitat elsewhere. Limiting construction activities in suitable snake habitat to between May 1 and October 1 should help minimize turtle mortalities, since they often overwinter underground in a manner similar to the snake. Avoidance of Fisherman's Lake by at least 61 m (200 ft.) will help protect much of the turtle's aquatic and upland habitat there. The NBHCP's connectivity assurances will also help preserve connectivity for the turtle throughout the Basin.

Predation by domestic and feral animals, increased vehicular strikes, and the additional closure of canals (see snake discussion) are three potential indirect effects of the proposed action. Under the Proposed Action, habitat reserves would be located at least 244 m (800 ft.) from urban areas and areas designated for urban development (unless a smaller distance is approved by CDFG and the Service on a case-by-case basis) and a buffer at least 9 m (30 ft.) wide established within the reserve between marsh habitat and roadways. By locating habitat reserves away from urban areas, the potential for death or injury to turtles from vehicle strikes and predation should be reduced, although not eliminated.

Overall, the proposed action is likely to benefit the turtle. Most of the potential habitat that will be lost as a result of the proposed action is rice. Its value to the turtle is questionable because there is little associated upland habitat for basking, nesting, and other upland-associated activities. In contrast, the Conservancy's system of managed marsh reserves will provide both suitable aquatic and upland habitat. Additionally, the Conservancy's upland reserves may provide potential turtle nesting and overwintering habitat. Therefore, the proposed action should increase the viability of the turtle in the Basin. As stated earlier, the Basin currently supports limited numbers of turtles. Because of the wide range of both the subspecies and species, the limited number of turtles in the Basin, and the limited amount of good-quality turtle habitat in the Basin, the Natomas Basin is probably not essential to the turtle's recovery.

Western Spadefoot Toad

Issuance of the proposed ITP's to the City, Sutter, and the Conservancy may result in limited direct effects to the western spadefoot toad. Although the toad has not been observed in the proposed action's action area, it has been observed approximately six miles from the Basin and suitable toad habitat may exist in the Basin (including the City's and Sutter's Permit Areas).

Development activities proposed by the Land Use agencies may result in the disturbance, injury, or deaths of toads. Toads could be injured or killed by construction activities when they are

crushed by construction equipment in their aquatic and upland habitats. Low frequency noises caused by heavy earth moving equipment could cause toads to come out of dormancy and emerge at inappropriate times. This disturbance could then indirectly result in the harm or death of toads. For example, vibrations could cause toads to emerge from their burrows during the summer months, thereby making them more susceptible to dessication.

As stated in the species descriptions, the amount of suitable toad habitat in the Basin was not quantified. The Basin is not known to contain substantial numbers of vernal pools and is not considered essential to recovery; the proposed action's action area is not included in the Service's proposed vernal pool critical habitat rule (67 FR 59884). The toad has not been identified in the Basin. Based upon estimates derived from data gathered in Sacramento County (see Environmental Baseline for details), the Basin's 886 acres of grasslands would contain at the most 21.3 acres of vernal pools. Additionally, some portion of the Basin's 96 acres of ponds and seasonally wet areas may be suitable for the toad. However, this estimate greatly overestimates the actual amount of vernal pool habitat in the Basin because grasslands in the Basin have a lower density of vernal pools than surrounding areas of Sacramento County (see Environmental Baseline) and most of the ponds and seasonal wetlands do not have correct hydrology to support covered vernal pool species. Of the total 886 acres of grasslands in the Basin, 427 are in the City's Permit Area and 134 are in Sutter's Permit Area (Table 14). This equates to 10.2 and 3.26 acres of vernal pools in the City and Sutter's Permit Areas, respectively. Of the total 96 acres of ponds and seasonally wet areas in the Basin, seven are in the City's Permit Area, four are in the MAP Permit Area, and ten are in Sutter's Permit Area (Table 14). Most of the potential habitat that will be lost is located in the eastern portion of the City's Permit Area. As stated in the species description, ponds and seasonally wet areas acreages almost certainly vastly overestimate the actual potential toad in the Basin, as most of the ponds and seasonally wet areas do not have the correct hydrology to support vernal pool-associated species. Ponds and seasonally wet areas located in the MAP Permit Area do not have the correct hydrology to support the toad and no other potential habitat is located within 76 m (250 ft.) of any of MAP's proposed action activities (Service 2002).

Issuance of the proposed ITP to the Conservancy may have some minimal detrimental effects on the toad on Conservancy reserve lands, if the toad ever occurs in the Basin and Conservancy reserve lands. Toads could be disturbed, harmed, or killed during construction and maintenance activities on Conservancy lands, especially managed marsh reserves and surrounding grasslands. Toads could be crushed in their burrows by heavy equipment, disturbed by heavy equipment, disturbed by people performing vegetation management, etc. The Conservancy's managed marsh reserves will likely provide some potential habitat for the toad. However, the species appears to be more successful in seasonally inundated environments such as vernal pools. Managed marsh reserves will likely not have large amounts of wetlands seasonally flooded in the winter; therefore, the toad will not benefit greatly from the reserves. However, the Conservancy has proposed to periodically consult with toad experts and investigate the possibility of creating potential toad habitat on its reserves.

The Land Use Agencies did not propose take avoidance and minimization measures specific to the toad because of the low likelihood of the species to occur in the Basin. However, they will require toad surveys. If toads are found, the Land Use Agencies will require the developers to consult with the Wildlife Agencies on how to avoid and minimize take. In addition, the toad may benefit from conservation measures proposed for other vernal pool Covered Species. For

example, if vernal pool crustaceans are identified, developers will be required to minimize their impacts according to current Service guidelines. Therefore, the toad may indirectly benefit from conservation measures proposed for the crustaceans. If toads are found in the Basin, the Conservancy will be required to provide suitable habitat for them on its reserves. Therefore, any take of toads is both minimized and mitigated.

Two potential indirect effects of the proposed action include predation and vehicular strikes. For example, the number of toads killed or injured by automobiles will likely increase as automobile traffic increases in the Basin. Vehicle mortalities has been identified as a source of toad mortalities. Under the Proposed Action, habitat reserves would be located at least 244 m (800 ft.) from urban areas and areas designated for urban development (unless a smaller distance is approved by CDFG and the Service on a case-by-case basis) and a buffer at least 9.1 m (30 ft.) wide established within the reserve between marsh habitat and roadways. By locating habitat reserves away from urban areas, the potential for death or injury to toads (if toads eventually inhabit the Basin) from vehicle strikes and predation should be reduced, although not eliminated.

Overall, the proposed action is likely to have little to no adverse effects on the toad. The toad has not been observed in the Basin and is very unlikely to occur there (K. Fuller, pers. comm. to C. Aubrey, 2003). In addition, very little suitable toad habitat exists in the Basin. In the remote event toads are discovered in the Basin, the Permittees would implement measures to minimize and mitigate the take. For example, a breeding pond could be avoided altogether or not filled until after the pond had dried and toads no longer inhabited it. Therefore, the proposed action will not impact the species as a whole.

California Tiger Salamander

The closest known occurrence of California tiger salamander is 11 miles from the proposed action's action area. There is a limited amount of potential habitat in the proposed action's action area and it seems likely that the Service would know if salamanders occurred there. The species is readily identifiable when its breeding ponds are surveyed and the species' presence in an area is often discovered when individuals are struck by cars while migrating to the breeding ponds. The Service is also unaware of any likely natural dispersal mechanism that would cause the salamander to occur in the proposed action's action area in the future. Therefore, issuance of the proposed ITPs to the City, Sutter, and Conservancy is not likely to result in any effects to the salamander.

In the very unlikely event salamanders are discovered in the future, the Permittees have proposed conservation measures to minimize and mitigate the impacts. For example, if a developer discovers salamanders on their property, they must consult with the Service to determine how to avoid and minimize impacts to the species. The Conservancy would then be required to provide salamander-conducive habitat in its reserves.

Sanford's Arrowhead

Issuance of the proposed ITP to the City, MAPPOA, Sutter and the Conservancy may adversely affect Sanford's arrowhead. Although the species has not been identified in the proposed action's action area, it is known to occur less than one mile from the Basin and suitable habitat exists in the proposed action's action area. The most likely potential source of direct effects to Sanford's

arrowhead is the death of plants during activities that alter the habitat of Sanford's arrowhead. For example, if a canal inhabited by the species is filled, plants inhabiting the canal could be crushed or otherwise destroyed by construction equipment. Additionally, the plants could be adversely affected if the canal is filled so that habitat is destroyed or sufficient water is no longer provided to the plants.

Issuance of the proposed ITP to the City is likely to destroy 124 acres of potential Sanford's arrowhead habitat (Table 14). Of this, seven acres are ponds and seasonally wet areas and 117 acres are canals. Issuance of the proposed ITP to Sutter is likely to destroy 225 acres of potential Sanford's arrowhead habitat. Of this, ten acres are ponds and seasonally wet areas and 215 acres are canals. The effects of issuance of the ITP for the MAP project were analyzed in the January 16, 2002, biological opinion for that project. Issuance of the proposed ITP to the MAPPOA is likely to destroy 76 acres of potential Sanford's arrowhead habitat. Of this, four acres are ponds and seasonally wet areas and 72 acres are canals. Although canals are considered potential habitat, water diversions and channel alteration have been listed as a threat to Sanford's arrowhead (CNDDB 2001, Tibor 2001).

Issuance of the proposed ITP to the Conservancy is likely to have both detrimental and beneficial effects on Sanford's arrowhead. Plants could be destroyed during the construction and management of reserves. For example, tractors working in an enhancement area could crush plants. The main potential beneficial effect is the construction of the Conservancy's system of managed marsh reserves. The overall effect of these reserves will likely be to improve habitat conditions for Sanford's arrowhead in the Basin. Reserves acquired as mitigation for development resulting from issuance of the ITPs (both together and separately) to the Land Use Agencies will provide a greater amount of potential habitat than currently exists in the Basin. As a result of destroying 124 acres of potential Sanford's arrowhead habitat in the City's Permit Area, the Conservancy (using mitigation fees) will develop 1006.2 acres of managed marsh habitat. As a result of destroying 225 acres of potential Sanford's arrowhead habitat in Sutter's Permit Area, the Conservancy (using mitigation fees) will develop 933.4 acres of managed marsh habitat. As a result of destroying 76 acres of potential Sanford's arrowhead habitat in MAPPOA's Permit Area, the Conservancy (using mitigation fees) will develop 247.9 acres of managed marsh habitat. In addition to the large increase in potential habitat, the habitat on managed marsh reserves is superior because it will not be subject to the relatively intense management practices that occur in the Basin's drainage and irrigation canals.

In addition to acquiring fees for the development of managed marsh reserves, the Land Use Agencies have proposed to minimize the effects of the proposed action on Sanford's arrowhead by conducting pre-development surveys and relocating any potentially affected plants (another potential direct effect related to development). The Conservancy will monitor any populations identified on Conservancy reserves and manage for their conservation.

The most likely potential indirect effect of the proposed action is the closing or reduced usage of drainage and irrigation canals in response to development. This potential effect is addresses in the snake's indirect effects section.

Overall, issuance of the proposed ITPs to the Permittees should have little to no adverse effects on the Sanford's arrowhead. The species has not been observed in the Basin. However, if the species later colonizes the Basin, it is likely to benefit from the proposed action because the

project will result in a net increase of suitable habitat. In the event the species is identified in an area to be developed, the plan allows for their transplantation prior to disturbance. The Conservancy's managed marsh reserves will provide high-quality habitat for the species that is not subject to the adverse impacts of practices such as devegetating irrigation and drainage canals. Because the proposed action is likely to have little adverse effects on Sanford's arrowhead locally, particularly as the species is not known to occur in the basin, and the range of the species is far greater than the immediate project area, the proposed action is not expected to adversely affect the species as a whole.

Delta Tule Pea

Delta tule pea is not known to occur within 20 miles of the action area and the Service does not believe that it is likely that the species will naturally occur in the action area during the future. The Service also does not anticipate any indirect effects to the species in the Basin or in general. Therefore, issuance of the proposed ITPs to the City, Sutter, and MAPPOA is not likely to result in adverse effects to the delta tule pea. In the very unlikely event the delta tule pea does eventually colonize the Basin, the Land Use Agencies have proposed to allow plants to be transplanted from development sites to minimize impacts to the affected individuals. The Conservancy's managed marsh reserves will provide high-quality habitat for the species that is not prone to management practices such as devegetating canals.

Cumulative Effects

Cumulative effects are the effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal Action under review (50 C.F.R. 402.02).

The NBHCP anticipates that a total of 17,500 acres of development will occur in the Basin during the 50-year life of the ITPs. This is based upon the extent, amount, and location of future development outlined in the City's, Sutter's, and Sacramento County's adopted Land Use Plans as well as the level of development contemplated in adopted community plans and specific plans. Section 3.1.4 of the Final NBHCP EIR/EIS discusses a number of development projects including, but not limited to, Alleghany Properties, Northern Territories/Brookfield Land Company, expansion of the Sacramento International Airport, and a private university proposal, that are outside of the development analyzed in the NBHCP and could potentially occur in the Basin in the future. However none of these potential development projects is reasonably certain to occur in the action area of the plan. These areas are not planned for urban development under adopted land use plans; (2) these areas are located outside of the City's Sphere of Influence, the City of Sacramento city limits and Sacramento County's Urban Services Boundary; (3) no urban services (such as sewage) are available to serve development; and (4) other significant legal and planning hurdles must be overcome before development could proceed. In addition, neither the City, Sutter, nor Sacramento County are considering proposed amendments to their general plans that would result in additional urban development in the Natomas Basin. Therefore, none of the projects are either "reasonably certain to occur" within the action area of the plan. Detailed discussion can be found in Section 3.1.4 of the Final NBHCP EIR/EIS.

In addition, any activities in the Natomas Basin that result in take of listed animal species would require either: (1) a Section 10 permit, a federal action, which in turn will trigger formal

consultation under Section 7 with the Service; or (2) a Section consultation with the service if a federal action is involved. The giant garter snake is known to occur in many of the areas identified above, so that incidental take authorization under Section 7 or Section 10 would likely be required before projects in these areas could legally proceed. Therefore, these activities would not be considered cumulative effects.

Both the City and Sutter have agreed to restrict development in the Basin to that outlined in the NBHCP (17,500 acres [including MAP]). If either the City or Sutter does decide to pursue additional development, they agree that prior to approval of any related rezoning or prezoning, such future urban development shall trigger a reevaluation of the Plan and ITPs, a new effects analysis, potential amendments and/or revisions to the Plan and ITPs, a separate conservation strategy and issuance of ITPs to the City and/or Sutter for that additional development. Failure to meet these requirements, could trigger suspension or revocation of their ITP(s).

Threatened Vernal Pool Fairy Shrimp, Endangered Vernal Pool Tadpole Shrimp, Threatened Colusa Grass, Threatened Slender Orcutt Grass, Endangered Sacramento Orcutt Grass, Midvalley Fairy Shrimp, Western Spadefoot Toad, California Tiger Salamander, Legenere, and Boggs Lake Hedge-Hyssop

Changes in land use practices could adversely affect Covered vernal pool species. For example, if an area used for grazing contains vernal pools, conversion of that area to row crops, vineyards, or orchards could result in the destruction of those vernal pools and the organisms that inhabit them. However, considering that most of the species have not been observed in the action area and that the amount of potential habitat in the Basin is very limited, this cumulative effect is likely to have little to no effect on the species by itself, or when added to the proposed action. If a listed vernal pool animal species occurs in the vernal pools, federal action would be required to authorize incidental take, so that these effects would not be considered cumulative to the current action.

Threatened Giant Garter Snake

Because the snake inhabits wetlands and adjacent uplands in highly modified portions of the proposed action's action area, the Service anticipates that a wide range of activities will affect the species. An undetermined number of future land use conversions and routine agricultural practices (including those by RD 1000 and Natomas Mutual) may convert or otherwise alter habitat or disturb, kill, or injure snakes. Ongoing agricultural activities also affect the giant garter snake and other Covered Species, and are largely not subject to an obvious bosection 7 consultation. Some agriculture, such as rice farming, can provide valuable seasonal foraging and upland habitat for Covered Species. Although rice fields and agricultural waterways can provide habitat for the snake and other Covered Species, agricultural activities such as waterway maintenance, weed abatement, rodent control, and discharge of contaminants into wetlands and waterways can degrade habitat and increase the risk of mortality (Service 1999). Maintenance of agricultural waterways can also eliminate or prevent establishment of snake habitat, eliminate food resources, and can fragment existing habitat and prevent dispersal of giant garter snakes and wetland-dependent species (Service 1999). In addition, crop rotation within the Natomas Basin causes shifts in habitat availability, quantity, quality, and affects the presence of giant garter snakes. Although these agricultural practices can result in take of the snake, the snake has persisted despite these activities for decades and therefore, its baseline is probably not being

further depressed by these activities. In addition, in the event take resulted from these activities, it would violate the Act unless authorized through an incidental take statement or an incidental take permit, both of which would trigger Section 7 consultation.

Other cumulative effects include: (1) fluctuations in acres of aquatic habitat due to water management or acres of ricelands in production; (2) diversion of water; (3) levee repairs; (4) riprapping or lining of canals and stream banks; (5) dredging, clearing, and spraying to remove vegetation from irrigation canals; (6) discing, mowing, clearing and spraying vegetation adjacent to canals and streams; (7) use of burrow fumigants on levees and other potential upland refugia; (8) contaminated runoff from agriculture and urbanization; and (9) use of herbicides and pesticides in ricelands and other agricultural lands that provide snake habitat, or which are adjacent to and/or drain into snake habitat. As with the agricultural activities discussed in the preceding paragraph, the snake has persisted despite these activities for decades and therefore, its baseline is probably not being further depressed by these activities.

Non-agricultural flood control and maintenance activities which can result in snake mortality and degradation of habitat include levee construction, stream channelization, and the riprapping of streams and canals (Service 1999); most of these activities would require permits from the U.S. Army Corps of Engineers and trigger a section 7 consultation with the Service. The interior drainage channels within the Natomas Basin are subject to fewer impacts than banks along riverine systems, but plans exist for a possible relocation of a reach of the Natomas East Main Drainage Canal. Similar to flood control and maintenance activities, these activities would likely not be considered cumulative effects because they would require a Section 404 Clean Water Act Permit and therefore, would require section 7 formal consultation if they were likely to adversely affect the snake.

Threatened Valley Elderberry Longhorn Beetle

No potential cumulative effects within the proposed action's action area are anticipated because habitat for this species is limited in the basin, the species is not known to occur in the basin and additional growth beyond planned development covered by the NBHCP not reasonably certain to occur within the action area.

Swainson's Hawk

Infection of hawks by West Nile virus could potentially occur within the Central Valley population of Swainson's hawks (M. Bradbury, pers. comm. to Craig Aubrey, 2002). However, the Service is not aware of Swainson's hawks being infected by the disease in California, although the species has been observed carrying the virus (Centers for Disease Control and Prevention, 2002). Infection of hawks from this disease is not reasonably certain to occur within the action area of the plan and is not considered a cumulative effect. In addition, according to Bradbury (2002, pers. comm. to Craig Aubrey), the more individuals there are, the more likely there will be enough immune individuals to allow the population to recover and the larger the area they cover, the less chance any individual will come into contact with the disease. The proposed action should have no affect on the ability of the hawk to either avoid or recover from the virus. The proposed action is not anticipated to reduce the number of hawks and the amount of habitat being converted is very small in comparison to the total amount of habitat in the vicinity of the proposed action.

Aleutian Canada Goose

A potential cumulative effect of the proposed action specific to the goose is the use of herbicides and pesticides in ricelands and other agricultural lands that provide goose foraging habitat. However, as discussed in the analysis of direct and indirect effects, the goose is only an occasional visitor to the Basin and the Basin represents only a small portion of the goose's winter range in California. Therefore, such use should have little effect on the goose, by itself or when added to the effects of the proposed action.

Burrowing Owl

Potential cumulative effects of the proposed action specific to the owl are: (1) the use of herbicides and pesticides in agricultural lands that provide owl foraging and nesting habitat; and (2) use of rodenticides in lands that provide owl burrowing habitat. However, neither of these activities is likely to reduce the viability of the owl in the Basin or as a whole, either alone or when added to the effects of the proposed action. The burrowing owl has persisted in the basin despite the use of herbicides, pesticides, and rodenticides for decades in the Basin, and the use of these substances is not expected to increase in the future.

Loggerhead Shrike

A potential cumulative effect of the proposed action specific to the shrike is use of herbicides and pesticides in agricultural lands that provide shrike foraging habitat. Herbicides and pesticides have been used for decades in the Basin; their use is not anticipated to increase or to affect the viability of the shrike in the Basin or as a species. The species is not considered to be subject to any identifiable threat in the State and populations in the western United States appear to be stable. Shrikes are common throughout lowland California and the Natomas Basin represents a very small fraction of the species' range. There for, such use is should have little effect on the shrike, by itself, or when added to the effects of the proposed action.

Tricolored Blackbird

A potential cumulative effects of the proposed action specific to the tricolor is the use of herbicides and pesticides in agricultural lands that provide tricolor nesting and foraging habitat. Because of the similarity of habitat requirements with the snake, many of the cumulative effects described for the snake such as agricultural activities will also affect the tricolor. As with the snake, these cumulative effects should not affect the viability of the tricolor in the Basin or as a species, by itself or when added to the effects of the plan. Herbicides and pesticides have been used for decades in the Basin; their use is not anticipated to increase.

White-Faced Ibis

A potential cumulative effect of the proposed action specific to the ibis is the use of herbicides and pesticides in agricultural lands that provide ibis wintering and foraging habitat. In addition, because of the similarity of habitat requirements with the snake, many of the cumulative effects described for the snake will also affect the ibis. Although agricultural pesticide use is a concern, ibis appear to be performing well in Central Valley rice fields, and rice fields represent the majority of available ibis habitat in the Basin. These cumulative effects, by themselves, or when

added to the effects of the proposed action, are not expected to reduce the viability of the ibis in the Basin or as a species.

Bank Swallow

A potential cumulative effects of the proposed action specific to the bank swallow the is use of herbicides and pesticides in agricultural lands that provide swallow foraging habitat. Herbicides and pesticides have been used for decades in the Basin; their use is not anticipated to increase. Furthermore, the swallow is only an occasional visitor to the Basin. Therefore, the cumulative effects of such use on the bank swallow are not, by themselves, or when added to the effects of the proposed action, expected to affect the viability of the swallow in the Basin or as a species.

Northwestern Pond Turtle

A potential cumulative effects of the proposed action specific to the turtle is the use of herbicides and pesticides in agricultural lands that provide turtle foraging habitat. In addition, because of the similarity of habitat requirements with the snake, many of the cumulative effects described for the snake such as canal maintenance will also affect the turtle. The turtle has probably persisted despite the use of herbicides and pesticides in the Basin for decades; their use is not anticipated to increase. The Basin currently provides limited habitat for the turtle and the species ranges from Washington to Mexico. The subspecies ranges from Washington to just south of the project area. Therefore, these cumulative effects, by themselves, or when added to the effects of the proposed action, are not expected to affect the viability of the turtle in the Basin or as a species.

Sanford's Arrowhead

One potential cumulative effect of the proposed action on Sanford's arrowhead is water transfers. In 2003, a number of northern California water districts (including Natomas Mutual) sold water to water districts in southern California. According to news accounts (e.g., Hacking 2003) southern California water districts are currently negotiating for long-term water transfer contracts. If entered into, these contracts could result in a decrease in the amount or suitability of potential Sanford's arrowhead habitat because less water would be available in the proposed action's action area for the species. However, since the basin area provides little potential habitat for this species and the the species has not been observed in the proposed action's action area, future water transfers, by water districts in the basin, either by themselves or when added to the proposed action, are not likely to affect the viability of the Sanford's arrowhead in the Basin or as a species.

Delta Tule Pea

Because the species has neither been observed in nor is expected to occur in the proposed action's action area, no cumulative effects are anticipated.

Conclusion

<u>Federally-Listed, Proposed and Delisted Species</u>

After reviewing the current status of the endangered vernal pool tadpole shrimp, threatened giant garter snake, threatened valley elderberry longhorn beetle, threatened vernal pool fairy shrimp,

endangered Sacramento Orcutt grass, threatened Colusa grass, threatened slender Orcutt grass, proposed California tiger salamander, and delisted Aleutian Canada goose, the environmental baselines for the action area, and the effects of the proposed action, including all measures proposed to avoid, minimize, and mitigate adverse effects and the cumulative effects, it is the Service's biological opinion that the issuance of incidental take permits to the City, Sutter, MAPPOA, and Conservancy pursuant to section 10(a)(1)(B) of the Act is not likely to jeopardize the continued existence of the vernal pool tadpole shrimp, giant garter snake, valley elderberry longhorn beetle, vernal pool fairy shrimp, Sacramento Orcutt grass, Colusa grass, slender Orcutt grass, California tiger salamander, and Aleutian Canada goose for the reasons stated in the "Effects of the Proposed Action" section of this opinion. Critical habitat has not been designated for the giant garter snake, therefore none will be affected. Critical habitat for the valley elderberry longhorn beetle exists to the south/southeast of the project area, but will not be affected. Proposed critical habitat for the listed vernal pool Covered Species (vernal pool tadpole shrimp, vernal pool fairy shrimp, Colusa grass, Sacramento Orcutt grass, and slender Orcutt grass) does not include the proposed action's action area; therefore, none will be affected. As stated earlier, the effects of the issuance of an ITP to MAP were previously analyzed in the January 16, 2002, biological opinion for that project (Service File # 1-1-01-F-0302) and the Service issued an ITP to MAPPOA on February 21, 2002 (TE036473-0). The MAP biological opinion is incorporated by this reference into this opinion.

Other Covered Species - Not Federally-Listed as Threatened or Endangered

After reviewing the current status of the unlisted Swainson's hawk, white-faced ibis, bank swallow, tricolored blackbird, northwestern pond turtle, loggerhead shrike, burrowing owl, western spadefoot toad, midvalley fairy shrimp, Boggs Lake hedge-hyssop, legenere, Sanford's arrowhead, and delta tule pea, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is the Service's opinion that should any of these species be listed in the future, issuing incidental take permits that include these species as covered species and that authorize the incidental take of the currently unlisted animal covered species should they become listed during the term of the permits, is not likely to jeopardize the continued existence of the Covered Species. Summaries of the components of the proposed NBHCP that were particularly instrumental in supporting the Service's conclusion with regard to currently unlisted Covered Species are provided in the effects section of this opinion. As stated earlier, the effects of the issuance of an ITP to MAP were previously analyzed in the January 16, 2002, biological opinion for that project (Service File # 1-1-01-F-0302) and the Service issued an ITP to MAPPOA on February 21, 2002 (TE036473-0). The MAP biological opinion is incorporated by this reference into this opinion.

Incidental Take Statement

Section 9(a)(1) of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened animal species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which

include, but are not limited to, breeding feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement. Sections 7(b)(4) and 7(o)(2) of the Act do not apply to listed plant species.

Ten of the fifteen covered animal species addressed in this biological opinion are neither proposed for listing nor currently listed. As such, there is no take prohibitions under the Act for these animal species at the time of writing. The Incidental Take Statement for the unlisted animal Covered Species and the Permit shall become effective as to each currently unlisted Covered animal Species if and when it becomes are listed under the Act during the terms of the permits.

The proposed NBHCP and its associated documents clearly identify anticipated impacts to affected species likely to result from the proposed taking and the measures that are necessary and appropriate to minimize those impacts. All conservation measures described in the proposed HCP, together with terms and conditions described in the associated IA and any section 10(a)(1)(B) permit or permits issued with respect to the proposed HCP, are hereby incorporated by reference as reasonable and prudent measures and terms and conditions within this Incidental Take Statement pursuant to 50 CFR 402.14(i). Such terms and conditions are non-discretionary and must be undertaken for the exemptions under section 10(a)(1)(B) and section 7(o)(2) to apply. If the Permittees fail to adhere to these terms and conditions, protective coverage of the section 10(a)(1)(B) permit and section 7(o)(2) may lapse. The amount or extent of incidental take anticipated under the proposed NBHCP, associated reporting requirements, and provisions for disposition of dead or injured animals are described in the NBHCP and its accompanying section 10(a)(1)(B) permits.

The proposed action's action area is known to be occupied or visited by ten of the Covered animal Species. Although the valley elderberry longhorn beetle, bank swallow, midvalley fairy shrimp, western spadefoot toad, and California tiger salamander are not known from the action area, all but the California tiger salamander have potential to be observed there in the future. The amount of take (killing, harming, harassing, wounding) of most animal species, described below, is anticipated to be low, due to the effectiveness of the take avoidance and minimization measures. Many of the species are highly mobile and/or only frequent the Natomas Basin during the winter and are expected to avoid direct effects. Indirect effects are best interpreted as the extent of habitat lost or degraded by the covered activity.

The section 10 (a) incidental take permit would also constitute a Special Purpose permit under 50 CFR 21.27 for the take of any Covered animal Species which may be listed as threatened or endangered under the Endangered Species Act during the permit term and which are also protected by the MBTA, in the amount and/or number and subject to the terms and conditions specified in the 10(a) permit. The MBTA special purpose permit would become effective upon the listing of the species under the ESA. Any such take shall not be in violation of the MBTA of 1918, as amended (16 U.S.C. 703-712). The Special Purpose permit shall be valid for a period of three years from the effective date, provided the section 10(a) permit remains in effect for such period. The Special Purpose permit shall be renewed, provided the permittees remain in compliance with the terms of the 10(a) permit and the Implementation Agreement. Each such

renewal shall be valid for the maximum period of time allowed by 50 CFR 21.27 or its successor at the time of renewal.

Incidental take associated with the MAP project was authorized in the 10(a)(1)(B) permit for that project. Therefore, incidental take related to that project and mitigation reserve lands acquired as a result of that project are not included in this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the Service so that they become binding conditions of any grant or permit issued to the City, Sutter, and Conservancy, as appropriate, for the exemption in section 7(o)(2) to apply. The Service has a continuing duty to regulate the activity covered by this Incidental Take Statement. If the Service (1) fails to assume and implement the terms and conditions or (2) fails to adhere to the terms and conditions of the Incidental Take Statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Service must track the progress of the action and its impact on the species as specified in the Incidental Take Statement. [50 CFR §402.14(i)(3)]

Amount or Extent of Take

The City and Sutter propose to permanently convert a maximum of 15,517 acres in accordance with the requirements, guidelines, measures, and processes described in the NBHCP and NBHCP IA. Additionally, if all of the 15,517 acres are developed, at least 7,758.5 acres of reserve lands are expected to be established under the NBHCP; take incidental to management of reserves is expected. The disturbance and conversion of land is expected to result in incidental take of the Covered Species. Incidental take that will result from the City's, Sutter's, and the Conservancy's habitat conversion and acquisition, restoration, and management of reserve lands will be authorized through the section 10(a)(1)(B) permit for the NBHCP. Take will be in the form of disturbance, harm, and kill. It is expected that individuals of the Covered Species will or may be taken during development as well as other activities addressed above and in the NBHCP.

The Service expects that incidental take of various Covered Species will be difficult to detect or quantify for the following reasons: (1) the aquatic nature of certain of the organisms and their relatively small body size make the finding of a dead specimen unlikely; (2) the secretive nature of certain of the species makes detection or quantification difficult; (3) species abundance may be masked by seasonal fluctuations in numbers or other causes; (4) species occur in habitats that make them difficult to detect; (5) the species use of the habitat is intermittent. Therefore, the Service estimates that take of covered animal species associated with loss of up to 15,517 acres of Covered Species habitat will be affected as a result of issuing the proposed ITPs to the City and Sutter.

The Service expects that incidental take of various Covered Species on the Conservancy's reserves will be difficult to detect or quantify for the following reasons: (1) the aquatic nature of certain of the organisms and their relatively small body size make the finding of a dead specimen unlikely; (2) the secretive nature of certain of the species makes detection or quantification difficult; (3) species abundance may be masked by seasonal fluctuations in numbers or other causes; (4) species occur in habitats that make them difficult to detect; (5) the species use of the habitat is intermittent. Due to the difficulty in quantifying the number of Covered Species that will be taken as a result of the proposed management actions (described in SSMPs and effects

section), the Service is quantifying take incidental to the project as the number of acres of habitat that could be affected for the Covered Species as a result of the action. Therefore, the Service estimates that take of covered animal species associated with restoration/enhancement/perpetual management of up to 7,758.5 acres of Covered Species habitat (excluding mitigation lands for MAP) will be affected as a result of issuing the proposed ITP to the Conservancy.

Listed and Proposed Species

Threatened Vernal Pool Fairy Shrimp and Endangered Vernal Pool Tadpole Shrimp

The Service anticipates that an undetermined number of vernal pool fairy shrimp and vernal pool tadpole shrimp could be taken over a 50-year period as a result of this proposed action. Vernal pool crustaceans could be killed, harmed, or disturbed during construction activities, implementation of the proposed conservation measures, or management on the Conservancy's reserves. We estimate that the City will incidentally take up to all vernal pool tadpole shrimp and vernal pool fairy shrimp via the disturbance associated with construction activities on 10.2 acres of vernal pools and up to 7 acres of ponds and seasonally wet areas within the City's Permit Area and in association with off-site infrastructure improvements. We estimate that Sutter will incidentally take up to all vernal pool tadpole shrimp and vernal pool fairy shrimp via the disturbance associated with construction activities on 3.3 acres of vernal pools and up to 10 acres of ponds and seasonally wet areas within Sutter's Permit Area and in association with off-site infrastructure improvements. We estimate that the Conservancy will incidentally take up to all vernal pool tadpole shrimp and vernal pool fairy shrimp via the disturbance associated with management activities on up to 0.9 acres per year of vernal pool habitat within the Conservancy's Permit Area. These estimates vastly overstates the actual amount of take likely to occur because it assumes: (1) that all ponds and seasonally wet areas are suitable vernal pool habitat; (2) that the applicants always fill pools; (3) that the applicants always mitigate according to the programmatic ratios; (4) that the Conservancy will disturb one percent of its pools per year to the point of taking all vernal pool fairy shrimp and vernal pool tadpole shrimp inhabiting them; and (5) that all of the Conservancy's pools are occupied by the vernal pool fairy shrimp and/or vernal pool tadpole shrimp. The number of vernal pool crustaceans affected by implementation of the proposed action should be very small, as the amount of potential vernal pool crustacean habitat is very limited throughout the proposed project's action area. No proposed critical habitat will be affected, as none is located in the proposed project's action area.

Threatened Giant Garter Snake

The Service anticipates that an undetermined number of giant garter snakes could be taken over a 50-year period as a result of this proposed action. Take associated with initial construction activities will be in the form of harm, disturbance, and injury or death. We estimate that the City will incidentally take two (2) giant garter snakes via mortality and ten (10) giant garter snakes via the disturbance associated with construction activities on 1,094 acres of snake habitat within the City's Permit Area and in association with off-site infrastructure improvements. Snake take values are based upon data gathered at Colusa National Wildlife Refuge (Service 1999). We estimate that Sutter will incidentally take thirteen (13) giant garter snakes via mortality and fifty-one (51) giant garter snakes via the associated with construction activities on 5,802 acres of snake habitat within Sutter's Permit Area and in association with off-site infrastructure improvements.

Sutter's development activities will kill no more than two (2) snakes per year. Snake take values are based upon data gathered at Colusa National Wildlife Refuge (Service 1999).

Giant garter snakes are likely to inhabit certain lands acquired for reserves and will thus be subject to harm and disturbance from restoration/enhancement/management activities. While minimization measures will be implemented, it is possible that giant garter snakes will be found within reserve lands during these activities. We estimate that the Conservancy will incidentally take three (3) giant garter snakes via mortality and eighteen (18) giant garter snakes via the disturbance associated with construction activities on the Conservancy's 1,939.7 acres of managed marsh reserves. The Conservancy's managed marsh construction activities will kill no more than two (2) snakes per year. We estimate that the Conservancy will incidentally take twenty-one (21) giant garter snakes per year via the disturbance associated with perpetual management activities on the Conservancy's 1,939.7 acres of managed marsh reserves. In addition, we estimate that the Conservancy will incidentally take (primarily in the form of disturbance) forty-one (41) giant garter snakes via the disturbance associated with activities on the Conservancy's 3879.3 acres of rice reserves.

Snake take values are based upon data gathered at Colusa National Wildlife Refuge (Service 1999). Colusa National Wildlife Refuge was chosen as a reference point because at the time the data were gathered, Colusa likely had snake habitat most similar to that of the Basin, when compared to Gilsizer Slough and Badger Creek. The Service would expect that, given the extensive marsh habitats at Gilsizer and Badger Creek, snake densities observed there would be greater than those expected in the Basin and therefore, they would not be good indicators of the density of snakes in the Basin. Although some snake populations have been estimated for the Basin, these populations are based upon linear estimates (i.e., snakes/unit length) and are therefore, not appropriate for estimating the number of snakes affected by the proposed project, which is expressed in the amount of habitat lost in acres (i.e., snakes/unit area).

Threatened Valley Elderberry Longhorn Beetle

The Service anticipates that an undetermined number of beetles could be taken over a 50-year period as a result of this proposed action. Take could be in the form of disturbance, harm, or death. The applicants did not conduct surveys for the beetle in the proposed Permit Areas. However, the amount of potential beetle habitat affected is expected to be very limited, as the Basin is not known for large stands of elderberry shrubs. We estimate that the City will incidentally take up to all valley elderberry longhorn beetles via the disturbance associated with elderberry shrub relocation activities on 6 acres of oak groves, 24 acres of riparian area, and 10 acres of tree groves in the City's Permit Area and in association with off-site infrastructure improvements. We estimate that Sutter will not take any beetles, as no potential habitat is expected to be in Sutter's proposed Permit Area. It is anticipated that some beetles inhabiting elderberry shrubs in riparian restoration areas of reserve lands could be subject to some direct and indirect effects from reserve management activities. Therefore, we estimate that the Conservancy will incidentally take up to all valley elderberry longhorn beetles inhabiting 25 elderberry shrubs per year via the disturbance associated with management activities on 1,939.7 acres of managed marsh in the Conservancy's Permit Area. This amount of take is based upon the amount of potential elderberry shrub habitat that will be lost, the average density of elderberry plant plantings outlined in the Beetle Guidelines (5 elderberry shrubs per 1800 square feet), an assumption that one elderberry shrub is located on each acre of potential beetle habitat to be lost,

and an assumption that ten percent of the Conservancy's elderberry shrubs will be affected per year. It greatly overestimates the actual amount of take likely to occur, as the Conservancy should not be conducting a significant amount of activity that will affect the beetle and not all elderberry shrubs, if any, will be occupied by the beetle. No critical habitat will be affected, as none is located in the proposed project's action area.

California Tiger Salamander

No salamanders are known or expected to occur within the proposed project's action area; therefore, no incidental take is expected from the issuance of the proposed ITP's to the City and Sutter.

Unlisted Species

Swainson's Hawk

The Service anticipates that an undetermined number of Swainson's hawks could be taken over a 50-year period as a result of this proposed action. Take associated with initial construction activities and the Conservancy's management activities (including monitoring) will be in the form of harm or disturbance. Loss of prey species and foraging habitat and disturbances to nesting and foraging hawks from construction are anticipated forms of take. Due to the difficulty in quantifying the number of hawks that will be taken as a result of the proposed action, the Service is quantifying take incidental to the project as the number of acres of potential nesting and foraging habitat that will be impacted due to direct or indirect effects as a result of the action. Therefore, the Service estimates that 8,785 acres of potential hawk foraging habitat will become unsuitable as a result of the proposed action. Issuance of the proposed ITP to the City is likely to result in 6,925 acres of potential foraging habitat and 40 acres of nesting habitat becoming unsuitable for the hawk. Issuance of the proposed ITP to Sutter is likely to result in 1,860 acres of potential foraging habitat becoming unsuitable for the hawk. Estimates of foraging and nesting habitat lost overestimate the actual take associated with the action. As stated in the "Effects of the Proposed Action" section, most of the potential nesting habitat lost (24 acres) will not actually be developed because it is in the Fisherman's Lake buffer area. Loss of potential nesting and foraging habitat is not expected to result in injury or mortality of hawks because hawks can both forage and nest in other habitat that is available in and around the Basin. Also, Swainson's nest trees will not be removed while young are still in the nest. Issuance of the proposed ITP to the Conservancy is likely to result in the conversion/restoration/ enhancement of up to 1,939.7 acres of potential hawk habitat when the Conservancy's upland reserves are created. Conservancy management practices will also potentially disturb hawks on 2,909.5 acres of managed marsh uplands, upland, and fallowed rice reserves.

Aleutian Canada Goose

The Service anticipates that an undetermined number of Aleutian Canada geese could be taken over a 50-year period as a result of this proposed action. Due to the difficulty in quantifying the number of geese that will be taken as a result of the proposed action, the Service is quantifying take incidental to the project as the number of acres of potential foraging habitat that will become unsuitable due to direct or indirect effects as a result of the action. Therefore, the Service estimates that 12,863 acres of potential goose foraging habitat will become unsuitable as a result

of the proposed action. Issuance of the proposed ITP to the City is likely to result in 5,656 acres of potential foraging habitat becoming unsuitable for the goose. Issuance of the proposed ITP to the Sutter is likely to result in 7,207 acres of potential foraging habitat becoming unsuitable for the goose. Estimating take in terms of foraging habitat lost overestimates the actual take, as geese will very likely forage in other areas available in the Basin and will not incur any significant disruption of their normal behavioral patterns. And, the goose is only a transient visitor to the Basin. Loss of its foraging habitat in the Basin should have very little impact on the goose. Issuance of the proposed ITP to the Conservancy is likely to result in the conversion of up to 1,939.6 acres of potential goose habitat when the Conservancy's managed marsh reserves are created. Conservancy management practices will also potentially distrub geese on 7,758.5 acres of managed marsh, upland, and rice reserves.

Burrowing Owl

The Service anticipates that an undetermined number of owls could be taken over a 50-year period as a result of this proposed action. Take will likely occur in the form of harm, disturbance and mortality. Due to the difficulty in quantifying the number of owls that will be taken as a result of the proposed action, the Service is quantifying take incidental to the project as the number of acres of potential foraging and nesting habitat that will become unsuitable due to direct or indirect effects as a result of the action. Therefore, the Service estimates that 685 acres of potential foraging habitat and 235.2 miles of canals will become unsuitable as a result of the proposed action. Issuance of the proposed ITP to the City is likely to result in 450 acres of potential foraging habitat and 19.3 miles of canals becoming unsuitable for the owl. Issuance of the proposed ITP to the Sutter is likely to result in 235 acres of potential foraging habitat and 33.6 miles of canals becoming unsuitable for the goose. Estimating take in terms of foraging habitat lost overestimates the actual take, as burrowing owls will likely forage in other areas available in the Basin, especially when that foraging habitat is not located near any burrowing owl burrows, and will not incur any significant disruption of their normal behavioral patterns. Issuance of the proposed ITP to the Conservancy is likely to result in the conversion of undetermined amount of potential foraging habitat when the Conservancy's managed marsh reserves are created. Conservancy management practices will also potentially disturb owls on 5,818.9 acres of managed marsh and upland reserves.

Loggerhead Shrike

The Service anticipates that an undetermined number of shrikes could be taken over a 50-year period as a result of this proposed action. Take will likely occur in the form of mortality, harm, and disturbance. Due to the difficulty in quantifying the number of shrikes that will be taken as a result of the proposed action, the Service is quantifying take incidental to the project as the number of acres of potential habitat that will become unsuitable due to direct or indirect effects as a result of the action. Therefore, the Service estimates that 8,550 acres of potential shrike habitat will become unsuitable as a result of the proposed action. Issuance of the proposed ITP to the City is likely to result in 6,473 acres of potential habitat becoming unsuitable for the shrike. Issuance of the proposed ITP to the Sutter is likely to result in 2,077 acres of potential habitat becoming unsuitable for the shrike. Estimating take in terms of foraging habitat lost overestimates the actual take, as the shrike will very likely forage in other areas available in the Basin and will not incur any significant disruption of its normal behavioral patterns. Issuance of the proposed ITP to the Conservancy is likely to result in the conversion of undetermined amount

of potential shrike habitat when the Conservancy's managed marsh and upland reserves are created. Conservancy management practices will also potentially disturb shrikes on 3,879.25 acres of managed marsh and upland reserves.

Tricolored Blackbird

The Service anticipates that an undetermined number of tricolored blackbirds could be taken over a 50-year period as a result of this proposed action. Take will likely occur in the form of harm and disturbance. Due to the difficulty in quantifying the number of tricolors that will be taken as a result of the proposed action, the Service is quantifying take incidental to the project as the number of acres of potential habitat that will become unsuitable due to direct or indirect effects as a result of the action. Therefore, the Service estimates that 373 acres of potential nesting habitat and 13,341 acres of potential foraging habitat will become unsuitable as a result of the proposed action. Issuance of the proposed ITP to the City is likely to result in148 acres of potential nesting habitat and 6,083 acres of potential foraging habitat becoming unsuitable for the tricolor. Issuance of the proposed ITP to the Sutter is likely to result in 225 acres of potential nesting habitat and 7,341 acres of potential foraging habitat becoming unsuitable for the tricolor. Estimating take in terms of foraging habitat lost overestimates the actual take, as the tricolor will very likely forage in other areas available in the Basin, especially when the foraging habitat is not near any tricolor nesting colonies, and will not incur any significant disruption of its normal behavioral patterns. Issuance of the proposed ITP to the Conservancy is likely to result in the conversion of undetermined amount of potential tricolor habitat when the Conservancy's managed marsh and upland reserves are created. Conservancy management practices will also potentially disturb tricolors on up to 7,758.5 acres of managed marsh upland, and rice reserves.

White-Faced Ibis

The Service anticipates that an undetermined number of white faced ibis could be taken over a 50-year period as a result of this proposed action. Take expected to be in the form of disturbance or harm, through loss of aquatic foraging habitat, primarily rice fields, canals and ditches. Due to the difficulty in quantifying the number of ibis that will be taken as a result of the proposed action, the Service is quantifying take incidental to the project as the number of acres of potential habitat that will become unsuitable due to direct or indirect effects as a result of the action. Therefore, the Service estimates that 6,899 acres of potential ibis habitat will become unsuitable as a result of the proposed action. Issuance of the proposed ITP to the City is likely to result in 1,097 acres of potential habitat becoming unsuitable for the ibis. Issuance of the proposed ITP to the Sutter is likely to result in 5,802 acres of potential habitat becoming unsuitable for the ibis. Estimating take in terms of foraging habitat lost overestimates the actual take, as the ibis will very likely forage in other areas available in the Basin and will not incur any significant disruption of its normal behavioral patterns. Issuance of the proposed ITP to the Conservancy is likely to result in the conversion of undetermined amount of potential ibis habitat when the Conservancy's managed marsh and upland reserves are created. Conservancy management practices will also potentially disturb ibis on 7,758.5 acres of managed marsh, upland, and rice reserves.

Bank Swallow

The Service anticipates that an undetermined number of bank swallows could be taken over a 50-year period as a result of this proposed action. Take expected to be in the form of harm or disturbance through loss of rarely-used foraging habitat. Due to the difficulty in quantifying the number of swallows that will be taken as a result of the proposed action, the Service is quantifying take incidental to the project as the number of acres of potential habitat that will become unsuitable due to direct or indirect effects as a result of the action. Therefore, the Service estimates that 13,797 acres of potential foraging habitat will become unsuitable as a result of the proposed action. Issuance of the proposed ITP to the City is likely to result in 6,231 acres of potential foraging habitat becoming unsuitable for the swallow. Issuance of the proposed ITP to the Sutter is likely to result in 7,566 acres of potential foraging habitat becoming unsuitable for the swallow. Estimating take in terms of foraging habitat lost overestimates the actual take, as the bank swallow will very likely forage in other areas available in the Basin and will not incur any significant disruption of its normal behavioral patterns. In addition, there is there is very little potential nesting habitat near the Natomas Basin and therefore, the number of swallows that forage in the Basin should be small. Issuance of the proposed ITP to the Conservancy is likely to result in the conversion of undetermined amount of potential swallow foraging habitat when the Conservancy's managed marsh and upland reserves are created. Conservancy management practices will also potentially disturb shrikes on 7,758.5 acres of managed marsh, upland, and rice reserves.

Northwestern Pond Turtle

The Service anticipates that an undetermined number of pond turtles could be taken over a 50-year period as a result of this proposed action. Take expected to be in the form of harm, disturbance and killing, through construction-related loss of habitat and management of the Conservancy's reserves. Due to the difficulty in quantifying the number of turtles that will be taken as a result of the proposed action, the Service is quantifying take incidental to the project as the number of acres of potential habitat that will become unsuitable due to direct or indirect effects as a result of the action. Therefore, the Service estimates that 6,920 acres of potential turtle habitat will become unsuitable as a result of the proposed action. Issuance of the proposed ITP to the City is likely to result in 1,118 acres of potential habitat becoming unsuitable for the turtle. Issuance of the proposed ITP to the Sutter is likely to result in 5,802 acres of potential habitat becoming unsuitable for the turtle. Estimating take in terms of habitat lost overestimates the actual take, as much of the Basin's available turtle habitat is rice and as stated in the "Effects of the Proposed Action," has limited value to the turtle. Issuance of the proposed ITP to the Conservancy is likely to result in the conversion of undetermined amount of potential shrike habitat when the Conservancy's managed marsh and upland reserves are created. Conservancy management practices will also potentially disturb turtles on 7,758.5 acres of managed marsh and rice reserves.

Western Spadefoot Toad and Midvalley Fairy Shrimp

The Service anticipates that an undetermined number of toads and midvalley fairy shrimp could be taken over a 50-year period as a result of this proposed action. Toads and midvalley fairy shrimp could be killed, harmed, or disturbed during construction activities, implementation of the proposed conservation measures, or management on the Conservancy's reserves. The number of

toads and midvalley fairy shrimp affected by implementation of the proposed action should be very small, as the amount of potential suitable habitat is very limited throughout the proposed project's action area. We estimate that the City will incidentally take up to all western spadefoot toads and midvalley fairy shrimp via the disturbance associated with construction activities on 10.2 acres of vernal pools and up to seven acres of ponds and seasonally wet areas within the City's Permit Area and in association with off-site infrastructure improvements. We estimate that Sutter will incidentally take up to all western spadefoot toads and midvalley fairy shrimp via the disturbance associated with construction activities on 3.3 acres of vernal pools and up to 10 acres of ponds and seasonally wet areas within Sutter's Permit Area and in association with off-site infrastructure improvements. We estimate that the Conservancy will incidentally take up to all western spadefoot toads and midvalley fairy shrimp via the disturbance associated with management activities on up to 0.9 acres per year of vernal pool habitat within the Conservancy's Permit Area. This estimate vastly overstates the amount of actual take likely to occur because it assumes: (1) that all ponds and seasonally wet areas are suitable vernal pool habitat; (2) that the applicants always fill pools; (3) that the applicants always mitigate according to the programmatic ratios; (4) that the Conservancy will disturb one percent of its pools per year to the point of taking all western spadefoot toads and midvalley fairy shrimp inhabiting them; and (5) that all of the Conservancy's pools are occupied by the western spadefoot toads and/or midvalley fairy shrimp. The number of midvalley fairy shrimp and western spadefoot toads affected by implementation of the proposed action should be very small, as the amount of potential vernal pool habitat is very limited throughout the proposed project's action area and neither one of the species has ever been observed in the Basin.

Effect of the Take

Listed and Proposed Species

For the reasons stated in the analyses of the proposed project's effects, the Service determined that the level of incidental take specified in the effects of the action and this Incidental Take Statement is not likely to result in jeopardy to the endangered vernal pool tadpole shrimp, threatened giant garter snake, threatened valley elderberry longhorn beetle, threatened vernal pool fairy shrimp, or proposed California tiger salamander. The Service has also determined that the proposed action will not destroy or adversely modify either valley elderberry longhorn beetle critical habitat or proposed vernal pool fairy shrimp and vernal pool tadpole shrimp critical habitat.

Unlisted Species

For the reasons stated in the analyses of the proposed project's effects, the Service determined that the level of incidental take specified in the effects of the action and this Incidental Take Statement is not likely to result in jeopardy to the following unlisted Covered Species should they become listed: Swainson's hawk, white faced ibis, bank swallow, tricolored blackbird, northwestern pond turtle, loggerhead shrike, burrowing owl, western spadefoot toad, and midvalley fairy shrimp. The Service has determined that the specified level of incidental take is not likely to result in jeopardy to the Aleutian Canada goose, should it become re-listed.

Reasonable and Prudent Measures and Terms and Conditions

The NBHCP and accompanying agreements identify anticipated adverse effects to all Covered Species likely to result from the proposed actions, and the specific measures and levels of species and habitat protection that are necessary and appropriate to minimize those adverse effects. All of the conservation and management measures in the NBHCP and accompanying agreements, together with the terms and conditions identified in the associated Implementing Agreement, are hereby incorporated by reference as reasonable and prudent measures, and terms and conditions for this incidental take statement pursuant to 50 CFR 402.14(I). Such terms and conditions are non-discretionary and must be undertaken for the exemptions under section 10(a)(1)(B) and section 7(o)(2) of the Act to apply. If the Applicants fail to adhere to these terms and conditions, the protection of the Permit, and section 7(o)(2), may lapse. The amount or extent of the incidental take anticipated under the NBHCP, associated reporting requirements, and provisions for disposing of dead or injured animals, are as described in the Permit.

Further, the following terms and conditions apply to the Service after issuance of the Permit:

1. The Service shall provide technical assistance to the Applicants throughout the term of the Permit.

2. The Service shall, at all time of listing of any of the currently unlisted Covered Species, reinitiate consultation on the proposed actions in accordance with 50 C.F.R. 402.16.

3. The Service shall ensure that any section 7 consultation with other Federal agencies regarding development activities covered by the permits are consistent with the conservation goals and objectives of the NBHCP, and that any such activities reviewed under section 7 and the Act shall provide levels of listed species protection consistent with the protection afforded under the NBHCP.

Reporting Requirements

The Conservancy shall provide the Wildlife Agencies with an Implementation Annual Report by May 1 of each calendar year the NBHCP is in effect. The Implementation Annual Report shall include all of the information identified in Chapter VI of the NBHCP, including the results of the Compliance Monitoring implemented by City, Sutter and the Conservancy and the Biological Effectiveness Monitoring implemented by the Conservancy during the prior calendar year, and provide an accounting of all mitigation fees collected, all urban development permits issued, and all mitigation lands acquired.

The City and Sutter shall each implement the annual report requirements described at Chapter VI of the NBHCP. In addition, at any other time during the Permit terms, City and Sutter, at the request of the Service or CDFG, shall provide within thirty (30) days, to the Wildlife Agencies additional information relevant to implementation of the NBHCP reasonably available to the City and Sutter.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service has the following conservation recommendations:

1. Pursue available funding sources to enhance and enlarge the habitat preservation program of the MAPHCP and the NBHCP. Priority areas for acquisition should have known giant garter snake presence. In addition, known giant garter snake corridors should be acquired to enhance population exchange.

2. Investigate methods whereby phased agricultural practices can be employed on upland parcels such that maximum net benefits are achieved for Swainson's hawks, burrowing owls, loggerhead shrikes, tricolored blackbirds, and bank swallows.

Reinitiation-closing statement

This concludes formal consultation and conference on the issuance of a Permit to implement the NBHCP. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals that the agency action may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

The Incidental Take Statement provided in this conference opinion for unlisted Covered Species does not become effective until the unlisted Covered Species is listed and the conference opinion is adopted as the biological opinion issued through formal consultation. If you have any questions regarding this consultation, please contact Wayne S. White, Field Office Supervisor, at (916) 414-6600.

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Table 1. Species proposed for coverage (Covered Species) in the Natomas Basin Habitat Conservation Plan (E = endangered, T = threatened, P = Proposed, D = delisted, SC = species of concern, R = rare, SSC = species of special concern).

Species	Federal Status	State Status
Aleutian Canada goose	D	
Bank swallow		T
Burrowing owl		SSC
Loggerhead shrike	SC	SSC
Swainson's hawk		T
Tricolored blackbird	SC	SSC
White-faced ibis	SC	SSC
Giant garter snake	T	T
Northwestern pond turtle	SC	SSC
California tiger salamander	P	SSC
Western spadefoot toad	SC	SSC
Valley elderberry longhorn beetle	T	
Midvalley fairy shrimp	SC	
Vernal pool fairy shrimp	T	
Vernal pool tadpole shrimp	E	
Boggs Lake hedge-hyssop		E
Colusa Grass	T	
Delta tule pea	SC	
Legenere	SC	
Sacramento Orcutt grass	E	E
Sanford's arrowhead	SC	
Slender Orcutt grass	T	E

Table 2. Habitat reserve types to be created based upon Planned Development in the Natomas Basin Habitat Conservation Plan.

Permittee	Planned Development	Reserve Total to be Created at 0.5 to 1.0	50 percent Rice Reserves	25 percent Managed Marsh Reserves	25 percent Upland Reserves
City of Sacramento	8,050	4,025.0	2,012.5	1,006.3	1,006.3
Sutter County	7,467	3,733.5	1,866.8	933.4	933.4
Metro Air Park	1,983	991.5	495.8	247.9	247.9
TOTAL	**17,500**	**8,750.0**	**4,375.0**	**2,187.5**	**2,187.5**

Table 3. Ratios used to calculate amount of habitat to be acquired to compensate for vernal pool resources.

	Bank	Non-Bank
Preservation	2:1	3:1
Creation	1:1	2:1

Table 4. Anticipated change in the amount of potential giant garter snake habitat (acres) in the Natomas Basin as a result of implementing the Natomas Basin Habitat Conservation Plan. Acreage values were obtained from the Draft NBHCP EIR/EIS.

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	After Implememntation
Ponds / seasonally wet areas	96	-7	-4	-10	-21	75
Rice	22,693	-970	-1,541	-5,577	-8,087	14,606
Canals	1,778	-117	-72	-215	-404	1,374
TOTAL	**24,567**	**-1,094**	**-1,617**	**-5,802**	**-8,512**	**16,055**

Table 5. Anticipated change in the amount of potential Swainson's hawk habitat (acres) in the Natomas Basin as a result of implementing the Natomas Basin Habitat Conservation Plan (a = nesting habitat, b = foraging habitat). Acreage values for nesting habitat were obtained from the Draft NBHCP EIR/EIS. Acreage values for the foraging habitat were obtained from the *Addendum to the NBHCP EIR/EIS Technical Memorandum* (see Appendix K of the NBHCP), which includes an updated analysis of Swainson's hawk foraging habitat.

(a)

Habitat Class	**Baseline**	**City of Sacramento**	**Metro Air Park**	**Sutter County**	**Total Change**	**Future Condition**
Riparian	124	-24	0	0	-24	100
Oak groves	98	-6	-2	0	-8	89
Tree groves	106	-10	-23	0	-33	73
TOTAL	**328**	**-40**	**-25**	**0**	**-65**	**263**

(b)

Habitat Quality	**Baseline**	**City of Sacramento**	**Metro Air Park**	**Sutter County**	**Total Change**	**Future Condition**
High	1,835	-675	-50	-8	-733	1102
Moderate	15,666	-5,098	-349	-1,852	-7,299	8,367
Low	4,550	-1,152	-4	0	-1,156	3,394
TOTAL	**22,051**	**-6,925**	**-403**	**-1,860**	**-9,188**	**12,863**

Table 6. Anticipated change in the amount of potential Aleutian Canada goose habitat (acres) in the Natomas Basin as a result of implementing the Natomas Basin Habitat Conservation Plan. Acreage values were obtained from the Draft NBHCP EIR/EIS.

Habitat Class	**Baseline**	**City of Sacramento**	**Metro Air Park**	**Sutter County**	**Total Change**	**Future Condition**
Non-rice crops	16,686	-4,663	-325	-1,529	-6,517	10,169
Pasture	674	-23	-22	-101	-147	527
Rice (roosting/ foraging)	22,693	-970	-1,541	-5,577	-8,087	14,606
TOTAL	**40,053**	**-5,656**	**-1,888**	**-7,207**	**-14,751**	**25,302**

Table 7. Anticipated change in the amount of potential burrowing owl habitat (acres) in the Natomas Basin as a result of implementing the Natomas Basin Habitat Conservation Plan. Acreage values were obtained from the Draft NBHCP EIR/EIS.

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Alfalfa	371	0	0	0	0	371
Grassland	886	-427	0	-134	-560	325
Pasture	674	-23	-22	-101	-147	527
TOTAL	**1,931**	**-450**	**-22**	**-235**	**-707**	**1,223**

Table 8. Anticipated change in the amount of potential loggerhead shrike habitat (acres) in the Natomas Basin as a result of implementing the Natomas Basin Habitat Conservation Plan. Acreage values were obtained from the Draft NBHCP EIR/EIS.

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Alfalfa	371	0	0	0	0	371
Grassland	886	-427	0	-134	-560	325
Non-rice crops	16,686	-4,663	-325	-1,529	-6,517	10,169
Oak groves	98	-6	-2	0	-8	89
Orchard	182	-13	0	0	-13	169
Pasture	674	-23	-22	-101	-147	527
Ponds and seasonally wet areas	96	-7	-4	-10	-21	75
Riparian	124	-24	0	0	-24	100
Ruderal	1,970	-1,137	-6	-88	-1,231	739
Rural	377	-46	-10	0	-56	321
Tree groves	106	-10	-23	0	-33	73
Canals (all)	1,778	-117	-72	-215	-404	1,374
TOTAL	**23,348**	**-6,473**	**-464**	**-2,077**	**-9,014**	**14,332**

Table 9. Anticipated change in the amount of potential Tricolored blackbird habitat (acres) in the Natomas Basin as a result of implementing the Natomas Basin Habitat Conservation Plan (a = nesting habitat, b = foraging habitat). Acreage values were obtained from the Draft NBHCP EIR/EIS.

(a)

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Ponds and seasonally wet areas	96	-7	-4	-10	-21	75
Riparian	124	-24	0	0	-24	100
Canals (all)	1,778	-117	-72	-215	-404	1,374
TOTAL	**1,998**	**-148**	**-76**	**-225**	**-449**	**1,549**

(b)

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Alfalfa	371	0	0	0	0	371
Non-rice crops	16,686	-4,663	-325	-1,529	-6,517	10,169
Grassland	886	-427	0	-134	-560	325
Pasture	674	-23	-22	-101	-147	527
Rice	22,693	-970	-1,541	-5,577	-8,087	14,606
TOTAL	**41,310**	**-6,083**	**-1,888**	**-7,341**	**-15,311**	**25,998**

Table 10. Anticipated change in the amount of potential white-faced ibis habitat (acres) in the Natomas Basin as a result of implementing the Natomas Basin Habitat Conservation Plan. Acreage values were obtained from the Draft NBHCP EIR/EIS.

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Alfalfa	371	0	0	0	0	371
Ponds and seasonally wet areas	96	-7	-4	-10	-21	75
Rice	22,693	-970	-1,541	-5,577	-8,087	14,606
Canals (all)	1,778	-117	-72	-215	-404	1,374
TOTAL	**24,938**	**-1,097**	**-1,617**	**-5,802**	**-8,512**	**16,426**

Table 11. Anticipated change in the amount of potential bank swallow habitat (acres) in the Natomas Basin as a result of implementing the Natomas Basin Habitat Conservation Plan. Acreage values were obtained from the Draft NBHCP EIR/EIS.

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Alfalfa	371	0	0	0	0	371
Grassland	886	-427	0	-134	-560	325
Non-rice crops	16,686	-4,663	-325	-1,529	-6,517	10,169
Pasture	674	-23	-22	-101	-147	527
Ponds and seasonally wet areas	96	-7	-4	-10	-21	75
Rice	22,693	-970	-1,541	-5,577	-8,087	14,606
Riparian	124	-24	0	0	-24	100
Canals (all)	1,778	-117	-72	-215	-404	1,374
TOTAL	**43,308**	**-6,231**	**-1,964**	**-7,566**	**-15,760**	**27,547**

Table 12. Anticipated change in the amount of potential northwestern pond turtle habitat (acres) in the Natomas Basin as a result of implementing the Natomas Basin Habitat Conservation Plan. Acreage values were obtained from the Draft NBHCP EIR/EIS.

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Ponds and seasonally wet areas	96	-7	-4	-10	-21	75
Rice	22,693	-970	-1,541	-5,577	-8,087	14,606
Riparian	124	-24	0	0	-24	100
Canals (all)	1,769	-117	-72	-215	-404	494
TOTAL	**24,691**	**-1,118**	**-1,617**	**-5,802**	**-8,536**	**16,155**

Table 13. Anticipated change in the amount of habitat (acres) most likely to support habitat of the valley elderberry longhorn beetle (elderberry shrubs [*Sambucus* spp.] with stems greater than one inch diamter) in the Natomas Basin as a result of implementing the Natomas Basin Habitat Conservation Plan. Acreage values are based upon data available in the Draft NBHCP EIR/EIS.

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Oak groves	98	-6	-2	0	-8	89
Riparian	124	-24	0	0	-24	100
Tree groves	106	-10	-23	0	-33	73
TOTAL	**328**	**-40**	**-25**	**-0**	**-65**	**262**

Table 14. Anticipated change in the amount of habitat (acres) most likely to support habitat of the vernal pool fairy shrimp, vernal pool tadpole shrimp, midvalley fairy shrimp, western spadefoot toad, Colusa grass, Sacramento Orcutt grass, slender Orcutt grass, legenere, and Bogg's Lake hedge-hyssop in the Natomas Basin as a result of implementing the Natomas Basin Habitat Conservation Plan. Acreage values are based upon data available in the Draft NBHCP EIR/EIS.

Habitat Class	Baseline	City of Sacramento	Sutter County	Total Change	Future Condition
Ponds and seasonally wet areas	96	-7	-10	-17	75
Grassland	886	-427	-134	-561	325
TOTAL	**982**	**-434**	**-144**	**-578**	**400**

Table 15. Anticipated change in the amount of habitat (acres) most likely to support Sanford's arrowhead and Delta tule pea in the Natomas Basin as a result of implementing the Natomas Basin Habitat Conservation Plan. Acreage values were obtained from the Draft NBHCP EIR/EIS.

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Ponds and seasonally wet areas	96	-7	-4	-10	-21	75
Canals (all)	1,778	-117	-72	-215	-404	1,374
TOTAL	**1,874**	**-124**	**-76**	**-225**	**-425**	**1,449**

IN THE UNITED STATES DISTRICT COURT

FOR THE EASTERN DISTRICT OF CALIFORNIA

NATIONAL WILDLIFE FEDERATION, et al.,

Plaintiffs,

v.

GALE NORTON,

Defendant.

CIV-S-04-0579 DFL JFM

MEMORANDUM OF OPINION AND ORDER

Plaintiffs National Wildlife Federation, Friends of the Swainson's Hawk, Planning and Conservation League, and Sierra Club allege that the Secretary of the Interior violated the Endangered Species Act by approving the Natomas Basin Habitat Conservation Plan and issuing incidental take permits to the City of Sacramento and Sutter County. By orders of July 2, 2004 and July 19, 2004, the court permitted the City of Sacramento, Sutter County, and several landowners in the affected area to intervene as defendants. The parties now cross-move for summary judgment.

This is the second time that the court has been asked to

review a habitat conservation plan for the Basin. See Nat'l Wildlife Fed'n v Babbitt, 128 F.Supp.2d 1274 (E.D. Cal. 2000) ("Natomas I"). In Natomas I, the court held that the habitat conservation plan was inadequate. For the reasons that follow, the court now finds that the revised plan satisfies the requirements of the Endangered Species Act ("ESA").

I. Background

A. History of the Habitat Conservation Plan

The Natomas Basin is a low-lying region of approximately 53,000 acres in Sacramento and Sutter Counties. (Administrative Record ("AR") 59.) The Basin is home to the Giant Garter Snake ("GGS") and the Swainson's Hawk, the two species of greatest concern in this litigation. In 1993, the Secretary listed the GGS as a threatened species under the Endangered Species Act ("ESA").[1] The Swainson's Hawk has not been listed as a threatened species by the Secretary; however, it has been so listed by the California Department of Fish and Game under the California Endangered Species Act. 14 C.C.R. § 670.5(b)(5)(A), Cal. Fish & Game Code § 2067. The GGS is an elusive animal that lives in rice fields and drainage ditches; it is found only in rice-growing regions of the Central Valley, including rice-growing areas in the Basin and associated canals. The Swainson's Hawk is migratory, wintering in Central and South America and

[1] A "threatened" species is any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. 16 U.S.C. § 1532(20).

spending March to September in the Central Valley. The hawk forages on small rodents found in large open fields and nests in large trees; there are approximately 50 identified hawk nesting sites in the Basin and the riparian corridor of the Sacramento river. (AR 952-55.)

The ESA conditions the Secretary's issuance of an incidental take permit ("ITP") upon her approval of a habitat conservation plan ("HCP). The ITP allows activity, here development, that could injure or harm - "take" in the language of the statute -- an endangered or threatened species. Without an ITP, developers would be subject to serious penalties, including criminal prosecution, for any injury to an endangered or threatened species. 16 U.S.C. §§ 1538, 1540. The history of the development of the Natomas Basin HCP is outlined in Natomas I and need not be repeated here in detail. See Nat'l Wildlife Fed'n v Babbitt, 128 F.Supp.2d at 1277-78. In brief, the first HCP for the Basin was a regional conservation plan designed to cover development in the entire Basin. Id. at 1279. The 1997 HCP anticipated that five jurisdictions -- the City, Sacramento County, Sutter County, Reclamation District No. 10, and the Natomas Central Mutual Water Company -- would apply for ITPs. Id. The HCP was designed to permit development of 17,500 acres of Basin land over the 50-year life of the ITPs, with mitigation lands acquired at a .5-to-1 ratio as land was developed. Id. at 1280. The acquisitions were to be funded with mitigation fees paid by developers in the relevant jurisdictions. Id. In the

end, however, only the City applied for a permit under the HCP. Despite the lack of participation by the other jurisdictions, the Secretary granted an ITP to the City, finding that the issuance of an ITP to the City, with the limitations imposed by the HCP, would not likely jeopardize the continued existence of the species covered by the HCP, including the GGS and the Swainson's Hawk. Id. at 1282-84.

The Secretary's issuance of an ITP to the City was challenged by various organizations, among whom were the plaintiffs in the present action. On August 15, 2000, the court found that several of the Secretary's findings were unreasonable and violated the ESA, thereby setting aside the Secretary's issuance of the ITP. Id. at 1292-1300. Specifically, the court found that the Secretary erroneously concluded that: (1) the HCP minimized and mitigated the impact of the permitted takings "to the maximum extent practicable;" (2) the City had ensured adequate funding for the mitigation plan; and (3) issuance of the ITP to the City, in the absence of participation by the other jurisdictions, would not jeopardize the continued existence of the covered species. Id. On this last issue, the court found that a principal failing of the 1997 ITP was that it relied upon an HCP that took a regional approach to conservation, covering the entire 53,000-acre Basin, when in fact only the City sought an ITP and agreed to be bound by the HCP. Id. at 1291, 1299. The HCP failed to analyze possible effects on the species in the event that the other jurisdictions -- primarily Sacramento and

Sutter counties -- failed to subscribe to the HCP. However, the court upheld the conclusion that the HCP would not result in jeopardy to the covered species were it implemented by the five jurisdictions envisioned by the HCP. Id. at 1295-98.

After the 1997 ITP was set aside, the City revised the HCP to address the flaws identified by the court. Currently before the court is a revised HCP, covering development only by the City and Sutter. This second Natomas Basin HCP ("NBHCP") was approved by the Secretary in April 2003. At the same time, the Secretary granted ITPs to the City and Sutter, authorizing a total of 15,517 acres of development.[2] Shortly thereafter, the Service and the Secretary issued the required supporting documents: a Biological Opinion ("BiOp") examining effects upon the species listed in the proposed ITP, Findings and Recommendations supporting the issuance of an ITP, a final EIR/EIS, and the Record of Decision, in which the Secretary adopted the Service's findings and announced her decision to issue the ITPs.[3]

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[2] The NBHCP also anticipates development of 1,983 acres in the Metro Air Park project. (Pl.'s Mot. at 5-6.) An ITP was previously issued for that project, an action the court upheld in Nat'l Wildlife Fed'n v. Norton, 306 F.Supp.2d 920 (E.D. Cal. 2004) ("Metro Air Park"). In total the NBHCP anticipates 17,500 acres of development in the Basin.

[3] The final EIR/EIS was prepared to comply with the public agencies' obligations under the National Environmental Policy Act and the California Environmental Quality Act. The EIR/EIS evaluates a broader range of potential environmental impacts. The adequacy of the EIR/EIS is not challenged in this action. However, because the EIR/EIS is part of the record of decision, the analysis and responses to comments in the EIR/EIS are relevant to evaluating the Secretary's conclusions under the ESA.

B. The Final NBHCP

The purpose of the NBHCP is to "promote biological conservation in conjunction with economic and urban development within the permit area." (AR 19.) The final NBHCP envisions participation by the City and Sutter, but does not depend on participation by both entities. (Id. at 50-51.) The NBHCP covers 22 species, with particular attention to the GGS and the Swainson's Hawk, since they are prominent in the Basin, listed as threatened under state or federal law, and occupy habitat that will also benefit other covered species. (Id. at 64.) The NBHCP anticipates that development by the City and Sutter will be limited to 15,517 acres -- 8,050 acres within the City and 7,467 acres in Sutter County -- and provides that approval of any development beyond this limit -- whether by the City and Sutter or by other entities -- will trigger reevaluation and possible amendment of the plan, and could result in suspension or revocation of the City and Sutter permits. (Id. at 20, 23-26, 110.)

Like the 1997 HCP, the primary mitigation measure relied on in the NBHCP is acquisition and enhancement of reserve properties at a .5-to-1 ratio for all of the lost habitat, to be funded by developer fees.[4] (Id. at 36, 169-98.) The 8,750 acres of reserve land will be divided in the following fashion: 50% in

[4] The plan also requires other minimization and avoidance measures. In particular, the plan calls for preservation of the "Swainson's Hawk Zone," a one-mile strip of land adjacent to the Sacramento River, which contains many of the Swainson's Hawk nesting sites in the Basin. (AR 1032, 1034.)

rice cultivation that will serve as habitat for the GGS; 25% in managed marsh habitat for the GGS; and 25% in upland habitat that could be used for foraging by the Swainson's Hawk. (Id. at 37.) The NBHCP offers the following reasons to support the adequacy of the .5-to-1 ratio: (1) the reserves will provide higher quality habitat than the lands to be developed, especially given that the reserves will be managed for the covered species; (2) much of the land to be developed is of limited value as habitat but will be assessed as if it were of value; (3) the reserves will provide permanent habitat for the covered species; (4) the NBHCP provides monitoring and adaptive management to protect the species; and (5) the reserves will be large and biologically viable. (Id. at 132-33.) On this last point, the NBHCP requires that, by the end of the 50-year term of the plan, there must be one reserve of at least 2,500 acres in size, with the remaining reserves in blocks of 400 acres or more that will be connected by watercourses. (Id. at 140.) The NBHCP also provides that setback zones should be "considered" prior to the acquisition of reserve lands and that, if possible, reserve lands should be located 800 feet or more from urban development. (Id. at 142.)

The NBHCP contains several provisions designed to ensure that its environmental objectives will be achieved and that development will not outpace the acquisition of mitigation lands. One of these provisions is a 200-acre "cushion" of mitigation land, which requires that, as of September of each year, the Natomas Basin Conservancy ("NBC") -- which is the entity that

owns, acquires, and manages the reserve lands -- must have acquired at least 200 more acres of reserve land than necessary to mitigate all of the development approved to that date before any further development is permitted. (Id. at 213-14.) This requirement is intended to assure that the NBC will never be unable to find and acquire mitigation lands for development that has already been approved. The NBHCP also calls for increases in the mitigation fees, as necessary and without a cap, to pay for increased costs of land acquisition and reserve management. (Id. at 211.) "Catch-up fee" ordinances enacted by the City and Sutter will require developers who have received development approval to pay the increased mitigation fees if they have not yet engaged in ground-disturbing activity. (Id. at 212.)

The NBHCP also imposes monitoring and review obligations designed to ensure that the plan will achieve the desired conservation objectives and goals. Two types of monitoring are required by the plan: (1) compliance monitoring, to assure that the reserves are properly acquired and managed; and (2) biological effectiveness monitoring, to determine whether the assumptions of the plan hold true in practice over time. (Id. at 217-32.) Beyond these continuing obligations, the plan also calls for broad reviews at designated development milestones. An overall program review will be conducted once 9,000 acres of development have been approved. (Id. at 239-41.) The overall program review will be made available for public review and comment. (Id.) The NBHCP also calls for an independent mid-

point review by each permittee to address the possibility that development might proceed faster in one jurisdiction than the other. (Id.) The NBHCP also provides for "adaptive management" to respond to the monitoring, reviews, or other new scientific data. (Id. at 234-38.) Should the adaptive management provisions prove insufficient, the NBHCP can be amended or revised, or, in the worst case, the permits could be suspended or revoked. (Id. at 252-56.)

The NBHCP concedes that there will be harm to the species listed in the permit, but contends that the harm will be significantly reduced by the measures described above. (Id. at 263-330.) The NBHCP further finds that the proposed level of mitigation is the "maximum extent practicable," relying on economic analysis. (Id. at 332-36.) Finally, the NBHCP concludes that the plan as proposed is the best option among other possible alternatives in light of biological and financial considerations. (Id. at 336-38.)

Through the implementation agreement, the City and Sutter agree to be bound by the terms of the NBHCP, which are also incorporated into the ITP. (Id. at 806-55.)

C. The 2003 Biological Opinion

The Biological Opinion ("BiOp") is an evaluation by the Service's wildlife biologists of the potential effects of issuance of the ITPs on the species identified in the plan and

the proposed ITPs.[5] 16 U.S.C. § 1536. While acknowledging that the proposed development will have both direct and indirect negative effects on the GGS, the BiOp ultimately concludes that the ITPs will not affect the viability of the GGS population within the Natomas Basin or the viability of the species as a whole. (AR 1028.) This finding is based on several factors: (1) the minimization and take avoidance measures imposed by the NBHCP, including pre-construction surveys and de-watering and fencing of canals; (2) the protection, enhancement, restoration, or creation of 6,562.5 acres of higher quality reserves for the snake; (3) the maintenance of connectivity between reserve lands; (4) the continued existence of 16,000 acres of GGS habitat that will remain in the Basin after development; and (5) the creation of year-round protected habitat in the reserves specifically managed to benefit the GGS and not subject to the vagaries of rice farming. (Id.)

The BiOp similarly acknowledges that the Swainson's Hawk will suffer some negative impacts from implementation of the proposed action, including the loss of up to 20% of its nesting habitat and 40% of its foraging habitat in the Basin, most of which is of high or moderate quality. (Id. at 1032-37.) However, the BiOp concludes that the proposed action will not jeopardize the survival of the Central Valley population of the Swainson's Hawk or the species as a whole because: (1) the

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[5] The BiOp is required by the ESA because the issuance of an ITP is a federal action. See part II.A, infra.

reserves created will provide foraging opportunities at the appropriate time of year, during nesting; (2) approximately 13,000 acres of foraging habitat will not be affected; (3) the acquired foraging habitat will be closer to the nesting trees; (4) more high quality foraging habitat will be created; and (5) significant foraging habitat exists to the west, in Yolo County. (Id. at 1039.) In sum, the BiOp concludes that issuance of ITPs to the City and Sutter will not appreciably reduce the likelihood of the survival and recovery of these species in the wild.

D. The 2003 Findings and Recommendations

The Findings and Recommendations represent the Service's findings in light of the information in the NBHCP and the BiOp. The Service concludes that the impacts of the issuance of the ITPs will be minimized and mitigated to the maximum extent practicable. (Id. at 1182.) Specifically, the Service finds that the injury to the species covered by the permit will be mitigated to the maximum extent practicable by: (1) the measures identified in the NBHCP; (2) establishment, enhancement, and active management of 7,758.5 acres of high-quality reserve habitat; (3) establishment of a monitoring and reporting plan; and (4) use of a funding mechanism that contains assurances that the NBHCP will be implemented. (Id. at 1184-85.) The Service finds that the harm will be minor for all of the covered species, except the GGS, and that, for all covered species, including the GGS, the consequences of the harm will be effectively mitigated by the conservation measures provided for by the NBHCP. More

specifically, as to the Swainson's Hawk, the Service determines that the degree of injury will be low because: (1) the majority of the foraging habitat that will be lost is currently not available to the hawk during its nesting season[6]; (2) substantial foraging habitat will exist in the Basin even after the planned development; and (3) substantial foraging habitat will remain in Yolo County. (Id. at 1188-89.) The Service further concludes that any injury will be effectively mitigated for the reasons stated in the BiOp and described above.

As to the GGS, the Service acknowledges that there is a higher likelihood of injury to the GGS, but still concludes that the injury will be effectively mitigated by the measures included in the NBHCP, including: (1) limits on construction during the GGS dormant period; (2) pre-construction surveys and dewatering; (3) the creation of managed marsh habitat; (4) the acquisition of rice fields and their management with "snake friendly practices"; and (5) the assurances of connectivity of snake habitat. (Id. at 1190-91.)

The Findings and Recommendations conclude that, in addition to effectively mitigating for the anticipated harm, the NBHCP provides for mitigation to the "maximum extent practicable," relying on the economic analysis prepared in conjunction with the

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[6] The Swainson's Hawk nests and breeds in the Basin from March to September. However, under current conditions, much of the potential foraging habitat is cultivated with crops that either do not provide good foraging habitat for the Swainson's Hawk or do not provide good foraging habitat until August or September, after young have fledged. (AR 725-49.)

NBHCP. (Id. at 1192-93.) The Findings and Recommendations likewise conclude that the City and Sutter have ensured adequate funding for the plan through: (1) the mitigation fee program, which includes five different components and which is not capped; (2) the catch-up fee ordinance; and (3) the 200-acre cushion of mitigation land. (Id. at 1194-95.) Finally, the Findings and Recommendations conclude that the issuance of the ITPs will not appreciably reduce the likelihood of survival and recovery of any of the covered species, including the Swainson's Hawk and GGS. (Id. at 1196-99.) In accordance with these Findings, the Service recommends that the Secretary of the Interior approve the ITPs for the City and Sutter.

The Findings and Recommendations became the decision of the Secretary of Interior once she adopted them in the Record of Decision and issued the two ITPs.[7] This suit followed in March 2004. Plaintiffs seek a ruling that the Secretary's findings are not supported by the record and that the Secretary's approval of the NBHCP and issuance of the ITPs should be revoked.

II. Statutory Standards and Requirements

A. The Endangered Species Act

The purpose of the ESA is to "conserve ecosystems upon which endangered and threatened species depend" and "to provide a

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[7] Although the Secretary made the final decision to issue an ITP, her conclusions depend on the analysis and findings of the Service. Therefore, although the Secretary is the named defendant in this case, the court will frequently refer to the BiOp and Findings and Recommendations of the Service in reviewing the decision of the Secretary.

program for the conservation of such endangered species." 16 U.S.C. § 1531(b). As a means of achieving this goal, Section 9 of the ESA prohibits private individuals from "taking" endangered or threatened species. Id. § 1538(a)(1)(B). The ESA defines "take" to include "harm" to animals. Id. § 1532(19). The Service has defined "harm," within the meaning of "take," to include "significant habitat modification or degradation where it actually kills or injures wildlife," a definition that has been upheld by the Supreme Court. 50 C.F.R. § 17.3 (2004); Babbitt v. Sweet Home Chapter for Cmtys. for a Great Or., 515 U.S. 687, 696, 115 S.Ct. 2407 (1995).

The broad scope of Section 9 is limited by several exceptions, found in Section 10. Specifically, Section 10 authorizes the Secretary to issue a permit, an ITP, for any taking that is incidental to the carrying out of an otherwise lawful activity. 16 U.S.C. § 1539(a)(1)(B). To receive an ITP, the permit applicant must submit an HCP that specifies: (i) the impact which will likely result from such taking; (ii) what steps the applicant will take to minimize and mitigate such impacts, and the funding that will be available to implement such steps; (iii) what alternative actions to such taking that the applicant considered and the reasons why such alternatives were not selected; and (iv) such other measures that the Secretary may require as necessary or appropriate for the purposes of the plan. Id. § 1539(a)(2)(A); 50 C.F.R. § 17.22 (2004). The Secretary must issue an ITP upon finding that: (i) the taking will be

incidental; (ii) the applicant will, to the maximum extent practicable, minimize and mitigate the impacts of the taking; (iii) the applicant has ensured adequate funding for the HCP; (iv) the taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild; and (v) any additional measures required by the Secretary will be undertaken. 16 U.S.C. § 1539(a)(2)(B).

Section 7 of the ESA applies to federal actions, and requires federal agencies, through consultation with the Service, "to insure that any action authorized, funded, or carried out" by the agency is "not likely to jeopardize the continued existence of any endangered species or threatened species." Id. § 1536(a)(2). Issuance of an ITP is an agency action that requires the Service to engage in internal consultation and prepare a BiOp evaluating whether issuance of the ITP will result in jeopardy to any endangered or threatened species. Id. § 1536(b). An action will result in "jeopardy" if it will "reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild. . . ." 50 C.F.R. § 402.02 (2004). The required jeopardy analysis under Section 7(a)(2) is identical in almost all respects to the inquiry under Section 10(a)(2)(B)(iv). Natomas I, 128 F.Supp.2d at 1286. In considering whether the action will jeopardize a species, the Service must evaluate the effects of the action and any cumulative effects on the listed

species.[8] 50 C.F.R. § 402.14(g) (2004).

B. The Administrative Procedure Act

Review of final agency actions under the ESA is governed by the Administrative Procedure Act ("APA"). 5 U.S.C. § 706; Pacific Coast Fed'n of Fishermen's Ass'ns v. NMFS, 265 F.3d 1028, 1034 (9th Cir. 2001). The APA provides that the court must "hold unlawful and set aside agency action, findings and conclusions" that are "arbitrary, capricious, an abuse of discretion or otherwise not in accordance with law." 5 U.S.C. § 706(2)(A). An agency action is arbitrary and capricious if the agency failed to consider relevant factors, failed to articulate a rational connection between the facts found and the choice made, or made a clear error of judgment. Baltimore Gas & Elec. Co. v. NRDC, 490 U.S. 87, 105-06, 103 S.Ct. 2246 (1983); Pacific Coast Fed'n of Fishermen's Ass'ns, 265 F.3d at 1034; Greenpeace v. NMFS, 80 F.Supp.2d 1137, 1150 (W.D. Wash. 2000). Review under this standard is "searching and careful," but "narrow." Marsh v. Or. Natural Res. Council, 490 U.S. 360, 378, 109 S.Ct. 1851 (1989). The court should not substitute its judgment for that of the agency, but rather must determine whether the evidence in the

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[8] "Effects of the action" are the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent on that action, that will be added to the environmental baseline. 50 C.F.R. § 402.02 (2004). "Cumulative effects" are "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." Id.

administrative record permitted the agency to make the decision it did. Baltimore Gas & Elec. Co., 462 U.S. at 97; Occdidental Eng'g Co. v. INS, 753 F.2d 766, 769-70 (9th Cir. 1985). The agency decision need not be ideal, so long as the agency gave at least minimal consideration to the relevant facts contained in the record. Southwest Ctr. for Biological Diversity v. Bureau of Reclamation, 143 F.3d 515, 523, quoting Ctr. for Marine Conservation v. Brown, 917 F.Supp. 1128, 1143 (S.D. Tex. 1996).

Deference to the agency is especially appropriate where the challenged decision relies upon the agency's expertise. Mt. Graham Red Squirrel v. Espy, 986 F.2d 1568, 1571 (9th Cir. 1993). The court should defer to the agency's reasonable interpretation and resolution of equivocal or conflicting evidence, including conflicting expert opinions. Friends of Endangered Species, Inc. v. Jantzen, 760 F.2d 976, 986 (9th Cir. 1985); Cent. Ariz. Water Conservation Dist. v. EPA, 990 F.2d 1531, 1539 (9th Cir. 1993).

Plaintiffs challenge three of the Secretary's conclusions as arbitrary and capricious under the APA: (1) that the injury to the GGS and Swainson's Hawk will not appreciably reduce the likelihood of survival and recovery of these species; (2) that the NBHCP will minimize and mitigate the effects of any taking to the maximum extent practicable; and (3) that the City and Sutter will ensure adequate funding for the required mitigation. (Compl. ¶¶ 55-72.)[9] The court addresses these three contentions

[9] Defendants do not contest plaintiffs' standing to challenge the Secretary's issuance of the ITPs and approval of the NBHCP.

in the following sections.

III. No Jeopardy to Survival Findings

Plaintiffs allege that the Secretary erroneously concluded that development activity permitted under the NBHCP will not appreciably reduce the likelihood of the survival and recovery of the Swainson's Hawk and the GGS. 16 U.S.C. §§ 1536, 1539. At the heart of plaintiffs' argument is their contention that the Secretary gave insufficient consideration to the development that is likely to occur in the remainder of the Basin, outside the City's current boundaries and Sutter County, over the 50-year term of the NBHCP, and to the effect of this additional development on the viability and efficacy of the planned reserves and the survival of the species. (Pls.' Mot. at 19.) Plaintiffs' arguments generally fall into three categories: (1) the Service failed to analyze the lack of binding commitments from other jurisdictions and, at the same time, erroneously relied on voluntary mitigation measures by those jurisdictions; (2) the Service failed to consider the cumulative impacts of other proposed projects in the Basin; and (3) the Service failed to consider the lack of protection of the 800-foot reserve setbacks.

A. Failure to Analyze the Lack of Binding Commitments by Other Jurisdictions

Plaintiffs argue that the Service failed to address the lack of binding commitments to the NBHCP by other entities -- namely, the County of Sacramento, the Natomas Mutual Water Company, and

Reclamation District 1000 -- and instead assumed that these entities will continue their current course of conduct. (Id.) Plaintiffs rely on Natomas I, in which the court faulted the Secretary for issuing an ITP to the City alone, based on a regional HCP that assumed participation of five jurisdictions. 128 F.Supp.2d at 1295-96, 1299. However, unlike the 1997 HCP, the non-participation of the other jurisdictions is specifically considered and addressed in the present NBHCP; the Secretary determined that the lack of participation would not negatively impact implementation of the plan.

As to the water agencies, plaintiffs argue that the plan erroneously assumes that the water agencies will continue to maintain the network of canals and irrigation ditches that will connect the reserves. All parties agree that the connectivity of habitat provided by the irrigation system is essential to the survival of the GGS. In response, defendants contend that this issue was looked at in great detail and that, for a number of reasons, the Service reasonably concluded that hydrological connectivity would not be affected by the failure of the water districts to participate. First, the Service found that connectivity corridors will remain open because they will continue to be needed for drainage and irrigation of agricultural lands. (AR 1611-14.) Of course, this assumes that much of the Basin will continue in agriculture, a point addressed further below, but if this assumption is correct then irrigation canals will still be necessary. The Service further analyzed whether

current management practices by farmers and the water agencies are sufficient to protect the snake as it moves through the corridors and concluded that they are. (Id.) Second, the Service reasoned that any decision by the water agencies to close or fill the canals would necessarily require further federal consultation, either because the activity would result in a "taking" under the ESA or because it would require a § 404 Clean Water Act permit, and that any adverse impacts to the GGS could be mitigated at that time. (Id.) Third, the Service noted that the NBHCP includes other measures to protect connectivity, including yearly evaluations of connectivity and the use of mitigation fees to purchase canals or channels, if needed. (Id.) Finally, and closely related to the third point, the Service also relied on the NBC's status as a landowner and, therefore, as a shareholder in the Natomas Mutual Water Company, increasingly able to influence the water company's decision-making as the NBC acquires new land and shares. (Id. at 1612, 1028.)

The issue of connectivity is discussed in the NBHCP, the BiOp, and in the Final EIR/EIS, both as part of the original analysis and in response to comments. (Id. at 134-37; 888-90, 1027-28, 1611-14, 1955-58, 1999-2000, 2005-06, 2132-44.) All of the arguments now advanced by defendants have been addressed in these documents. Taken together, the four considerations advanced by the Service rationally explain how connectivity will be maintained. It cannot fairly be said that the Service and, by extension, the Secretary, failed to consider the issue. Nor does

it appear, in light of the evidence in the record, that the Secretary was "arbitrary and capricious" or made a clear error of judgment in concluding that connectivity would not be significantly affected by the failure of the water agencies to participate.

Plaintiffs similarly argue that the Secretary failed to consider the non-participation of Sacramento County and erroneously assumed that Sacramento County's land in the Basin will remain devoted to agricultural uses. (Pls.' Mot. at 19-21.) The NBHCP and the BiOp do assume that development in the Basin will be limited to the 17,500 acres in the permit areas and relies on that assumption in concluding that sufficient habitat will remain for the covered species. (AR 1026.) This assumption is based on the current land use plans of Sacramento County. (Id. at 121, 1055.) The NBHCP, BiOp, and EIR/EIS also conclude that because any future development in the Basin not covered by the HCP and ITPs would likely result in injury to listed species, any future development in the Basin would require new federal approvals. Any such approvals would in turn require a new HCP and ITP for the particular project, and could also lead to revision of the existing NBHCP, were the additional development to exceed the assumed limits in the NBHCP. (Id. at 121, 1055, 1617-32.) The court previously upheld reliance of the Service on the general plans of the City, Sutter, and Sacramento County to determine the probable extent of development and the likely impacts to the covered species. Natomas I, 128 F.Supp.2d at

1296. Although these plans can be changed, they are the best current information about future development. Given that any development outside of the NBHCP would be subject to its own environmental review, the decision of the Service to rely on the general plan of Sacramento County to predict future development in Sacramento County is not unreasonable.[10]

Plaintiffs also argue that the Service ignored the development of "agricultural-residential rural estates" and other small projects in Sacramento County whose impacts have not, and will not, be mitigated. (Pls.' Reply at 8, 14-15, 20-22.) However, the impacts of such developments were considered in the NBHCP and the EIR/EIS, and their impact was determined to be small. (AR at 61, 1630, 1979, 2082-83.) The Service considered these developments and rationally determined that they would not result in jeopardy to the covered species.

Finally, plaintiffs cite a number of cases for the proposition that the Service cannot rely on "voluntary" and "speculative" mitigation measures by the water agencies,

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[10] One of the benefits of a regional HCP is that it removes the incentive to be among the first to develop and the potential unfairness to those landowners who, for whatever reason, choose to develop at a later time. Those who develop at the end of the line may find that they cannot obtain an ITP because so much habitat has already been affected by earlier development. The same dynamic occurs as between regional HCPs. Thus, the decision not to participate in the NBHCP may place Sacramento County in a more difficult position if it later seeks an ITP. Thus, while plaintiffs contend that future development will vitiate the NBHCP, it is more likely that, if future development in the County will have this effect, the Secretary will decline to issue ITPs for development in the County or will insist on mitigation that may be considerably greater than that required by the NBHCP.

individual landowners, or Sacramento County in reaching a no-jeopardy conclusion. (Pls.' Mot. 21-22 n.12; Pls.' Reply at 13.) However, in the cases cited by plaintiffs, the Service assumed that the third-party would undertake affirmative acts that would mitigate injury to a species, even though those actions were speculative or voluntary. In this case, by contrast, the Service merely evaluated the baseline conditions in the Basin and concluded, based on articulated reasons, that those conditions were not reasonably likely to change without further federal review and approval.

Accordingly, the Secretary's finding that the failure of other jurisdictions to participate in the NBHCP does not undermine its effectiveness is not arbitrary, capricious or clearly erroneous. The fatal flaw of the earlier HCP was that it was a regional conservation plan that assumed all jurisdictions would participate and gave no attention to the possibility that some would not. 128 F.Supp.2d at 1291. This plan, by contrast, focuses on the two permittees and explains why further development or action by any other entity would require additional federal approvals. The plan does not assume or require the participation of any third parties to be effective. Plaintiffs' claim that the plan depends on the voluntary actions of third-parties is without merit.

B. Failure to Consider the Cumulative Impacts of the Joint Vision MOU and Other Proposed Projects

Plaintiffs argue that the Service failed to undertake an

adequate cumulative effects analysis, as required by the ESA, because it failed to consider the impacts of the so-called "Joint Vision" development and other proposed projects. (Pls.' Mot. at 22-31.) Specifically, plaintiffs focus on a Memorandum of Understanding entered into in December 2002 by the City of Sacramento and Sacramento County, commonly referred to as the "Joint Vision MOU," which sets forth several principles for going forward with annexation and urbanization of 10,000 acres in Sacramento County currently designated for agricultural use. (Id.) This 10,000-acre area is not part of the 17,500 acres that the NBHCP projects for development in the entire Basin and, were development of the 10,000 acres to occur, this might well be a significant change in circumstances that could destroy the effectiveness of the NBHCP. Because the "Joint Vision MOU" is by no means a concrete plan for development, the court finds that the Service was correct in finding that the lands covered by the MOU are not reasonably likely to be developed and, therefore, need not be the subject of a cumulative effects analysis.

The purpose of the Joint Vision MOU is to "define a mutually acceptable set of proposed principles that the City and [Sacramento] County are prepared to consider when considering future land use planning" in the Basin. (AR 2374.) The principles set forth are "intended to guide future discussion and the ultimate negotiation of an agreement between the County and the City." (Id. at 2377.) The MOU asserts that growth in the Basin is "inevitable," and assigns to the City the primary

responsibility for planning new growth in the area. (Id. at 2373, 2375.) However, the MOU also contemplates that any implementation of its principles will require discretionary legislative actions by the relevant land-use jurisdictions and further state and federal environmental review. (Id. at 2374-75.)

The ESA requires the Service, in evaluating whether the ITP will affect the likelihood of survival and recovery of the covered species, to consider "cumulative effects" on the species. 50 C.F.R. § 402.02 (2004). These effects are defined to include the "effects of future state or private actions, not involving federal activities, that are reasonably likely to occur." Id. By negative implication, the Service is not required to analyze the effects of future federal actions. Similarly, it is not required to analyze non-federal actions that are not reasonably likely to occur. Future federal actions include actions that require federal authorization, through permitting or funding. Loggerhead Turtle v. County of Volusia, 120 F.Supp.2d 1005, 1017 n.20 (M.D. Fla. 2000); Cal. Native Plant Soc.'y v. Norton, 2004 WL 1118537 at *14 (S.D. Cal. Feb. 10, 2004). Although the regulations do not define when an effect is "reasonably certain" to occur, the FWS HCP Handbook offers the following explanation[11]:

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[11] Defendants argue that the Handbook is entitled to deference under the standard set forth in United States v. Mead Corp., 533 U.S. 218, 226-27, 121 S.Ct. 2164 (2001). Plaintiffs do not dispute that the interpretation of "reasonably certain" in the Handbook is entitled to deference, nor do they offer an

> the more State, tribal, or local administrative discretion remaining to be exercised before a proposed non-federal action can proceed, the less there is a reasonable certainty the project will be authorized. Speculative non-federal actions that may never be implemented are not factored into the cumulative effects analysis . . . . The action agency should consider the economic, administrative, and legal hurdles remaining before the action proceeds.

United States Fish & Wildlife Service and National Marine Fisheries Service, Endangered Species Act Consultation Handbook 4-30 (1998).

In support of their argument that the "no jeopardy" finding was arbitrary and capricious in light of the cumulative effects on the species, plaintiffs contend: (1) the additional 10,000 acres of development proposed in the MOU is reasonably certain to occur; (2) the development of this acreage fatally undermines the NBHCP; (3) the development will not necessarily require further federal approval; and (4) the Service was required to consider its effects upon the species covered by the ITP but failed to do

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alternate interpretation of the term. In enacting the ESA, Congress gave the Service authority to promulgate binding regulations. 16 U.S.C. § 1540(f). However, the Handbook definition is not a regulation, but a mere interpretation of a regulation. The court in Mead explicitly found that interpretations contained in agency manuals are not entitled to the highest level of deference. 533 U.S. at 234. Nonetheless, a court may still defer to an agency's interpretation of its own regulation, depending upon "the thoroughness evident in its consideration, the validity of its reasoning, its consistency with earlier and later pronouncements, and all those factors which give it power to persuade, if lacking power to control." Id. at 227-230, 234-38, quoting Skidmore v. Swift & Co., 323 U.S. 134, 140, 65 S.Ct. 161 (1944). Applying this standard, the court finds that the Service's interpretation is entitled to deference and is a reasonable construction of the regulation.

so. (Pls.' Mot. at 22-31.)

In concluding that development of the 10,000 acres within the Joint Vision MOU was not "reasonably certain," the Service relied on the numerous discretionary steps remaining before any development could occur, and the preliminary nature of the Joint Vision MOU. These discretionary steps include: land-use planning, environmental review, biological resources evaluation, compliance with local, state, and federal laws, and approval of the plan by the City, County, and Local Agency Formation Commission ("LAFCO"). (AR 1617.) If these regulatory hurdles are surmounted, further review will be required by federal agencies under the ESA and the NBHCP.

Furthermore, the Joint Vision MOU is only a "conceptual agreement" designed to "establish principles to form the parameters of a future agreement or agreements." (Id. at 2373.) The MOU is not a concrete development proposal establishing a set level of development or land use patterns. (Id. at 2373-77.) No funds are committed. (Id.) The MOU does not change the existing agricultural-use designation for any of the 10,000 acres. (Id. at 2374.) The MOU does not waive any existing land use requirements but explicitly contemplates the necessity for further discretionary approvals and environmental review. (Id.) Given the tentative, general nature of the MOU and the considerable number of local, state, and federal approvals that would be required before any development of the 10,000 acres could occur, the Service did not err in determining that the

Joint Vision development was not reasonably certain to occur and need not be considered by the Service in conducting its jeopardy analysis.

In addition, the Service reasonably concluded that the MOU would require federal action because any future development will require: (1) a new ITP and therefore a new evaluation by the Service of possible injury to protected species from that development if the ITP is approved; and (2) a reevaluation of the efficacy of the NBHCP in light of the proposed development. Indeed, the City has a powerful incentive to assure that development under the MOU is consistent with federal requirements; through the implementation agreement, the City has committed to ensuring that additional development does not occur in the Basin without federal review. Thus, were the MOU lands to develop without federal review -- an unlikely prospect given that the MOU assigns control to the City -- the City could face revocation of its existing ITP under the NBHCP. (Id. at 20-21.) Therefore, any further development will necessarily be a federal action because further federal approval will be required under any scenario that could impair the efficacy of the NBHCP.[12] The

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[12] Plaintiffs cite two cases for the proposition that the MOU must be considered now as a cumulative impact. Neither case is binding and neither is on point. In NWF v. Norton, 332 F.Supp.2d 170,177-79 (D.D.C. 2004), the court found that the Service entirely ignored small-scale state and local projects that were reasonably certain to occur and, in fact, ignored its own conclusion that habitat degradation was a significant threat to the panther. Here, the Service explicitly considered the possibility of additional development and determined that any development would be subject to additional federal review. In Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv., 2005 WL

Service is entitled to assume that private individuals and the relevant agencies will seek the required federal approvals before proceeding with activities that could result in a taking of a protected species. Natomas I, 128 F.Supp.2d at 1298. The determination of the Service that any development under the Joint Vision MOU would be a federal action and, therefore, need not be included in the cumulative effects analysis, is not arbitrary or clearly erroneous, particularly given that development of the 10,000 acres is not "reasonably certain" to occur.

C. Impact of the Joint Vision on the Acquisition of Reserves

Plaintiffs argue that, in addition to the direct destruction of 10,000 acres of habitat through the Joint Vision development addressed above, the Service also should have considered the probable effect of the Joint Vision development on the ability of the NBC to acquire sufficient reserves. (Pls.' Mot. at 30.) Plaintiffs argue that, of the 53,000 acres in the Basin, 7,000 acres are already developed, 17,500 acres are approved for development under the NBHCP, and 10,000 are contemplated for development under the Joint Vision, leaving only 18,000 acres for mitigation of the impacts of both the NBHCP development and the Joint Vision development. (Id.)

Plaintiffs' scenario is unlikely and, more importantly, is

1278878 at *18-21 (D.Or. 2001), the court held that the agency had the discretion to consider the impacts of future actions that were reasonably certain to occur, even though such actions would require additional federal approvals, not that it was required to do so.

adequately addressed in the record. First, as discussed above, at this point, the Joint Vision development is not reasonably likely to occur. Second, if and when a concrete development proposal is put forth, it will be the subject of additional federal and state environmental review. The Service, and the court, are entitled to assume at this point that future development will not be permitted if sufficient mitigation land is unavailable and the development will result in jeopardy.[13] Furthermore, the NBHCP provides a fail-safe measure to ensure a sufficient supply of mitigation land. The NBHCP provides that, if off-site mitigation land is not available for purchase by the NBC, development must either stop or the developer must provide an in-lieu dedication of sufficient mitigation land. (AR 804.) Finally, the EIR/EIS did consider the impact of the Joint Vision on the acquisition of mitigation lands, but concluded that it was not a pressing concern at this time, for the reasons addressed above. (Id. at 1618.) For these same reasons, the court finds that the Service did not clearly err in concluding that the Joint Vision MOU does not vitiate the NBHCP.

D. Other Proposed Developments

Finally, plaintiffs argue that the Service erred in failing

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[13] The court notes, however, that the Service and those seeking an ITP in the future will face an uphill battle if they attempt to argue that additional development in the Basin beyond 17,500 acres will not result in jeopardy. The NBHCP, BiOp, EIR/EIS, and Findings and Recommendations are all predicated on the assumption that development in the Basin will be limited to 17,500 acres and that the remaining lands will remain in agricultural use. (AR 20-24, 862, 866-67, 1171-72, 1617-18.)

to analyze the cumulative impacts of other specific development proposals moving forward in the Basin. (Pls.' Mot. at 22-27.) However, the final EIR/EIS specifies that all of these projects will require future federal approval because they are not covered by any of the ITPs issued under the NBHCP. (AR 1624-31.) Moreover, the record reflects multiple reasons why the Service concluded that these developments are not reasonably certain to occur: (1) the areas are not currently planned for urban development under existing land use plans; (2) the lands are located outside the City's sphere of influence, the City limits, and the urban services boundary; (3) no urban services are available; and (4) there are significant legal and planning hurdles to development. (Id. at 1055, 1216, 1614-32.) Plaintiffs, by contrast, present no evidence in the record showing that these projects are anything more than the optimistic day dreams of developers. In light of the reasoned analysis by the Service as to why the impacts of these proposals need not be considered, and in the absence of any evidence that the Service made a clear error of judgment, the decision to exclude consideration of these projects was not arbitrary or clearly erroneous.

E. Failure to Consider the Lack of Protection of Setbacks

Finally, plaintiffs argue that the no-jeopardy conclusion was erroneous because it depends on 800-foot setbacks for the reserve lands but does not protect the setbacks from development. (Pls.' Mot. at 32; Pls.' Reply at 26.) As discussed above, one

of the acquisition criteria for reserve lands is that they should be located at least 800 feet from lands currently designated or used for urban development. (AR 889.) The plan does not contemplate that the setback lands will be acquired by the NBC, but assumes that the setback areas will be agricultural lands within the Basin. (Id. 889-90.) However, after reserve lands are acquired, the setbacks are not required to be managed in any particular fashion and later could be used for urban development. (Id.) Plaintiffs argue that the failure to protect the setbacks fatally undermines the no-jeopardy conclusion. (Pls.' Mot. at 32; Pls.' Reply at 26.)

However, the Service explicitly stated in the BiOp that the setbacks are not a permanent aspect of the mitigation program but are, instead, a mere acquisition criteria, to be considered and achieved, if possible. (AR 889-90.) Therefore, the Service's no-jeopardy conclusion did not erroneously assume or depend on permanent protection of the 800-foot setbacks. Moreover, the NBHCP provides for re-evaluation of the status and adequacy of the setback criteria during the mid-point reviews. (Id. at 142-3.) The Service's determination that the reserve system would prevent jeopardy to the GGS and Swainson's Hawk considered the potential impact of development in the setback zone. This determination was not arbitrary or capricious.

F. Summary

In sum, plaintiffs have not pointed to evidence demonstrating that the "no-jeopardy" finding was arbitrary and

capricious. Although the Secretary did not reach the conclusions plaintiffs desire, the record indicates that the Secretary considered the relevant factors and articulated a rational connection between the facts found and the conclusions reached. The Service addressed the non-participation of other agencies, considered the potential Joint Vision development plan, and did not depend on the 800-foot preferred setbacks in reaching the no-jeopardy conclusion. The no jeopardy finding is not arbitrary or clearly erroneous.

IV. Mitigate to the Maximum Extent Practicable

Prior to issuing an ITP, the Secretary must determine that the permit applicant will, to the maximum extent practicable, minimize and mitigate the impacts of the taking. 16 U.S.C. § 1539(a)(2)(B)(ii). There are two components to this finding: (1) the adequacy of the mitigation program in proportion to the level of injury -- take -- that will result; and (2) whether the mitigation is the maximum that can be practically implemented by the applicant. Metro Air Park, 306 F.Supp.2d at 927-28. These two factors are evaluated on a sliding scale, such that a stronger showing on one factor may compensate for a weaker showing on the other. Id. For instance, where the habitat lost is of minimal or no value to the covered species and the mitigation plan more than compensates for the level of injury, the applicant need not do more, even if it would be financially feasible. Id. at 928. Here, plaintiffs assert that the Service's findings on both aspects are arbitrary and capricious.

A. Proportionality to the Injury

Plaintiffs argue that the Service erred in finding that the .5-to-1 mitigation ratio sufficiently compensates for the injury that will occur to the GGS and the Swainson's Hawk as a result of the development authorized by the ITPs. (Pls.' Mot. at 35.)

1. Giant Garter Snake

As a result of the development authorized by the ITPs, 8,512 acres of GGS snake habitat will be destroyed. (AR 1021.) The Service determined that, if unmitigated, this would result in considerable harm to the GGS. (Id. at 1190.) However, this habitat will be replaced by 2,187 acres of restored marshlands and 4,375 acres of rice habitat, resulting in an effective mitigation ratio, for the GGS, of approximately .75-to-1. (Id. at 1191.)

The Service offers several reasons why the reserve lands adequately compensate for the loss of some habitat. Unlike existing habitat, reserve habitat: (1) will be protected in perpetuity; (2) will be actively managed for the snake; (3) will not be subject to the continual disturbance caused by farming or canal maintenance; (4) will be available year round; (5) will not be unavailable to the snake because of canal maintenance activities; and (6) will be relatively free of human intrusion. (Id. 1026, 1191.) The restored marsh is considered particularly valuable replacement habitat, as it is the preferred habitat for the GGS. (Id. at 1191.) The Service also emphasizes the provisions of the NBHCP that preserve connectivity and minimize

disturbances during construction activity. (Id. at 1190-92.) The Service concludes that the combination of on-site minimization measures and the new high-quality wetland habitat will effectively mitigate for the harm to the GGS of the development permitted by the ITP and the NBHCP. (Id. at 1192.) The Service's analysis considers the relevant issues and is a reasoned explanation as to why the mitigation measures are proportionate to the possible injury or take.

2. Swainson's Hawk

Two types of Swainson's Hawk habitat will be affected by the development authorized by the ITPs: nesting habitat and foraging habitat. (Id. at 1188-89.) Approximately 80% of the nesting habitat in the Basin, most of it in the Swainson's Hawk Zone, will remain after the authorized development. (Id. at 1032.) Although four nest trees will be removed as a result of the authorized development, the City has committed to planting 60 replacement nesting trees. (Id. at 1033.) The Service determined that this was adequate to mitigate for the removal of nest trees and the small loss of nesting habitat, particularly given that most of the nesting trees in the area of authorized development are not active. (Id. at 1034.) Plaintiffs do not point to any evidence in the record to contradict this conclusion, or any evidence that the Service should have considered, but did not. The Service evaluated the available scientific information and reached a reasonable conclusion that the effects to nesting habitat would be fully mitigated.

The impact to Swainson's Hawk foraging habitat is quantitatively more significant. Approximately 40% of the Basin's potential foraging habitat, some 9,188 acres, will be lost as a result of the authorized development. (Id. at 1034.) The NBHCP provides for acquisition of 2,187.5 acres of high-quality upland foraging habitat. (Id. at 731.) Approximately 1,000 acres of additional foraging habitat will be available through the fallowed rice lands and upland components of the managed marsh. (Id. at 732.) However, even with the reserve lands, there will be a net loss of approximately 6,000 acres of potential foraging habitat.

Nonetheless, the Service concludes, for reasons discussed at length in the BiOp, the Findings and Recommendations, and an Addendum to the EIR/EIS, that the loss of this habitat would result in a low level of harm to the hawk if mitigated as required by the NBHCP. (Id. at 1034-39, 1189-90, 726-47.) The Service concludes that despite the quantitative losses in habitat, the replacement habitat will likely be qualitatively equivalent. (Id.) The technical memorandum identifies at least three reasons why the Swainson's Hawk will not be negatively affected by the loss of habitat. First, the 2,187.5 acres of replacement habitat will all be of high quality, managed specifically for the hawk. (Id. at 731.) Even under the worst-case implementation scenario, where more than half of the reserve lands would consist of current high-value habitat, rather than newly created high-value habitat, the NBHCP will result in an

increase of 353 acres of high-value habitat.[14] (Id. at 742.)

Second, under the NBHCP, the temporal availability of foraging opportunities would be maintained or improved. (Id.) Under current conditions, much of potential foraging habitat is available in September, when row crops such as corn are harvested, and in June. (Id. at 737.) By contrast, relatively little foraging habitat is available during the other months the Swainson's Hawk is in the Basin -- April, May, July, and August. (Id.) Under the most likely implementation scenarios for the NBHCP, foraging opportunities would be increased during the months of April, May, and June, with the anticipated effect of increasing nesting density and reproductive success. (Id. at 740-41, 744.)

Third, the acquired reserves will likely be in closer proximity to nesting trees. (Id. at 745.) A primary acquisition criteria for upland reserves is proximity to known or potential nesting trees. (Id. at 156.) Proximity of foraging habitat to nesting trees has been linked to reproductive success for the Swainson's Hawk. (Id. at 738.) For all of these reasons, the Service concludes that any harm to the Swainson's Hawk as a result of lost foraging lands will be effectively mitigated by the reserve lands. The Service considered the relevant scientific evidence in the record and articulated reasons for its

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[14] The analysis also offers several reasons why this situation, "Scenario 3," is not likely to occur. (AR 745.) Instead, Scenario 1 or 2, which both result in a net increase of 1,455 acres of high-value habitat, are determined to be more likely to occur. (Id.)

ultimate conclusion that the mitigation was sufficient.

In response to this technical analysis, plaintiffs point to a letter from James Estep, a leading expert on the Swainson's Hawk and Chair of the Swainson's Hawk Technical Advisory Committee. (Id. at 1244-46.) In his letter, Estep references earlier comments submitted by the Swainson's Hawk Technical Advisory Committee, which indicated that increased foraging habitat is needed to protect the Swainson's Hawk from losses. (Id.) He then criticizes the technical analysis prepared in response to these comments. (Id.) Specifically, while Estep admits that it is "literally possible" to double rodent production on half the foraging land, he asserts that this concept has "since been widely dismissed." (Id. at 1245.) He calls Appendix K an "attempt to construct models designed to justify the same flawed biological reasoning." (Id.)

This single letter from a respected expert is insufficient to show that the Service's conclusions are arbitrary or clearly erroneous. The Service responded to early comments with an extensive technical analysis of the effectiveness of the mitigation strategy, with references to multiple expert reports to support its conclusions. (Id. at 727-49.) Although Estep asserts that the conclusions of Appendix K are "flawed," he does not offer any explanation as to why the conclusions are flawed or offer any expert opinions to contradict these conclusions. Moreover, the court defers to the agency's reasonable resolution of conflicting opinions from experts, since the Service's

wildlife experts are in a much better position than the court to evaluate such evidence. See Friends of Endangered Species, Inc., 760 F.2d at 986; Cent. Ariz. Water Conservation Dist., 990 F.2d at 1539. Finally, although plaintiffs fault the Service for approving an HCP with less than a one-to-one mitigation ratio and cite other HCPs from surrounding areas that have higher ratios, they provide no evidence that these HCPs cover the same species, involve the same quality of habitat issues, or involve the same economic or demographic variables.

Based on the evidence in the record, the Secretary's determination that the mitigation was proportionate to the expected take of the GGS and Swainson's Hawk is not arbitrary or capricious. However, because the NBHCP results in a net loss of habitat, including moderate and high value habitat, for both the GGS and the Swainson's Hawk, this is not one of those rare cases where the habitat to be developed is of such low value that the feasibility of further mitigation is irrelevant.

B. Feasibility of Further Mitigation

Plaintiffs argue that the Service erroneously relied on the permittees' analysis of the feasibility of additional mitigation, rather than conducting an independent analysis of practicable alternatives. (Pls.' Mot. at 36-37.) Plaintiffs also argue that even the economic analysis prepared by the City and Sutter supports a higher mitigation ratio. (Id. at 30.) The economic analysis prepared by the permittees indicates two reasons why increased mitigation, specifically a 1-to-1 mitigation ratio,

would not be practicable or feasible: (1) the mitigation fees charged under the NBHCP are already substantially higher than fees charged under the HCPs in other California jurisdictions; and (2) the fees that would be charged under a higher mitigation ratio might well push the costs of development beyond the industry standard of feasibility. (AR 441-444, 455-57.)

On the first point, the economic analysis compares the proposed NBHCP mitigation fees to costs under the City of Bakersfield HCP, the City of Coalinga HCP, the South Sacramento HCP, and the Yolo County HCP and finds that the fees charged by these jurisdictions are substantially lower than the fees proposed under the NBHCP. (Id. at 457.) However, this analysis is not dispositive on the question of feasability because the level of mitigation fees the market will bear is tied to the relevant real estate market and the land-use composition of the development. Therefore, without any evidence that the lands covered by these HCPs have similar market conditions and land-use plans, these comparisons are of little value in determining the feasibility of a higher mitigation fee under the NBHCP.

However, the expert economic analysis also evaluates the market conditions in the Sacramento region and analyzes the effect of the proposed fees on the cost-effectiveness of the proposed development, looking at the cost burdens imposed by the combination of the proposed NBHCP fees and infrastructure fees, such as fees for schools, water, wastewater, and traffic. (Id. at 441-44, 457-60, 494.) The analysis finds that the estimated

total fees for residential development within the permit areas would be approximately 13-14% of the estimated sales price of a residential unit. (Id. at 441.) It also finds that a 15% fee burden is generally the "feasibility benchmark" for residential development, although a 20% cost burden may be feasible, depending on specific financial considerations. (Id.)

The analysis determines that alternatives calling for increased mitigation would not push the cost burden beyond the 15% benchmark under current conditions, but offers two reasons why increased mitigation might become infeasible. First, the analysis notes the City originally adopted a low infrastructure fee for the North Natomas area that eliminated certain funding and programs, including funding for police, fire services, bike trails and community center facilities. (Id. at 441, 443, 457-60.) However, that fee program is currently under revision, and the development impact fees are anticipated to increase, raising the overall fee burden. (Id.) Second, because the mitigation fees are not capped, and land acquisition prices are rising rapidly, the mitigation fees might be increased substantially to generate the funds necessary to buy mitigation lands. The analysis notes that this is particularly likely if mitigation is required at a 1-to-1 ratio, because developable land would become even more scarce. (Id.)

The Findings and Recommendations consider the economic analysis offered by the permittee and also offer three further reasons why additional mitigation is impracticable. (Id. at

1193.) First, the Findings and Recommendations point out that there is no cap on the mitigation fee over the 50-year term of the plan. (Id.) Second, the Service notes that the mitigation fee more than doubled since the time the economic analysis was prepared, so that the cost burdens might now be at or past the industry benchmarks of feasibility. (Id.) What was theoretical at the time the economic analysis was prepared, has become the reality. Finally, the Findings and Recommendations state that further fee increases are expected in the future, which could push costs beyond the industry benchmarks for feasibility. (Id.)

Plaintiffs contend that: (1) the project applicants did not examine an adequate range of alternatives; (2) the economic analysis does not support the finding of "impracticability"; and (3) the Service's two-page analysis is insufficient to support the finding of impracticability. (Pls.' Mot. at 38-39.) As to the first argument, defendants did consider two alternatives that called for an increased mitigation ratio. (AR 3351.) Plaintiffs do not indicate what other alternatives should have been considered or cite any legal precedent to support this position. (Pls.' Reply at 36.) Plaintiffs' second argument -- that the economic analysis does not support a finding of impracticability -- is based on a flawed interpretation of the word "practicable" as used in the statute. Plaintiffs assert that since the economic analysis does not state that increased fee levels are totally infeasible, the City and Sutter have not met their burden of showing that additional mitigation would be

impracticable. (Id. at 37-38; Pls.' Mot. at 39.) As this court previously found in Metro Air Park, 306 F.Supp.2d at 928 n.12, "practicable" as used in the ESA does not simply mean "possible," as opposed to impossible, but has the more nuanced meaning of "reasonably capable of being accomplished." The economic analysis noted a number of uncertainties that could push the fee burden beyond the feasibility benchmark and doom all development. In light of these uncertainties, and the rapid rise in fees noted in the Findings and Recommendations, the Service rationally concluded that additional mitigation was not "reasonably capable of being accomplished" without jeopardizing the proposed development. Ultimately this question is not a matter of arithmetic based on firm figures and projections but a judgment call given the uncertainties of the real estate market and the various other factors that affect development costs and rewards. In the circumstances here, particularly in light of rapidly rising land costs, the Secretary's finding represents a reasonable judgment.

Plaintiffs' final argument is that the Service abrogated its duties by relying on the analysis of the permit applicants to determine whether additional mitigation would be practicable. However, the case relied on by plaintiffs, Gerber v. Norton, 294 F.3d 173, 185 (D.C. Cir. 2002), is readily distinguishable. In Gerber, the Service relied on the developer's word that the proposed alternative was impracticable, without any supporting analysis. 294 F.3d at 185. Here, the City and Sutter provided

an extensive expert analysis to substantiate the conclusion that additional mitigation was not practicable. Furthermore, the Service went beyond the information provided by the City and Sutter, noting, for instance, that mitigation fees had increased significantly since the economic analysis was prepared.[15]

Based on the foregoing analysis, the finding of the Secretary that the NBHCP would minimize and mitigate the impacts of the proposed action to the maximum extent practicable is not arbitrary and capricious. The Service and the Secretary evaluated both proportionality and practicability and rationally determined that the proposed level of mitigation: (1) would effectively compensate for the injury to species that would occur under the ITPs; and (2) was the maximum practicable in the circumstances.

V. Failure to Ensure Adequate Funding

Plaintiffs' final claim is that the NBHCP fails to ensure adequate funding for the plan, as required by 16 U.S.C. § 1539(a)(2)(B)(iii). (Pls.' Mot. at 40.) Plaintiffs make three arguments as to why funding is not ensured: (1) the NBHCP relies on unfunded voluntary measures such as setbacks and connectivity;

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[15] Plaintiffs also contend that the Service had a duty to inquire whether a modified development scenario -- for example, commercial as opposed to residential -- would have been possible and permitted additional mitigation. (Pls.' Reply at 37-38.) However, plaintiffs have not provided any legal precedent for this position and the court previously rejected a similar argument. See Metro Air Park, 306 F.Supp.2d at 928 (holding that it is best to "avoid unduly enmeshing the Service in developers' economic affairs and projections.").

(2) the permittees have not "guaranteed" that they will fund the mitigation plan in the event that the developer fees prove inadequate; and (3) developers are immune from retroactive fee increases. (Id.; Pl.'s Reply at 39-41.) With regard to the first argument, as discussed above in Section III.A, the NBHCP does not rely on unfunded voluntary measures to ensure success -- funds are provided for ensuring connectivity and the plan does not "rely" on the 800-foot setback zones, which are merely a preferred acquisition criteria. (AR 135, 140-41.)

The second and third arguments are based on the same hypothetical fact scenario. Plaintiffs assert that since the fees will be set and then paid by developers on an annual basis, the fees collected may be insufficient if property costs increase between the time the fees are collected and the time mitigation lands are purchased. (Pls.' Mot. at 40.) As a result, plaintiffs argue, funding for the NBHCP has not been "ensured" by the City and Sutter.[16] (Id.) However, the NBHCP includes several fail-safe provisions to protect against rising land costs during the period between collection of fees and acquisition of reserve lands. First, the NBHCP requires the NBC to maintain a 200-acre "cushion" of reserve lands, so that development will not outpace the acquisition of mitigation land. (AR 213-14.)

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[16] Plaintiffs point to some speculation by the court in Natomas I "that it is not clear that a funding mechanism that is not backed by the applicant's guarantee could ever satisfy the requirement of § 1539(a)(2)(B)(iii)." This language is not holding and merely raises a question that is answered in this opinion.

Second, if land acquisition costs increase before the City and Sutter have an opportunity to adjust the mitigation fees, the developer can be required to dedicate land rather than paying the fee. (Id. at 804, 1195.) Although plaintiffs argue that "funding shortfalls" are still possible with land dedications, the court fails to see how this could occur; if there is a dedication of the required mitigation land, the landowner will not have to pay the land acquisition component of the mitigation fee, and the NBC will obtain the appropriate amount of reserve land. Third, the "catch-up" fee ordinances further protect against rising land costs, as they narrow the window between fee payment and acquisition of mitigation land. (Id. at 212.) Finally, unlike the funding mechanism found inadequate in Natomas I, the mitigation fees are not capped under the NBHCP, so that fees can be increased to compensate for rising land costs. (Id. at 212.)

In the Findings and Recommendations, the Service relied on all of these elements to find that the City and Sutter had adequately ensured funding for the plan. (Id. at 1194-96.) While it is true, as plaintiffs assert, that developers are protected from retroactive fee increases, plaintiffs have not pointed to any evidence in the record suggesting that such retroactive fee increases would be necessary under the NBHCP. The NBHCP is structured to avoid the need for retroactive fee increases through foresight and advance planning. Plaintiffs have not shown that the NBHCP, as structured, will not adequately

fund the required mitigation. The finding of the Secretary that the plan adequately ensures funding is not arbitrary or capricious.

VI. Conclusion

For the foregoing reasons, defendants' motion for summary judgment is GRANTED and plaintiffs' motion for summary judgment is DENIED. The clerk shall enter judgment.

IT IS SO ORDERED.

Dated: September 7, 2005

DAVID F. LEVI
United States District Judge

Natomas Basin Habitat Conservation Plan Area Biological Effectiveness Monitoring Report

2023 ANNUAL SURVEY RESULTS

ICF. 2024. *Natomas Basin Habitat Conservation Plan Area Biological Effectiveness Monitoring Report: 2023 Annual Survey Results*. July. Prepared for the Natomas Basin Conservancy, Sacramento, CA. Prepared by ICF, Sacramento, CA.

FRONT AND BACK COVER PHOTO OF SWAINSON'S HAWK: USFWS

FINAL

BIOLOGICAL EFFECTIVENESS MONITORING FOR THE NATOMAS BASIN HABITAT CONSERVATION PLAN AREA 2023 ANNUAL SURVEY RESULTS

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July 2024

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ICF. 2024. *Biological Effectiveness Monitoring for the Natomas Basin Habitat Conservation Plan Area 2023 Annual Survey Results*. July. Final. (ICF 104332.) Sacramento, CA. Prepared for the Natomas Basin Conservancy, Sacramento, CA.

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Acronyms and Abbreviations

Basin	Natomas Basin
BEMP	Biological Effectiveness Monitoring Program
BEMT	Biological Effectiveness Monitoring Team
BKS	Betts Kismat Silva
Cal-IPC	California Invasive Plant Council
CDFW	California Department of Fish and Wildlife
CESA	California Endangered Species Act
CMR	capture-mark-recapture
Covered Species	species covered by the Plan
DFG	California Department of Fish and Game
DFW	California Department of Fish and Wildlife
ESA	Endangered Species Act
g	grams
GGS	giant gartersnake
GIS	Geographic information system
I-	Interstate
ICF	ICF International and ICF Jones & Stokes
km^2	square kilometers
MAP HCP	Metro Air Park Habitat Conservation Plan
mm	millimeters
NAIP	National Agricultural Imagery Program
NBHCP	Natomas Basin Habitat Conservation Plan
NLIP	Natomas Levee Improvement Program
PIT	passive integrated transponder
Plan	Natomas Basin Habitat Conservation Plan
plan area	NBHCP Area
SAFCA	Sacramento Area Flood Control Agency
SCAS	Sacramento County Airport System
SECR	spatially-explicit capture-recapture
SMF	Sacramento International Airport
SR	State Route
SSMP	Site-Specific Management Plan
SUL	snout-urostyle-length
SVL	snout–vent length
TAC	Technical Advisory Committee
TNBC	The Natomas Basin Conservancy
TVL	tail–vent length
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
UTM	Universal Transverse Mercator

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Chapter 1
Introduction

CHAPTER HIGHLIGHTS

- 2023 marked the 20th year of comprehensive biological effectiveness monitoring for the Natomas Basin and Metro Airpark Habitat Conservation Plans.
- This annual report fulfills the monitoring and reporting requirements of the federal incidental take permits issued by the U.S. Fish and Wildlife Service and the state incidental take permits issued by the California Department of Fish and Wildlife.
- A summary of monitoring results for 2023 is provided at the end of this chapter.

1.1 Background

In November 1997, the Natomas Basin Habitat Conservation Plan (NBHCP) (City of Sacramento 1997) was submitted to the U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (now the California Department of Fish and Wildlife [CDFW]) in support of an application for a federal permit under Section 10(a)(1)(B) of the Endangered Species Act (ESA) and a state permit under Section 2081 of the California Fish and Game Code. USFWS and CDFW subsequently approved the NBHCP and issued permits. A modified version of the NBHCP was approved in 2003 (City of Sacramento *et al*. 2003).

The NBHCP (also referred to as the *Plan*) was designed to promote biological conservation while allowing economic development and the continuation of agriculture in the Natomas Basin (Basin) (Figure 1-1). The Plan established a multispecies conservation program to minimize and mitigate the anticipated loss of habitat and the incidental take of species covered by the Plan (hereafter referred to as *Covered Species*) that could result from urban development and actions associated with implementation of conservation activities that are required as mitigation.

The overall goal of the Plan is to minimize incidental take of Covered Species in the NBHCP Area (also referred to as the *plan area*) and to mitigate for impacts of covered activities on Covered Species and their habitats. Mitigation is achieved through the acquisition of reserve lands intended to be managed for the benefit of Covered Species. The primary biological goal of the Plan is to create a system of reserves that contain both wetland and upland components that will support and sustain viable populations of Swainson's hawk (*Buteo swainsoni*), giant garter snake (*Thamnophis gigas*), and other species covered under the Plan.

The Natomas Basin Conservancy (TNBC) is the nonprofit entity responsible for administering and implementing the NBHCP and the Metro Air Park Habitat Conservation Plan (MAP HCP).[1] TNBC serves as the Plan Operator on behalf of the City of Sacramento, Sutter County, and the MAP Property Owners Association. TNBC's actions are governed primarily by NBHCP terms and the commitments set forth in the Plan's Implementation Agreement. TNBC's primary function is the

[1] The MAP HCP covers a 2,015-acre portion of the Basin, adjacent to Sacramento International Airport (SMF), that is part of the 17,500 acres of planned urban development considered in the NBHCP.

acquisition, restoration, enhancement, and management of reserve lands. To fulfill this function, TNBC develops and implements Site-Specific Management Plans (SSMPs) and Site-Specific Biological Effectiveness Monitoring Plans (BEMPs)) for its mitigation land holdings within the Basin. A Technical Advisory Committee (TAC) provides technical assistance to TNBC when requested by the Executive Director.

To achieve the goals of the Plan, TNBC retained ICF (formerly ICF International and ICF Jones & Stokes) to conduct comprehensive biological effectiveness monitoring and report the results as required by the NBHCP. ICF assembled a Biological Effectiveness Monitoring Team (BEMT) comprised of published species' experts to conduct the required biological effectiveness monitoring, document progress made toward meeting the biological goals and objectives of the Plan, and provide recommendations for adapting management strategies as identified through the monitoring efforts.

By March 2023, TNBC owned and managed 38 separate tracts totaling approximately 5,153 acres (2,086 hectares) in the Basin on which biological effectiveness monitoring was implemented (Table 1-1). Since 2007, individual tracts of mitigation land have been organized into three main reserves: the North Basin Reserve, the Central Basin Reserve, and the Fisherman's Lake Reserve (Figure 1-2).

1.1.1 Location

The Basin is a low-lying area of the Sacramento Valley that encompasses portions of northern Sacramento and southern Sutter Counties (Figure 1-1). The 54,206-acre (21,666-hectare) plan area is bounded on the west by the Sacramento River, on the north by the Natomas Cross Canal, on the east by Steelhead Creek (formerly known as the Natomas East Main Drainage Canal), and on the south by Garden Highway (Figure 1-2).

The plan area contains incorporated and unincorporated areas within the jurisdictions of the City of Sacramento, Sacramento County, and Sutter County. The southern portion of the Basin is mostly urbanized and development of the northeast corner of the Basin began in earnest in 2023, while the rest of the Basin remains primarily agricultural.

1.1.2 Setting

The Basin is in the historical floodplain of the Sacramento and American Rivers. Land cover types in the Basin historically consisted of wetlands, narrow streams with associated riparian vegetation, shallow lakes, and grasslands on the terraces along the Basin's eastern edge. During the late 1800s and early 1900s, most of the Basin was converted to agriculture and many native aquatic habitats were replaced by channelized water delivery and drainage systems.

The lowest elevations in the Basin are currently in the central and northern portions, which are flat, open areas with deep clay soils that primarily support rice farming (Figure 1-3). With the exception of the mature riparian forest and wetland complex present along the length of the Natomas Cross Canal on the Basin's northern boundary (Figure 1-3), very few trees or native vegetation types remain.

The southern and western portions of the Basin contain largely alluvial soils and support a mixture of row, grain, and hay crops although small remnant stands of valley oak woodland and patches of riparian woodland persist throughout this area (Figure 1-4). The Sacramento River on the Basin's western edge supports mature cottonwood-dominated riparian forest. Implementation of the

Natomas Levee Improvement Project (NLIP) and its associated mitigation have resulted in a broad band of grasslands and young riparian forests connecting many of the patches of remnant oak woodland along the western boundary of the Basin (Figure 1-5).

The highest elevation in the Basin is the eastern edge situated on a terrace with gently rolling topography which is characterized by loam and clay-loam soils and supports annual grasslands as well as dry and irrigated pastures. Steelhead Creek - a channelized drainage - forms the eastern Basin boundary and hosts an extensive wetland complex with sparse riparian vegetation along its length (Figure 1-6).

1.2 The Biological Effectiveness Monitoring Program

1.2.1 Goals and Objectives

The purpose of the BEMP is to evaluate the effectiveness of the Plan in meeting its biological goals and objectives, and to provide recommendations for adapting management strategies to ensure that the Plan's goals and objectives are met. In general, monitoring is designed to establish annual conditions, track changes over time, and evaluate the effectiveness of current management actions. Specific purposes of the BEMP are listed below.

- Track population trends of Covered Species within the plan area to evaluate the effectiveness of the NBCHP in sustaining populations of Covered Species in the Basin.
- Evaluate the effectiveness of reserve design and management.
- Provide information and recommendations that can be used to enhance the design and management of reserves.

Monitoring must be conducted in accordance with the guidelines set forth in the Plan to achieve compliance with the provisions of the ESA 10(a)(1)(B) permit.

1.2.2 Covered Species

The NBHCP's 22 Covered Species are listed in Table 1-2. Seven Covered Species have been detected in the Basin. Two Covered Species—Swainson's hawk (*Buteo swainsoni*) and tricolored blackbird (*Agelaius tricolor*)—are currently listed under the California Endangered Species Act (CESA), while a third Covered Species—giant garter snake (*Thamnophis gigas*)—is listed under both CESA and the federal ESA (FESA). A fourth covered species, northwestern pond turtle (*Actinemys marmorata*), is currently proposed for listing as threatened under FESA. Three additional Covered Species are known to occur in the Basin: burrowing owl (*Athene cunicularia*), white-faced ibis (*Plegadis chihi*), and loggerhead shrike (*Lanius ludovicianus*). As Swainson's hawk and giant garter snake were federally or state listed when the Plan was approved, most of the monitoring efforts are devoted to these two species and are individually addressed in Chapter 3, *Giant Garter Snake*, and Chapter 4, *Swainson's Hawk.* The remaining Covered Species (collectively referred to as *Other Covered Species)* are addressed in Chapter 5, *Other Covered Wildlife Species.* No covered plant species have been found in the Basin since comprehensive monitoring began in 2004. Comprehensive floristic surveys were discontinued in 2023.

1.2.3 Types of Monitoring

The NBHCP and its Implementation Agreement require monitoring in accordance with the conditions of the federal [10(a)(1)(B)] and state (2081) permits issued by USFWS and CDFW, respectively. A comprehensive monitoring strategy was developed to satisfy these conditions and has been appropriately revised as new data and analytical techniques have become available over the last approximately 20 years.

1.2.3.1 Land Cover Tracking

Comprehensive land cover tracking has been conducted continuously since 2004 to identify and quantify the acreages of land cover types present in the Basin and habitat needed to support populations of Covered Species. Annual land cover tracking identifies the conditions extant during each annual monitoring effort and provides a method to quantify land cover changes through time. Land cover tracking is conducted on reserve lands and Basin-wide and is an essential component to evaluating the status of NBHCP Covered Species. Land cover tracking has built a comprehensive database of changes in the distribution and abundance of habitat types in the Basin from 2005-2023. The methods and results of land cover tracking are described in Chapter 2, *Land Cover Tracking.*

1.2.3.2 Giant Garter Snake Monitoring

Giant garter snake monitoring has been conducted in the Basin since the late 1990s. A standardized monitoring protocol and survey design was developed and implemented in 2004. The monitoring protocol was subsequently modified in 2011 to address survey issues associated with the low capture probabilities typically encountered with giant garter snake, and again in 2018 to incorporate recent advances in sampling and analytical techniques for species with low capture probabilities. The sampling design changes implemented in 2018, concurrent with the development of new analytical techniques, made the estimation of population density possible, which provided a valid metric to compare population densities among sites. Density estimates are more suitable for comparisons among sites than abundance estimates because they account for differences in the area sampled at each site. These estimates were used for the first time in 2023. Chapter 3, *Giant Garter Snake*, describes the sampling protocol methods and the results of these surveys.

1.2.3.3 Swainson's Hawk Monitoring

Systematic Swainson's hawk monitoring has been conducted under the auspices of the NBHCP since 1999. Because Swainson's hawk is a far-ranging species, it is intensively monitored throughout the Basin inclusive of both sides of the drainages that form the Basin's periphery. The methods and results of the Swainson's hawk surveys are described in Chapter 4, *Swainson's Hawk*.

1.2.3.4 Other Covered Wildlife Species Monitoring

Monitoring populations of Other Covered Species was initiated in 2004. Surveys on reserve lands are conducted to evaluate the effectiveness of reserve design and management in meeting objectives for Other Covered Species. Surveys on non-reserve lands are conducted to serve as "controls" for comparison to reserve lands to evaluate the success of design and management in increasing the numbers of Other Covered Species. Density estimates were used for the first time in 2023, along with information on nesting tricolored blackbird and white-faced ibis, to complete a comprehensive

evaluation of the effectiveness of the design, restoration, and management of mitigation lands in providing habitat and supporting Other Covered Species.

The methods and results of surveys for Other Covered Species are described in Chapter 5, *Other Covered Wildlife Species*.

1.3 Summary of the 2023 Biological Effectiveness Monitoring Program Results

This section summarizes the 2023 results of the BEMP. California experienced an extreme drought for 5 years from 2013 to 2017 that ended with one of the wettest years on record. This was followed by several more years of extreme drought (2018-2022), which ended in 2023 with another year of record rainfall. These extremes in weather and climate would be expected to negatively affect populations of Covered Species in multiple ways - some predictable and some unpredictable.

In 2015, construction was completed for the portion of the NLIP setback levee managed by the Sacramento Area Flood Control Agency (SAFCA) along the rural portions of the Sacramento River in the Basin. Large swaths of grassland, riparian, and managed marsh habitat that were created as mitigation for NLIP have been fully functional for more than 5 years and should contribute significantly to the conservation of Other Covered Species in the Basin.

Changes in land cover types from 2022 to 2023 were significant, with the majority of rice fields that were fallowed in 2022 due to extreme drought in the preceding years coming back into production after another record wet winter.

An assessment of the mitigation lands focused primarily on emergent tule marsh habitats created by TNBC indicates that habitat provided for giant garter snake in most TNBC marsh complexes provides habitat value equivalent to the habitat value provided in many linear water conveyance features delivering water to rice fields.

The sampling effort for giant garter snake in 2023 was similar to previous years. The number of snakes caught per unit effort was slightly higher in 2023 than 2022. Although the size distribution of captured snakes in 2023 was consistent with a healthy population, estimates of occupancy decreased between 2022 and 2023, and occupancy has decreased at a mean annual rate of 4% per year from 2011 through 2023. Management recommendations are provided to assist TNBC in achieving its goal to maintain a stable or increasing trend in the probability of occurrence of giant garter snake throughout the reserve system.

The total number of Swainson's hawk breeding pairs in the Basin declined slightly from 2022 to 2023, but remained well above the average and the overall trend of an increasing population over the monitoring period remains. However, all measures of reproductive success now exhibit a significant decline over the monitoring period, a phenomenon observed across the range of the species in California.

Reserve lands continue to provide important habitats for a wide variety of species, including shorebirds, neotropical migrants, raptors, and waterfowl. However, burrowing owl and loggerhead shrike detections have significantly declined on both reserve and non-reserve lands. Management action is required if these species are to be conserved in the Basin.

Northwestern pond turtle now occurs on most if not all TNBC tracts with a wetland component. In contrast, tricolored blackbird and white-faced ibis have not nested on reserve lands since 2010. These species are currently nesting intermittently on the SCAS Willey Wetlands Preserve and a patch of Armenian blackberry in an irrigated pasture on private land. Management of wetland habitats on reserve lands likely need to be modified for nesting of tricolored blackbird or white-faced ibis to be supported on reserve lands again.

Recommendations to improve reserve land functionality and modify management strategies of reserve lands to provide habitat that will support Covered Species are provided at the end of each chapter.

1.4 References

City of Sacramento. 1997. *Natomas Basin Habitat Conservation Plan, Sacramento and Sutter Counties, California*. November. Sacramento, CA.

City of Sacramento, Sutter County, and the Natomas Basin Conservancy. 2003. *Natomas Basin Habitat Conservation Plan; Sacramento and Sutter Counties, California*. Sacramento, CA.

Natomas Basin Conservancy. 2023. Current Base Map. Available: https://www.natomasbasin.org/helpful-documents/preserve-maps/. Accessed: March 9, 2024.

Table 1-1. Reserve Lands Acquired under the NBHCP on which Biological Effectiveness Monitoring was Conducted [a, b]

Reserve/Tract	Date Acquired	Acres
North Basin Reserve		
Atkinson	6/12/03	199
Bennett North	5/17/99	227
Bennett South	5/17/99	132
Bolen North	4/29/05	114
Bolen South	4/29/05	102
Bolen West	9/01/06	155
Frazer	7/31/00	93
Huffman East	9/30/03	136
Huffman West	9/30/03	158
Lauppe North	1/5/22	185
Lauppe South	6/30/20	172
Lucich North	5/18/99	268
Lucich South	5/18/99	352
Nestor	9/1/06	233
Ruby Ranch	6/23/03	91
Verona	7/02/20	116
Vestal	9/12/05	95
Willey	10/19/20	108
Central Basin Reserve		
Betts	4/5/99	139
Bianchi West	11/7/06	110
Elsie	11/7/06	158
Elverta	7/13/21	288
Frazer South	11/7/06	110
Kismat	4/16/99	40
Paulsen South	9/28/20	52
Richter	1/03/20	81
Sills	7/15/02	436
Silva	1/7/99	159
Silva South 1	9/28/12	29
Tufts	9/29/04	148
Fisherman's Lake Reserve		
Alleghany	11/7/02	50
Cummings	11/7/02	67
Natomas Farms	7/9/01	55
Rosa Central	3/23/05	100
Rosa East	3/23/05	106
Souza	7/2/01	40
Ann Rudin Preserve	2/28/23	53
Total		**5,155**

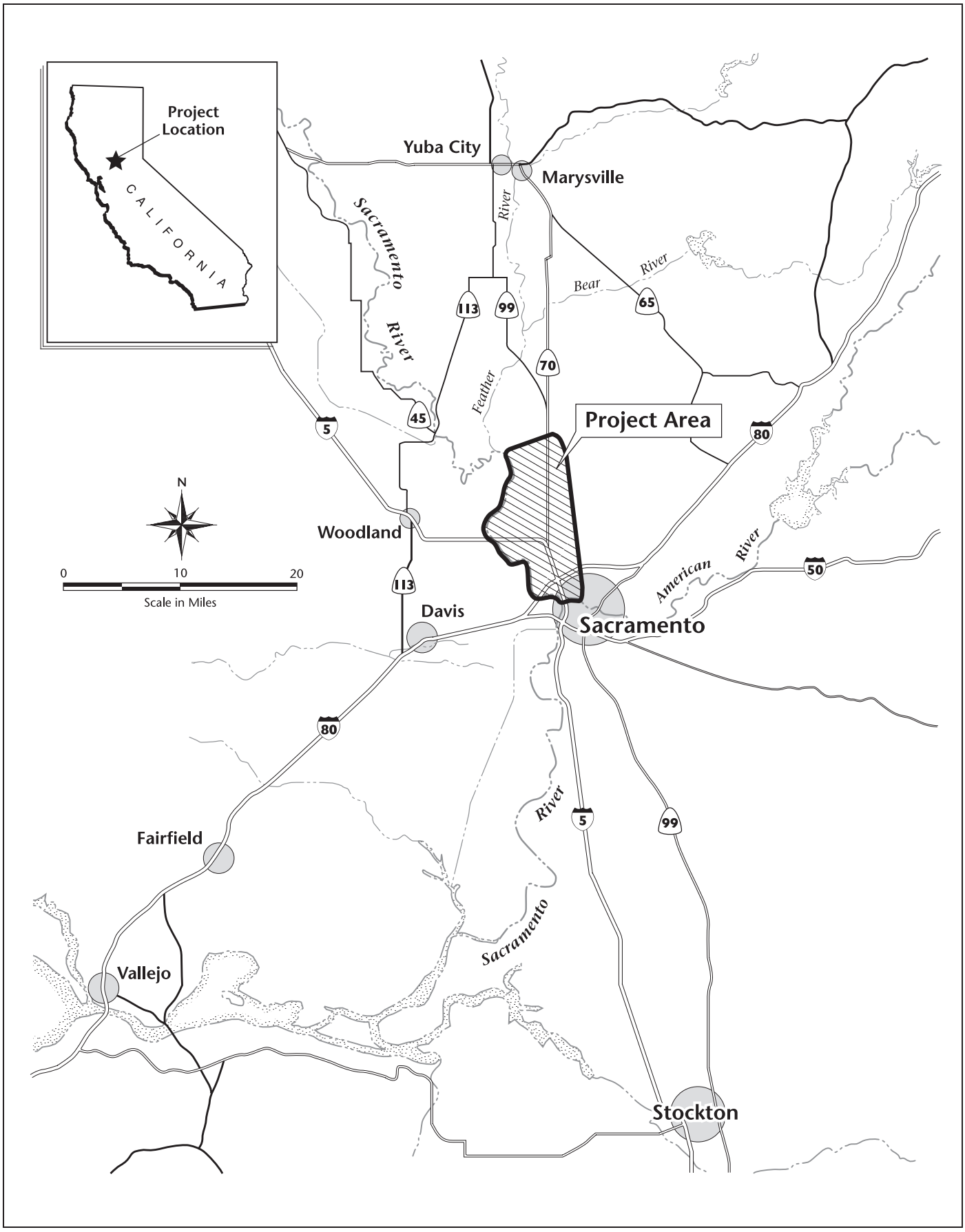
Source: The Natomas Basin Conservancy 2023.

[a] Includes 27.08 acres under easement.
[b] Acreage totals gathered through land cover mapping and GIS analysis may vary slightly.

Table 1-2. Species Covered under the NBHCP

Common Name	Scientific Name
White-faced ibis	*Plegadis chihi*
Aleutian cackling goose[a]	*Branta hutchinsii leucopareia*[a]
Swainson's hawk	*Buteo swainsoni*
Burrowing owl	*Athene cunicularia*
Loggerhead shrike	*Lanius ludovicianus*
Bank swallow	*Riparia riparia*
Tricolored blackbird	*Agelaius tricolor*
Giant garter snake	*Thamnophis gigas*
Pacific pond turtle	*Actinemys marmorata*
California tiger salamander	*Ambystoma californiense*
Western spadefoot	*Spea hammondii*
Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*
Vernal pool fairy shrimp	*Branchinecta lynchi*
Midvalley fairy shrimp	*Branchinecta mesovallensis*
Vernal pool tadpole shrimp	*Lepidurus packardi*
Delta tule pea	*Lathyrus jepsonii* ssp. *jepsonii*
Sanford's arrowhead	*Sagittaria sanfordii*
Colusa grass	*Neostapfia colusana*
Boggs Lake hedge-hyssop	*Gratiola heterosepala*
Sacramento Orcutt grass	*Orcuttia viscida*
Slender Orcutt grass	*Orcuttia tenuis*
Legenere	*Legenere limosa*

[a] Formerly Aleutian Canada goose (*Branta canadensis leucopareia*).



Graphics ... 890.10 NBC 3-11-2021) TAG

FIGURE 1-1
Project Location

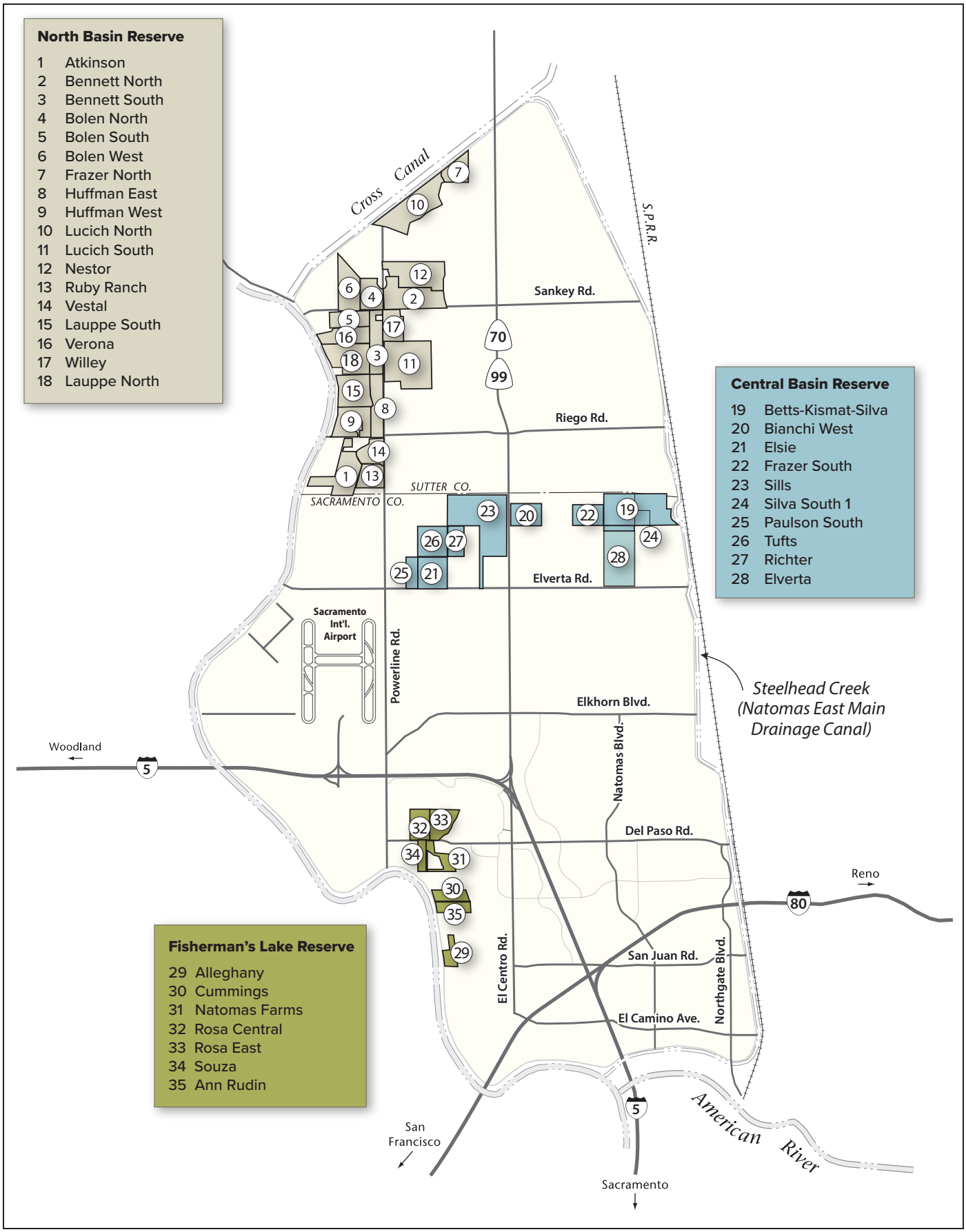


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FIGURE 1-2
Natomas Basin Reserves

Typical habitat of the central and northern Natomas Basin

Natomas Cross Canal

FIGURE 1-3
Central and Northern Basin Habitats

Fisherman's Lake

Mature riparian forest along the Sacramento River

FIGURE 1-4
Riparian Habitats in the Northern Basin

Riparian habitat created as mitigation for the SAFCA levee improvement project

Grassland habitat created as mitigation for the SAFCA levee improvement project

FIGURE 1-5
Southern and Western Basin Habitats

Typical habitat of the east basin

Steelhead Creek (formerly the Natomas East Main Drain Canal)

FIGURE 1-6
Eastern Basin Habitats

Chapter 2
Land Cover Tracking

CHAPTER HIGHLIGHTS

- After a substantial decrease in the acreage of active rice fields and the concomitant increase in fallow agricultural lands that occurred in 2022 due to extreme drought, active rice fields rebounded from 22% of the Basin in 2022 to 36% in 2023 following a historically wet winter. Rice fields continue to dominate the landscape in the Basin.
- Acreages of active rice fields to support giant garter snake and acreages of suitable foraging habitat for Swainson's hawk have not dropped below the minimum acreage thresholds.
- Large developments in the north and west of the plan area have been steadily increasing the acreage of developed land in the plan area.

2.1 Introduction

Land cover and habitat mapping is stipulated in the BEMP (2009) and is relevant to all Covered Species as it annually tracks temporospatial changes in the distribution and abundance of land cover and habitat types throughout the Basin. Land cover and habitat monitoring is achieved through annual field surveys of each original land cover polygon (circa 2004) and documenting changes that have occurred since the previous year.

Land cover monitoring on reserve lands has historically included botanical surveys for covered plant species and documenting distributions and abundances of noxious plant species with the potential to compromise habitat values for Covered Species. Botanical surveys were conducted from 2005 through 2022 and no covered plant species were detected. Botanical surveys were discontinued in 2023 because no covered plant species have been detected after 17 years of annual surveys. Noxious weed surveys are now being conducted by TNBC's land management firm (Triangle Properties); thus, no data on noxious weeds are reported herein.

2.1.1 Goals and Objectives

Effective monitoring requires baseline information on the distributions and abundances of the resources of interest. Annual land cover and habitat mapping in the plan area establishes the baseline conditions for the monitoring effort in each given year. The objective of the Basin-wide land cover and habitat monitoring component as identified in the 2009 BEMP is to "*quantify the distribution and abundance of land cover and habitat types throughout the Basin to guide future acquisitions of mitigation lands, to provide information on potential dispersal corridors between reserves, and to assess changes in the distribution and abundance of suitable habitats for Covered Species over time*" (BEMP Pg. 7, 2009).

2.2 Methods

Land cover and habitat types in the plan area have been documented annually since 2004 using aerial imagery followed by field surveys to verify ("ground-truth") digital mapping. Annually updated National Agricultural Imagery Program (NAIP) imagery at a resolution of 1 meter has been used by ICF geographic information system (GIS) specialists since 2013 to generate basemaps of Sacramento and Sutter counties. These basemaps are then used to digitally map land cover which is subsequently ground-truthed. In 2023, professional ICF botanists, experienced in aerial imagery interpretation and vegetation signatures of the southern Sacramento Valley, digitally mapped land cover types using Environmental Systems Research Institute's ArcGIS® 10.3.1 software. Polygons were delineated at a scale of 1:2,500–1:5,000 (approximately 1 inch = 200–400 feet) by following visible differences in color tone and texture on the photographs. In some cases, riparian areas and wetlands were digitized at larger scales. Minimum polygon size was typically 5 acres (2 hectares) for agricultural habitat types and developed areas, 0.25 acre (0.1 hectare) for seasonal wetlands, and 0.5 acre (0.2 hectare) for other sensitive habitat types. Ditches were historically mapped as line features, and no attempt has been made to calculate their area at any time; thus, ditches remain as line features.

All accessible polygons were subsequently ground-truthed during the growing season by ICF botanists. The acreage of each land cover type occurring on reserve lands from 2005 through 2023 is provided in Appendix A.

2.3 Results

2.3.1 Land Cover Types Basin-Wide

Table 2-1 lists the acreages of each land cover type mapped in the Basin from 2005 to 2023. The distribution of these types is shown on Figure 2-1 (note that several land cover types have been combined in the figure for clearer representation). The major land cover types that provide habitat for Covered Species in the Basin are rice fields, wetlands, upland agricultural lands, fallow agricultural fields, and grasslands. Upland agricultural fields, fallow agricultural fields, and grasslands constitute the majority of foraging habitat for Swainson's hawk. Active rice fields as well as the irrigation and drainage ditches that supply water to the fields are important habitats that can support giant garter snake, while created wetlands can provide essential habitats for giant garter snake, tricolored blackbird, and several other Covered Species. The acreages of these land cover categories are shown in Table 2-2, along with the proportion of the Basin comprising each type. Figure 2-2 shows changes in the acreage of major land cover types since 2005 which are summarized below.

- Active rice fields increased from 22% of the Basin in 2022 to 36% in 2023 following a historically wet winter. Rice fields continue to be the dominant land cover in the Basin.
- Fallow lands decreased substantially, previously covering 18.1% of the Basin in 2022 to 2.6% of the Basin in 2023.
- Upland agricultural lands, previously covering 14.3% of the Basin in 2022, decreased to 12.4% in 2023 losing approximately 1,017 acres.

- Grassland habitats, previously covering 10.0% of the Basin in 2022, increased to 12.6% in 2023 with an addition of 1,418 acres.
- Developed land cover increased by approximately 523 acres.

Changes in land cover and habitat values over the last 10 years continue to be driven by construction of the NLIP. Mitigation for impacts from the NLIP setback levee construction project have included the creation of fresh emergent marsh habitats from soil borrow sites and the creation and preservation of large swaths of grassland and riparian habitats adjacent to the new setback levee. These mitigation areas have the potential to significantly benefit numerous wildlife species, including several covered by the NBHCP.

Another significant change in the last few years has been the rapid increase in development since the 2017 lifting of the development moratorium issued in December 2008 to address flood protection concerns in the Basin. In 2023, developed habitats continued to increase - particularly in Sutter County - with large areas of land graded for conversion to high density developed lands in 2024.

Both the NBHCP and the BEMP have threshold limits for the minimum amount of habitat acreages for Covered Species. If habitat acreages drop to the minimum limit, a re-examination of the operating conservation program would be required. The fallowing of rice fields due to extreme drought can influence this threshold. The minimum limit for giant garter snake habitat acreage was reached in 2022 when active rice production dropped with the fallowing of rice fields due to extreme drought. Acreages of active rice fields rebounded to above the minimum threshold in 2023 with re-activation of the fallow rice fields following a very wet year. As of 2023, acreage of suitable foraging habitat for Swainson's hawk has not dropped below the minimum threshold.

The drop in active rice fields from 2005 through 2011 was due primarily to anticipated development. Subsequent variation in the acres of active rice fields have been due to extreme weather variations and its impact on water availability. Large fluctuations in acreages of active rice fields could potentially have adverse effects on populations of giant garter snake and other species that depend to varying degrees on the aquatic habitat provided by rice cultivation.

Natural vegetation, composed of tree- and shrub-dominated native communities such as valley oak woodland, riparian woodland, and riparian scrub, constitutes a small proportion of the Basin (i.e., 1.6% of the land area), but provides high-quality habitat for many species, including Swainson's hawk and loggerhead shrike, which are both Covered Species. As noted above, the Basin-wide acreage comprising these habitat types has been increasing due to mitigation from the NLIP. The maturation of tree plantings at freeway off-ramps resulted in those areas being mapped as woodland land cover types (e.g., mixed oak woodland, live oak woodland) in 2022. The small area of terrace grassland on the eastern edge of the Basin was included in the nonnative annual grassland category, although this area includes some remnant native valley floor grassland.

2.3.2 Land Cover Types on Reserves

The total acreage of each land cover type mapped on reserves from 2005 to 2023 is shown in Table 2-3; the major categories of land cover types providing habitat for Covered Species on reserves (rice, wetlands, upland agricultural lands, fallow agricultural fields, and grasslands) are shown in Table 2-4, along with the proportion of reserve lands comprising each type. The Ann Rudin tract (formerly AKT tract) was acquired from SAFCA in June 2023. This tract is comprised of approximately 37 acres

of created fresh emergent marsh habitat and 16 acres of upland row and field crop habitat. The area of plantings that was added on the Souza Tract in 2016 is continuing to thrive and mature.

Table 2-5 summarizes the major habitat types on reserves as a proportion of those habitats in the entire Basin. In 2023, reserve lands accounted for 46% of the managed marsh/wetlands in the Basin, but only 15.5% of the rice lands and 13.6% of upland agricultural habitats. Rice and upland agriculture are the other two important agricultural habitat types for Covered Species in the Basin. In 2023, active rice fields on reserve lands constituted 11% of the Basin-wide total, down from 11.5% in 2022. Upland agriculture on reserve lands accounted for approximately 6.8% of the upland agriculture in the Basin in 2023, up from 5.3% in 2021. Habitats on reserve lands are important components of the habitat landscape throughout the Basin. Managed marshes on TNBC reserves provide important habitats for several Covered Species. Because these marshes constitute almost half the wetlands in the entire Basin, they are an extremely important component of the mosaic of Basin-wide habitats.

2.4 Discussion

In summary, changes in the distribution and abundance of land cover and habitat types across the Basin have been primarily due to: (1) the fallowing of rice lands in 2006 and subsequent return to rice cultivation over the last decade; (2) the implementation of the NLIP, which resulted in a substantial increase in grasslands and managed marsh/wetland habitats; (3) the rapid resumption of development after the lifting of the moratorium on development in 2017; and (4) the fallowing of rice land in 2022 due to extreme drought and subsequent rapid return to rice cultivation the next year due to historically high precipitation in the 2022–2023 winter. Despite these changes, as of 2023, acreages of active rice fields to support giant garter snake and acreages of suitable foraging habitat for Swainson's hawk have not dropped below the minimum acreage thresholds.

Management actions to control noxious weeds should continue to be implemented in a timely fashion. Given that reserve lands are surrounded by a mosaic of urban, agricultural, and disturbed areas, management of noxious weeds is necessary to sustain the intended habitat values on reserves.

2.5 Recommendations

- Continue to monitor the distribution and abundance of noxious weeds on reserves, with a particular focus on aquatic plants (e.g., water primrose (*Ludwigia peploides*), mosquito fern (*Azolla* spp.), perennial pepperweed (*Lepidium latifolium*), and small smutgrass (*Sporobolus indicus*) that may compromise habitat values for Covered Species. Monitoring results should be used to inform timely weed control actions.

Table 2-1. Basin-Wide Extent (acres) of Mapped Land Cover Types, 2005–2023.

Land Cover Type	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Rice	22,321	14,792	14,590	14,224	15,014	15,023	15,287[a]	16,956	19,001	20,104	20,796	20,482	16,329	19,092	17,442	20,256	19,758	11,892	19,503
Fallow	1,625	10,101	10,033	10,076	5,869	2,912	2,323	2,282	2,160	1,555	1,366	1,712	6,442	3,307	4,667	3,234	3,414	8,951	1,404
Alfalfa	931	1,401	1,189	1,519	2,194	1,302	2,417	2,023	1,303	1,179	1,200	1,386	877	470	352	555	794	695	852
Irrigated grassland	452	374	451	373	378	345	746	750	757	757	352	326	326	311	311	310	314	295	280
Grass hay	178	153	2,212	2,367	2,769	6,724	5,423	6,504	6,250	6,850	7,582	7,043	7,211[f]	7,570	7,571	6,220	5,271	4,265	3,244
Dryland Pasture	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27
Wheat	1,824	2,375	1,104	804	3,919	695	585	413	440	978	650	1,192	383	172	792	705	321	552	341
Milo	0	328	211	161	0	0	0	0	155	94	0	0	0	303	104	111	289	14	0
Tomatoes	50	145	112	113	8	10	0	0	0	108	63	40	0	51	261	175	389	528	645
Sunflower	709	572	0	251	166	804	714	362	821	903	388	519	355	464	181	55	443	690	556
Safflower	886	532	244	426	162	214	278	322	0	29	448	426	345	511	196	262	193	404	175
Cover Crop	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	140
Other row and grain crops	2,537	582	2,396	2,279	2,096	3,770	4,937	3,645	2,370	906	1,151	958	1586	1445	719	445	770	308	503
Orchard	184	184	184	99	99	94	53	50[b]	50	307[d]	406[d]	406	406	480	480	482	463	626	630
Fresh emergent marsh (created)	575	575	676	897	897	897	897	897	897	1,042	1,042	1,042	1,042	1,042	1042	1,042	1,199	1,199	1,199
Fresh emergent marsh	138	154	154	155	155	155	154	154	154	154	154	154	154	154	154	154	154	154	154
Seasonal wetland	105	105	108	105	105	110	103	103	115	115	115	115	115	115	115	116	116	103	103
Grassland (created)	49	71	68	74	74	80	74	75	469[c]	511	511	511	506	506	506	506	506	506	570
Nonnative annual grassland	7,389	6,786	5,192	4,988	5,016	4,032	3,670	3,652	3,609	3,594	2,887	2,723	3,035	2,939	2,887	2,877	2,896	3,537	3,781
Ruderal	329	406	409	399	704	747	864	766	754	856	946	924	824	814	801	661	639	1,375	2,484
Valley oak woodland	191	195	192	192	194	209	240	242	257	248	261	322[e]	322	322	322	340[i]	341	328	267
Live oak woodland	–	–	–	–	–	–	–	–	–	–	–	–	–	–	38[h]	34[h]	28	28	28
Mixed oak woodland	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	11[i]	11	11	11
Riparian woodland	348	346	357	357	354	359	357	398	398	393	389	390	393	393	393	393	407	407	428
Riparian scrub	117	117	114	133	133	133	133	133	133	134	134	138	138	138	137[g]	137	137	137	137
Non-riparian woodland	52	50	51	51	51	29	28	43	43	43	28	28	26	26	26	43[i]	43	51	45
Open water	352	340	340	337	337	360	381	387	490	459	459	462	462	462	462	462	462	456	470
Developed—low density	1,565	1,639	1,706	1,949	1,961	1,977	2,114	2,202	2,307	2,296	2,310	2,306	2,115	2,194	3,000	3,072	2,573	2,249	2,426
Developed—high density	9,859	10,764	11,533	11,304	11,260	10,910	10,770[a]	10,604	10,529	10,533	10,505	10,539	10,753	10,868	11,191	11,470	12,081	12,592	12,666
Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33
Disturbed/bare	1,440	1,127	578	573	291	2,321	1,659	1,243	744	58	63	62	62	58	55	81[j]	177	830	1,102
Vineyard	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	19	2	2
Total	**54,206**	**54,206**	**54,206**	**54,206**	**54,206**	**54,206**	**54,206**	**54,206**	**54,206**	**54,206**	**54,206**	**54,206**	**54,206**	**54,206**	**54,206**	**54,206**	**54,206**	**54,206**	**54,206**

[a] In 2011, 586 acres of rice were erroneously mapped as developed—low density; acreages for both land cover types have been corrected in this report.
[b] Decrease in orchard acreage due to availability of new aerial imagery that allowed visibility of private property. This 3-acre crop is now irrigated grassland.
[c] Increase in grassland (created) due to conversion of disturbed/bare by SAFCA.
[d] Increase in orchard due to conversion of land west of the airport from row crops to orchard in 2014 and 2015.
[e] Increase in valley oak woodland due to establishment of woodland planted during the SAFCA revegetation of the setback levee.
[f] In 2017, 10 acres of grass hay were erroneously mapped as grassland (created), and 15 acres of grassland (created) were mapped as grass hay. Acreages for both land cover types have been corrected in this report.
[g] Small swath of riparian scrub along a canal was developed for housing.
[h] Maturation of live oak woodland plantings along freeway off-ramps; acreage was refined in 2020
[i] Maturation of woodlands along off-ramps.
[j] Disturbed/bare land cover was incorrectly labeled as fallow in 2019 and 2020; in 2021 the parcel's restoration was finished and it is now a fresh emergent marsh (created).

Table 2-2. Basin-Wide Summary of Major Habitat Types, 2005–2023.

Habitat Type[a]	2005		2006		2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		2017		2018		2019		2020		2021		2022		2023	
	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin
Rice	22,321	41.2	14,782	27.3	14,590	26.9	14,224	26.2	15,017	27.7	15,023	27.7	15,287[b]	28.2[b]	16,956	31.3	19,001	35.1	20,104	37.0	20,796	38.4	20,482	37.8	16,329	30.1	19,092	35.2	17,442	32.2	20,256	37.4	19,758	36.4	11,892	21.9	19,503	36.0
Managed marsh/ wetlands	818	1.5	834	1.5	938	1.7	1,157	2.1	1,157	2.1	1,162	2.1	1,153	2.1	1,153	2.1	1,165	2.1	1,311	2.4	1,311	2.4	1,311	2.4	1,311	2.4	1,311	2.4	1,311	2.4	1,311	2.4	1,468	2.7	1,455	2.7	1,456	2.7
Upland agriculture	7,567	14.0	6,462	11.9	7,919	14.6	8,293	15.5	11,692	21.6	13,863	25.6	15,100	27.9	14,019	25.9	12,096	22.3	11,601	21.4	11,771	21.7	11,890	21.9	11,084[d]	20.4	11,777	21.7	10,488[e]	19.3	8,837	16.3	8,784	16.2	7,752	14.3	6,735	12.4
Grassland	7,767	14.3	7,263	13.4	5,669	10.5	5,461	10.1	5,794	10.7	4,853	9.0	4,608	8.5	4,493	8.3	4,832	8.9[c]	4,961	9.2	4,344	8.0	4,157	7.7	4,364[d]	8.0	4,257	7.8	4,193	7.7	4,043	7.5	4,041	7.4	5,418	10.0	6,836	12.6
Fallow	1,625	3.0	10,101	18.6	10,033	18.5	10,076	18.5	5,869	10.8	2,912	5.4	2,323	4.3	2,282	4.2	2,160	4.0	1,555	2.9	1,366	2.5	1,712	3.2	6,442	11.9	3,307	6.1	4,667	8.6	3,234	6.0	3,414	6.3	9,813	18.1	1,404	2.6
Developed	12,864	23.7	13,531	25.0	13,817	25.5	13,826	25.5	13,512	24.9	15,208	28.1	14,543[b]	26.8[b]	14,049	25.9	13,581	25.1	12,887	23.8	12,878	23.8	12,907	23.8	12,929	23.9	13,120	24.1	14,246	26.3	14,623	27.0	14,831	27.3	15,671	28.9	16,194	29.9
Other	1,245	2.3	1,233	2.3	1,239	2.3	1,169	2.2	1,168	2.2	1,184	2.2	1,192	2.2	1,254	2.3	1,371	2.5	1,787	3.3	1,740	3.2	1,746	3.3	1,204	2.2	1,342	2.5	1,860	3.4	1,902	3.5	1,909	3.5	2,205	4.1	2,078	4.2
Total	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54.206**	**100**

[a] The managed marsh/wetlands habitat category includes the following land cover types: fresh emergent marsh, fresh emergent marsh (created), and seasonal wetland. The upland agriculture habitat category includes the following land cover types: alfalfa, grass hay, irrigated grassland, tomatoes, milo, safflower, sunflower, wheat, and other row and grain crops. The grassland habitat category includes the following land cover types: grassland (created), nonnative annual grassland, and ruderal. The fallow habitat category includes the following land cover types: fallow, fallow rice, and fallow row and grain crops. The developed habitat category includes the following land cover types: developed—low density, developed—high density, and disturbed/bare.

[b] In 2011, 586 acres of rice were erroneously mapped as developed—low density; acreages for both land cover types have been corrected in this report.

[c] Increase in grassland (created) due to conversion of disturbed/bare by SAFCA.

[d] In 2017, 10 acres of grass hay were erroneously mapped as grassland (created), and 15 acres of grassland (created) were mapped as grass hay. Acreages for both land cover types have been corrected in this report.

[e] In the 2019 annual report, orchard was erroneously included in this category; it has been corrected here.

Table 2-3. On-Reserve Extent (acres) of Mapped Land Cover Types, 2005–2023.

Land Cover Type	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Rice	1,671	1,529	1,715	1,849	2,136	2,059	1,930	2,200	2,273	2,205	2,442	2,344	1,820	2,262	2,000	2,344	2,606	1,526	3,028
Fallow	820	593	727	373	375	450	668	348	177	206	64	214	643	58	558	144	213	1,655	48
Alfalfa	106	106	150	150	204	127	126	259	204	348	348	348	143	143	88	161	335	437	536
Irrigated grassland	0	96	0	0	4	5	0	0	0	0	0	0	0	0	0	0	0	0	0
Grass hay	19	19	81	160	157	144	57	84	147	135	158	57	295[f]	356	145	241	136	196	166
Wheat	207	497	77	79	132	187	58	58	58	58	47	74	11	23	299	204	71	0	163
Milo	0	0	49	0	0	0	0	0	155	94	0	0	0	0	0	0	0	0	0
Tomatoes	0	0	55	55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sunflower	0	0	0	0	0	104	116	84	56	50	0	0	29	104	0	0	204	226	0
Safflower	0	0	0	0	104	0	68	11	0	0	0	23	41	0	0	0	0	0	0
Other row crops	10	157	279	472	26	32	27	6	27	0	37	59	132	127	28	23	58	0	31
Fresh emergent marsh (created)[a]	561	561	627	627	627	627	627	627	627	627	627	627	627	627	627	627	627	626	663
Cover Crop	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	140
Fresh emergent marsh	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seasonal wetland	6	6	4	4	4	4	3	3	4	4	4	4	4	4	4	4	3	3	3
Grassland (created)	47	76	76	72	72	72	71	72	72	73	73	73	67[f]	67	67	67	52	52	53
Nonnative annual grassland	318	225	254	254	254	254	254	228	226	226	226	203	203	203	203	203	204	204	204
Ruderal	38	33	29	29	29	28	25	25	25	36	36	36	47	47	42	44	34	34	60
Valley oak woodland	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	5[g]	6	6	5
Riparian woodland	13	13	12	12	12	12	12	12	12	12	12	12	12	12	12	12	9	9	10
Riparian scrub	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Nonriparian woodland	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Open water	0	0	0	0	0	0	0	0	20[c]	20	20	20	20	20	20	20	22	22	22
Developed—low density	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Developed—high density	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Disturbed/bare	0	0	0	0	0	0	63[b]	47	11	0	0	0	0	0	0	0	0	10	10
Total[d]	**3,835**	**3,931**	**4,154**	**4,154**	**4,154**	**4,124[b]**	**4,124**	**4,082[b]**	**4,112[e]**	**4,112**	**4,112**	**4,112**	**4,112**	**4,112**	**4,112**	**4,112**	**4,593**	**5,052**	**5,154**

[a] The fresh emergent marsh (created) land cover type includes some, but not all, of the associated uplands for most, but not all, tracts with wetlands. When patches of associated uplands are smaller than the minimum mapping unit, they are included in the fresh emergent marsh (created) land cover type; when they are larger than the minimum mapping unit, they are mapped as the land cover type that characterizes them.

[b] Acreage change from previous years is due to the SAFCA NLIP.

[c] Completion of improvements to linear water conveyance features in the North Basin Reserve resulted in the change of 20 acres of disturbed/bare to open water habitat in 2013.

[d] Discrepancies between this total and the surveyed acreages are due to inclusion here of a 12-acre easement of the Sills tract and minor GIS rounding errors.

[e] Acreage increase is due to the acquisition of the Silva South 1 tract.

[f] In 2017 on the Atkinson tract, 10 acres of grass hay were erroneously mapped as grassland (created), and 15 acres of grassland (created) were mapped as grass hay. Acreages for both land cover types have been corrected in this report.

[g] Valley oaks were removed as a part of levee improvements and maintenance.

Table 2-4. On-Reserve Summary of Major Habitat Types, 2005–2023.

Habitat Type	2005		2006		2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		2017		2018		2019		2020		2021		2022		2023	
	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands
Rice	1,671	43.6	1,529	38.9	1,715	41.3	1,849	44.5	2,136	51.5	2,059	49.93	1,930	46.8	2,200	53.9	2,273	55.3	2,205	53.6	2,442	59.4	2,344.4	57.0	1,819.7	44.3	2,262.2	55.0	2,000.1	48.6	2,343.9	57.0	2,231	54.9	1,526	30.2	3,028	58.8
Managed marsh/ wetlands	569	14.8	569	14.4	631	15.2	631	15.2	631	15.2	631	15.2	630	15.3	631	15.4	631	15.3	630	15.3	630	15.3	630.1	15.3	630.1	15.3	630.1	15.3	630.1	15.3	630.1	15.3	626	15.4	626	12.4	667	12.9
Upland agriculture	342	8.9	875	22.3	691	16.7	916	22.1	627	15.1	594	14.4	452	11	502	12.3	647	15.7	591	14.4	591	14.4	560	13.6	651[e]	15.8	794	19.3	560.2	13.6	629.6	15.3	655	16.1	873	17.3	1035	20.1
Grassland	403	10.5	334	8.5	359	8.6	355	8.5	355	8.5	331	8.02	350	8.5	325	8.0	323	7.8	334	8.1	334	8.1	312	7.6	317[e]	7.7	317	7.7	312	7.5	314.0	7.6	289	7.1	290	5.7	317	6.1
Fallow	820	21.4	593	15.1	727	17.5	373	9.0	375	9.0	450	10.9	668	16.2	348	8.5	177	4.3	206	5.0	64	1.5	214	5.2	643	15.6	58	1.4	558.0	13.6	144.0	3.5	213	5.2	1,674	33.1	48	0.9
Developed	5	0.1	5	0.1	5	0.1	5	0.1	5	0.1	5	0.1	68[b]	1.6	51	1.2	16	0.4	5	0.1	5	0.1	5	0.1	5	0.1	5	0.1	5	0.1	5	0.1	5	0.1	16	0.3	16	0.3
Other	25	0.7	26	0.7	25	0.6	25	0.6	25	0.6	54	0.8	26	0.6	25	0.6	45	1.1	140	3.4	46	1.1	46	1.1	46	1.1	46[f]	1.1	46	1.1	44.9	1.1	44	1.1	47	0.9	44	1
Total[c]	**3,835**	**100**	**3,931**	**100**	**4,154**	**100**	**4,154**	**100**	**4,154**	**100**	**4,124[b]**	**100**	**4,124**	**100**	**4,082[b]**	**100**	**4,112[d]**	**100**	**4,112**	**100**	**4,112**	**100**	**4,112**	**100**	**4,112**	**100**	**4,112**	**100**	**4,112**	**100**	**4,112**	**100**	**4,063**	**100**	**5,052**	**100**	**5,154**	**100**

[a] The fresh emergent marsh (created) land cover type includes some, but not all, of the associated uplands for most, but not all, tracts with wetlands. When patches of associated uplands are smaller than the minimum mapping unit, they are included in the fresh emergent marsh (created) land cover type; when they are larger than the minimum mapping unit, they are mapped as the land cover type that characterizes them.

[b] Acreage change from previous years is due to the SAFCA NLIP.

[c] Discrepancies between this total and the surveyed acreages are due to inclusion here of a 12-acre easement of the Sills tract and minor GIS rounding errors.

[d] Acreage increase is due to the acquisition of the Silva South 1 tract.

[e] "Other" acreage reported incorrectly as 0 acres in 2018; acreage fixed in this report.

[f] In 2017 on the Atkinson tract, 10 acres of grass hay were erroneously mapped as grassland (created) and 15 acres of grassland (created) were mapped as grass hay. Acreages for both land cover types have been corrected in this report.

Table 2-5a. On-Reserve Extent of Major Habitat Types as a Proportion of Each Habitat Type in the Basin, 2005–2014.

	2005			2006			2007			2008			2009			2010			2011			2012			2013			2014		
Habitat Type	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves
Rice	14,782	10.3	1,715	14,745	11.6	1,849	14,224	12.9	7.5	1,529	14,782	10.3	1,715	14,745	11.6	1,849	14,224	12.9	1,820	16,329	11.1	2,262	19,092	11.8	2,204.1	17,442	11.5	2,205	20,104	11.0
Managed marsh/ wetlands	834	68.2	631	936	67.3	631	1,157	54.5	69.6	569	834	68.2	631	936	67.3	631	1,157	54.5	630	1,311	48.1	630	1,311	48.1	630	1,311	48.1	631	1,311	48.0
Upland agriculture	6,462	13.5	691	7,919	8.7	916	8,293	11.0	4.5	875	6,462	13.5	691	7,919	8.7	916	8,293	11.0	651	11,089	5.9	794	11,782	6.7	560.2	10,488	5.3	591	11,601	5.1
Grassland	7,263	4.6	359	5,669	6.3	355	5,461	6.5	5.2	334	7,263	4.6	359	5,669	6.3	355	5,461	6.5	319	4,902	6.5	319	4252	7.5	312	4,193	7.4	334	4,961	6.7
Fallow	10,101	5.9	727	10,035	7.2	373	10,076	3.7	50.5	593	10,101	5.9	727	10,035	7.2	373	10,076	3.7	643	6,442	10.0	58	3,307	1.8	558	4,667	12.0	206	1,555	13.2
Developed	13,531	0	5	13,817	0	5	13,826	0	0	5	13,531	0	5	13,817	0	5	13,826	0	5	12,929	0.0	5	13,062	0.0	5	14,246	0.0	5	12,887	0.0
Other	1,233	2.1	25	1,239	2	25	1,169	2.1	2	26	1,233	2.1	25	1,239	2	25	1,169	2.1	46	1,204	3.8	46	1,399	0	46	1,860	2.5	140	1,787	7.8
Total	**54,206**	**7.3**	**4,154**	**54,206**	**7.6**	**4,154**	**54,206**	**7.7**	**7.1**	**3,931**	**54,206**	**7.3**	**4,154**	**54,206**	**7.6**	**4,154**	**54,206**	**7.7**	**4,112**	**54,206**	**7.6**	**4,112**	**54,206**	**7.6**	**4,112**	**54,206**	**7.6**	**4,112**	**54,206**	**7.6**

Table 2-5b. On-Reserve Extent of Major Habitat Types as a Proportion of Each Habitat Type in the Basin, 2015–2023.

	2015			2016			2017			2018			2019			2020			2021			2022			2023		
Habitat Type	Reserve Acres	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves
Rice	2,442	20,796	11.70%	2,344.40	20,482	11.4	1,820	2,606	2606	2,262	19,092	11.8	2,000.1	17,442	11.5	2,343.9	20,256	11.6	2,231	19,758	11.3	1,526	11,891	12.8	3,028	19,503	15.5
Managed marsh/wetlands	630	1,311	48.10%	630.1	1,311	48.1	630	630	630	630	1,311	48.1	630	1,311	48.1	630.1	1,311	48.1	626	1,468	42.6	626	1,455	43.0	667	1,456	45.8
Upland agriculture	591	11,771	5.00%	560	11,850	4.7	651[g]	805	805	794	11,782	6.7	560.2	10,488	5.3	629.6	9,319	6.8	655	8,784	7.5	873	7,752	11.3	895	6,596	13.6
Grassland	334	4,344	7.70%	312	4,157	7.5	319[g]	290	290	319	4252	7.5	312	4,193	7.4	314	4,043	7.8	289	4,041	7.2	290	5,418	5.4	317	6,835	4.6
Fallow	64	1,366	4.70%	214	1,712	12.5	643	213	213	58	3,307	1.8	558	4,667	12	144	3,234	4.5	213	3,414	6.2	1,674	9,813	17.1	48	1,404	3.4
Developed	5	12,878	0.00%	5	12,907	0	5	6	6	5	13,062	0	5	14,246	0	5	14,623	0	5	14,831	0	16	15,671	0.1	16	16,194	0.1
Other	46	1,740	2.60%	46	1,787	2.6	46	43	43	46	1,399	0	46	1,860	2.5	44.9	1,420.20	3.2	44	1,909	2.3	47	2,205	2.1	183	2,217	8.3
Total	**4,112**	**54,206**	**7.60%**	**4,112**	**54,206**	**7.6**	**4,112**	**4,593**	**4593**	**4,112**	**54,206**	**7.6**	**4,112**	**54,206**	**7.6**	**4,112**	**54,206**	**7.6**	**4,063**	**54,206**	**7.5**	**5,052**	**54,206**	**9.3**	**5,154**	**54,206**	**9.5**

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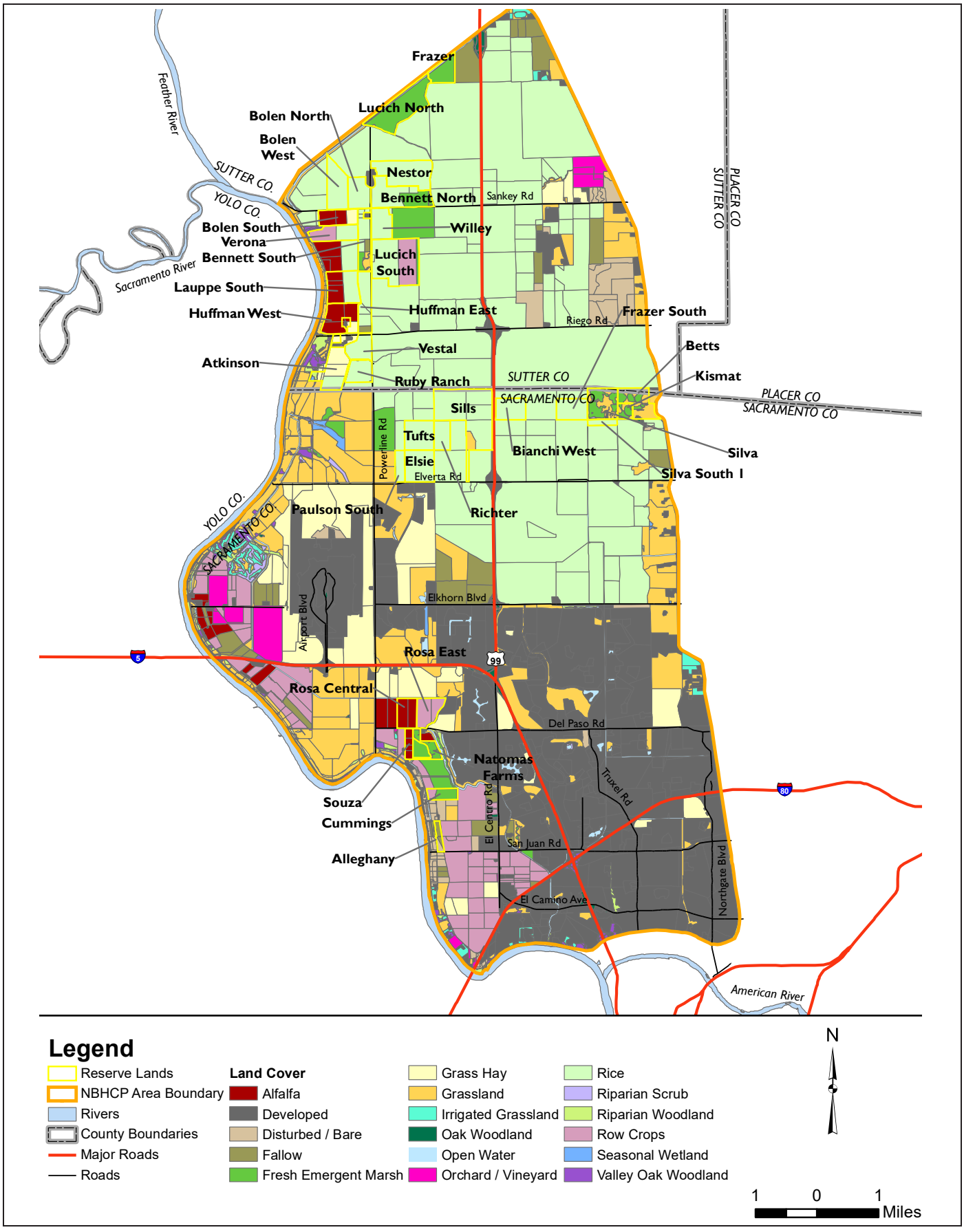
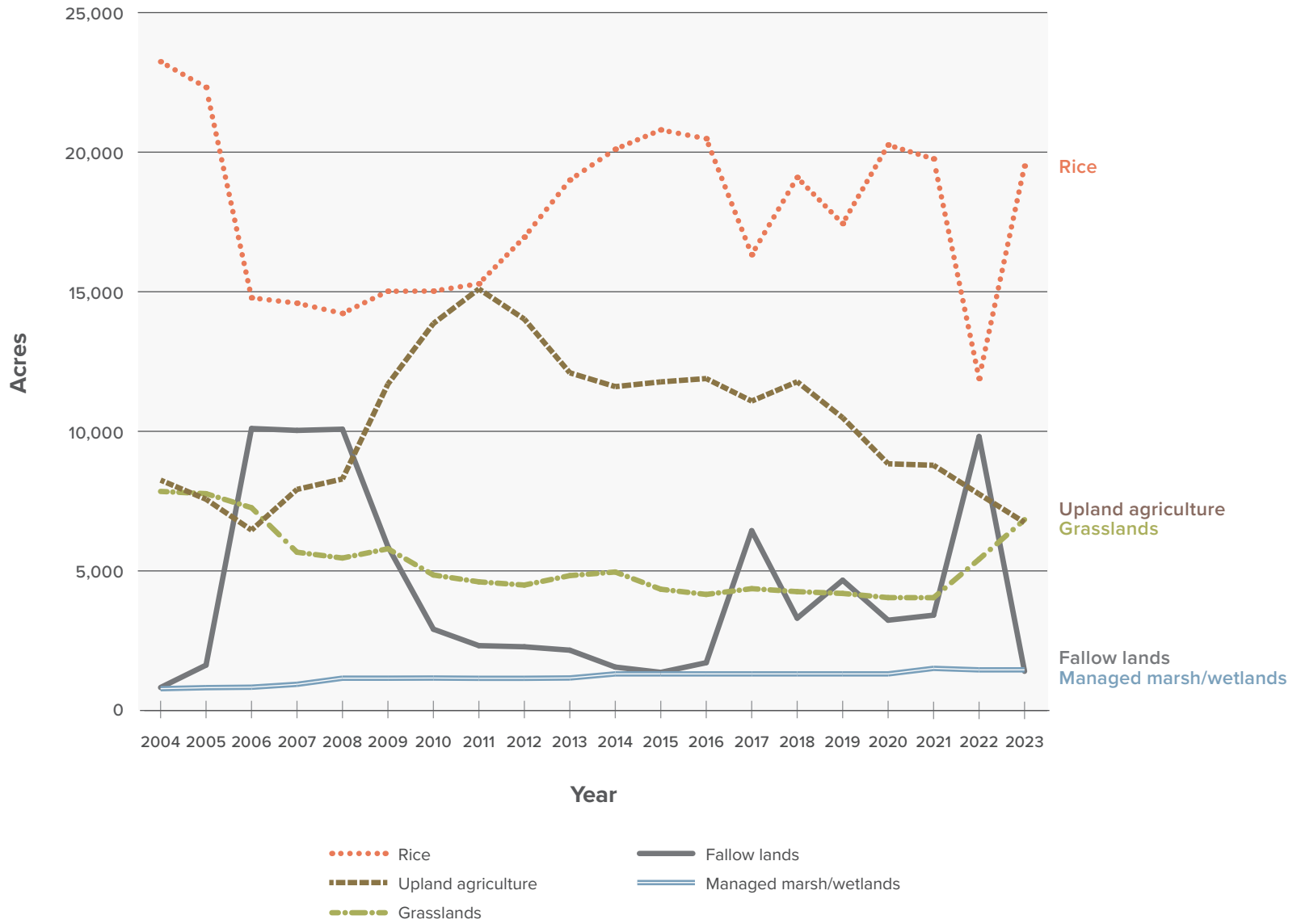


Graphics ... 662.17 NBC 2023 (2-23-2024) TG

FIGURE 2-1
Distribution of Land Cover Types in the Natomas Basin, 2023



NBC 104332 2023 AR (3-7-2024)

FIGURE 2-2

Changes in Acreage of the Major Habitat Types in the Natomas Basin, 2004–2023

Chapter 3
Giant Garter Snake

CHAPTER HIGHLIGHTS

- The trapping season (May–August) and sampling period (21 days) has been consistent since 2021. The number of sites sampled in 2023 was comparable to past years: 40 in 2020, 45 in 2021, 41 in 2022, and 40 in 2023 in a random stratified design in suitable wetland or canal habitat adjacent to rice. Sampling in this way allows inferences across TNBC reserves as a whole.
- The size distribution of captured snakes in 2023 was consistent with what is expected in a healthy population.
- Based on the dynamic occupancy model, the proportion of occupied wetland units on reserve lands has decreased annually by an average of 4% from 2011 through 2023. In 2011, giant garter snake occupied 14 of 23 (60.1%) surveyed wetland units on reserve lands; whereas giant garter snake occupied 17 of 40 (42.5%) surveyed wetland units on reserve lands in 2023. These data indicate a 17.6% reduction in occupancy across wetland units on reserve lands.
- The point estimate of density of giant garter snake was approximately five times greater in created marsh habitats in the BKS tract compared to the estimates for rice and associated canals on the Sills tract. The rice dominated Lucich South, Bianchi West, and Frazer South tracts had the second, third, and fourth highest density estimates, respectively, of giant garter snake in 2023, illustrating the importance of agricultural rice habitat in the Natomas Basin.
- Giant garter snake density in the Lucich North cluster of sites, which is dominated by created marsh, was lower than many rice sites and almost two orders of magnitude less than the giant garter snake density at BKS.
- Most tracts in TNBC's reserve system are well-connected and provide ample opportunity for snakes to move between tracts. However, connections between the Fisherman's Lake Reserve Area and the rest of the reserve system are tenuous. Although connectivity overall is improving, current data indicate that it is unlikely that the Fisherman's Lake Reserve is demographically connected to the other reserves.
- Overall, giant garter snake populations in the Central Basin Reserve appear healthy. Fewer individuals were captured in the North Basin Reserve, and no giant garter snakes were captured in the Fisherman's Lake Reserve.
- Specific management recommendations are provided at the end of this chapter.

3.1 Introduction

3.1.1 Background

The NBHCP (City of Sacramento et al. 2003) and its Implementing Agreement required implementing monitoring programs with qualitative and/or quantitative monitoring methods to evaluate management objectives and strategies for the reserve system. The Plan requires an annual assessment of giant garter snake populations within the Natomas Basin (Chapter VI, Section E [2][a][2] of the 2003 NBHCP) and an assessment of habitat connectivity for giant garter snake within and between reserves. This chapter presents the findings related to these requirements.

Studies from 2001 through 2003 focused on the distribution of giant garter snake in the Natomas Basin (Wylie et al. 2003:21). Subsequent surveys attempted to assess population trends across a broad array of habitats and geographic areas, but detection probabilities were too low and the range of environmental conditions too variable to allow for an estimation of abundance that accounted for variable detection probabilities. In 2011, the surveys were redesigned to increase sample sizes and account for the detection and capture process in a more statistically rigorous and scientifically defensible manner. In 2018, the study design was further modified based on advances in methods of wildlife populations analyses and scientific information obtained on giant garter snake since 2011. The 2018 revision allows for estimation of giant garter snake occupancy, abundance, and demographic parameters from a larger sample of sites throughout the Basin, increases sampling efficiency, and provides the means to evaluate the effects of management actions (e.g., releasing or withholding water, vegetation clearance, channel or marsh design, etc.) on giant garter snake. In combination with the new analytical techniques, the revised sampling design also facilitates estimation of density from a broader array of areas and increases the validity of comparisons of density among sites.

3.1.2 Goals and Objectives

Monitoring protocol revisions implemented in 2011 were designed to assess progress toward achieving the goals of the NBHCP. Components of the BEMP as required by the Plan are specified in Pages VI-15 through VI 17. In particular, the revised protocol was designed to:

- Examine the demography of giant garter snake populations within the Basin, with an emphasis on measuring abundance and estimating survival, recruitment, and population growth rate.
- Quantify the effects of management actions on giant garter snake demography and evaluate whether those actions have promoted positive population growth.
- Examine the distribution of giant garter snake across TNBC reserves, with an emphasis on evaluating patterns in the proportion of reserves occupied, and quantify environmental variables associated with the occurrence or lack of occurrence of giant garter snake.

Subsequent revisions to the study plan in 2018 were designed to increase the accuracy of evaluating the parameters outlined above. Changes in the study plan included adopting an occupancy and abundance sampling approach and extending the trapping period at each sample location to 21–29 days to provide an opportunity for recaptures of sufficient quantity to estimate abundance and demographic rates. With the revised sampling method, the data from adjacent or nearly adjacent traplines in wetland units or rice canals can be combined, resulting in greater precision to estimates

of abundance and demographic rates and increasing the probability of recapture because a larger area was being sampled. By increasing sample sizes, the new design also allows for accurate evaluations of the effects of habitat variables on giant garter snake and the effects of management actions.

The change in sampling design precludes comparison of results from previous years' sampling under the old design. Accordingly, it is not possible to track changes in abundance or demographic rates from years prior to 2019.

The purpose of monitoring giant garter snake demography is to determine the abundance, apparent survival (the probability of surviving from one year to the next), recruitment (the rate at which individuals are born and survive their first year in the sampled area, or migrate to the sampled area), and population growth rate of the species at occupied sites in the Basin. The management goal of the NBHCP as it relates to demography is to demonstrate a stable population or to show positive population growth.

The purposes of monitoring the distribution of giant garter snake on TNBC reserve lands are to determine the proportion of sites within reserve lands are occupied, which variables correlate with the probability that a site is occupied, and – ultimately - to calculate patterns in occurrence probability. The management goal as it relates to occupancy is to maintain a stable or increasing probability of occurrence throughout the reserve system.

3.1.3 Life History and Habitat Requirements

Giant garter snake (Figure 3-1) is a large aquatic snake endemic to the wetlands of California's Central Valley that was first described in the southern San Joaquin Valley by Fitch (1940) as a subspecies of the aquatic garter snake (at that time, *Thamnophis ordinoides*). Later taxonomic revisions resulted in the consideration of giant garter snake as a subspecies of Sierra garter snake (*Thamnophis couchii*). Because giant garter snake is morphologically distinguishable from, and allopatric with, its most closely related species, aquatic garter snake (*Thamnophis atratus*) and Sierra garter snake, it was recognized as a full species in 1987 (Rossman and Stewart 1987).

Giant garter snake is highly aquatic and historically occurred in marshes, sloughs, and other habitats with slow-moving, relatively warm water and emergent vegetation, especially tules (*Schoenoplectus acutus*). Although conversion of wetlands to agriculture has nearly extirpated giant garter snake from the San Joaquin Valley, the species persists in rice fields and nearby agricultural canals in the Sacramento Valley (Halstead et al. 2010). Canals associated with rice cultivation can provide marsh-like habitat conditions (i.e., emergent wetlands) for a portion of the giant garter snake active season (late March through early October) (Wylie et al. 2009). The quality of rice fields as giant garter snake habitat compared to natural or restored marshes is an area of active research. Recent research has shown that although giant garter snake does not spend much time in rice fields when compared to irrigation canals, individuals do have higher survival when inhabiting areas with more active rice fields surrounding them (Halstead et al. 2019).

Giant garter snake feeds primarily on small fish, frogs, and larvae (Rossman et al. 1996). Specific prey items may include larvae and small adults of American bullfrog (*Lithobates catesbeianus*) and Sierra treefrog (*Pseudacris sierra*). Fish prey items include mosquitofish (*Gambusia affinis*) and small cyprinid and centrarchid fishes. Little is known about the diet of juvenile giant garter snake, but neonates preferred amphibian larvae to fish in laboratory feeding trials (Ersan et al. 2020a, 2020b).

Giant garter snake is the longest of the garter snakes (Rossman et al. 1996), and is sexually dimorphic, with females as the larger sex (Wylie et al. 2010). Smaller giant garter snakes grow more rapidly than larger giant garter snakes (Coates et al. 2009; Rose et al. 2018d). Males and females exhibit differing patterns of seasonal growth, as males forgo foraging (and growth) for reproductive opportunities in the early spring (Coates et al. 2009). Similarly, male body condition is significantly lower than that of females during the spring mating season, but males and females enter hibernation in similar condition (Coates et al. 2009). Body condition might be related to the thermal ecology of giant garter snake. Females exhibit elevated body temperatures during their gravid period from June, July, and August (Wylie et al. 2009) whereas males exhibit an elevated body temperature in the winter and early spring (Wylie et al. 2009), likely in preparation for the spring mating season. Elevated body temperatures in male snakes may be metabolically costly, resulting in decreased body condition in spring.

Although some aspects of giant garter snake demography remain elusive, detailed studies of populations in the Sacramento Valley have yielded some insight into the population ecology of giant garter snake. Giant garter snakes in the Sacramento Valley tend to produce smaller litters than those historically observed in the San Joaquin Valley where mean litter size was 23 in one study (Hansen and Hansen 1990). In the Sacramento Valley, mean litter size was 17 (95% credible interval[1] = 13–21) based on females captured from 1995 to 1997 (Halstead et al. 2011a) and 16 (range = 5–35) based on females examined from 2013 to 2016 (Rose et al. 2018a). Mean parturition date in the Sacramento Valley was August 13, although parturition can occur from early July through early October (Halstead et al. 2011a). Neonates in the Sacramento Valley are born at approximately 209 millimeters (mm) snout–vent length (SVL) with a mass of 4.9 grams (g) (Halstead et al. 2011a). Litter size varies temporally, potentially with resources, and larger females produce more, rather than larger, offspring (Halstead et al. 2011a; Rose et al. 2018a).

Survival of adult females in the Sacramento Valley varies among sites, years, and conditions. The annual survival probability of adult females over 180 g was 0.61 (0.41–0.79) at an average site in an average year (Halstead et al. 2012). Individuals are at 2.6 (1.1–11.1) times greater daily risk of mortality in aquatic habitats compared with terrestrial habitats (Halstead et al. 2012), likely due to terrestrial locations consisting of subterranean refugia. The effect of linear habitats on daily risk of mortality vary with context: in agricultural rice systems, daily risk of mortality was lower in canals than away from canals, but in two-dimensional habitats with natural or restored marshes, risk of mortality was lower than in simple linear canals (Halstead et al. 2012). Overall survival was greatest in a site with a relatively large network of restored marshes (Halstead et al. 2012). A recent capture-mark-recapture (CMR) study found survival of giant garter snake is also positively related to SVL up to a peak, after which survival likely plateaus for the largest individuals (Rose et al. 2018b). This study also found a positive relationship between snake survival and cover of emergent vegetation at a site (up to approximately 40% emergent vegetation cover; Rose et al. 2018b). Giant garter snake population growth is highly dependent on the survival rate of adult females (Rose et al. 2019); therefore, fostering wetland characteristics that support high adult female survival is important for population persistence.

Abundance, density, and body condition of giant garter snake vary by site, presumably as a result of local differences in habitat. Abundances and densities were greatest at a natural wetland, lower in a natural wetland modified for agricultural uses, lower still in rice agriculture, and lowest in seasonal

[1] *Credible intervals* are the Bayesian equivalent of confidence intervals in traditional frequentist statistics. All ranges reported in this chapter represent 95% credible intervals.

marshes managed for waterfowl (moist soil management in summer, flooded in winter; Wylie et al. 2010). Body condition of females followed a similar pattern (Wylie et al. 2010). Habitats that most closely approximate natural marshes are therefore most likely to support dense populations of healthy giant garter snakes.

The historical range of giant garter snake once extended from Butte County in the north to Kern County in the south (Fitch 1940; Hansen and Brode 1980). The draining of wetlands and subsequent urban and agricultural development have contributed to the loss of over 95% of giant garter snake's original habitat (Frayer et al. 1989). The few remaining natural wetlands are fragmented, the natural cycle of seasonal valley flooding by high Sierra Nevada snowmelt has been limited, and waters have been diverted by a network of dams and levees. As a result, giant garter snake populations have become fragmented with only small, isolated populations remaining in the San Joaquin Valley. These factors precipitated the listing of giant garter snake by the State of California (California Department of Fish and Game Commission 1971) and later by the U.S. Fish and Wildlife Service as a threatened species with a recovery priority designation of 2C: full species, high degree of threat, and high recovery potential (U.S. Fish and Wildlife Service 1993, 1999). The recovery of giant garter snake will require the restoration, protection, and adaptive management of marsh habitats, a reliable (but non-flooding) year-round supply of water, and further research into the most effective conservation practices for this species.

3.1.4 History of the Natomas Basin

Lands of the Basin were historically subject to frequent flooding events due to proximity to the American and Sacramento Rivers. Situated just north of the confluence of these major river systems, the Basin was characterized by abundant marshlands, small streams, and a mixture of riparian, oak woodland, and grassland vegetation. Available information about the historical range of giant garter snake indicates that the Basin would have been part of that range and was likely home to an abundant population of giant garter snake.

3.2 Methods

3.2.1 Trapping Giant Garter Snake

All aspects of giant garter snake monitoring are based on livetrap transects composed of floating galvanized minnow traps (Casazza et al. 2000). Traps were modified in 2012 to contain one-way valves constructed from cable ties placed in the small opening of the funnels and were further modified in 2013 to include two pieces of hardware cloth attached to each end of the funnel using zip ties (Halstead et al. 2013a). These modifications help to direct snakes moving along habitat edges into the trap and keep the snake within the trap, thus increasing capture probability.

Giant garter snake occurrence and demography were monitored at 60 sites in 2018 and 2019, 40 sites in 2020 and 2023, 45 sites in 2021, and 41 sites in 2022. Between 2020 and 2022, substantial challenges were caused by the COVID-19 pandemic as well as heat waves and drought that resulted in low water levels and increased water temperatures. 2020 trapping efforts consisted of a 14-day period. In 2023, unprecedented rainstorms and flooding resulted in inaccessible roads and delays in setting certain traplines; however, as in the previous 2 years, a sampling period of up to 21-days was successfully completed.

In all years, sample sites were selected to ensure a random, spatially dispersed sample by using a Generalized Random Tessellation Stratified approach (Table 3-1; Figure 3-2). Random selection of sites allows inference to TNBC reserves as a whole. Sampled sites consisted of individual wetland units (defined as contained within water control structures) and canals adjacent to rice. Site selection was stratified by reserve area (22 sites in the North Basin Reserve, 10 sites in the Central Basin Reserve, and eight sites in the Fisherman's Lake Reserve) to ensure adequate representation of each reserve. At each site, one 50-trap transect was established, with traps spaced approximately 10–20 meters apart. In 2023, each transect was deployed for approximately 15–21 days beginning May 3, 2023 and ending August 31, 2023. Sampling did not occur on Memorial Day, Juneteenth, or Independence Day.

For sites that had been sampled as "occupancy traplines" pre- 2018, transects were generally placed in the same location in 2023; this approach maintained the same extent of sampling to provide inference about giant garter snake occurrence to the same areas. However, at the five "demography sites" on the BKS, Lucich North, Lucich South, Natomas Farms, and Sills tracts, sampling from 2018 to 2023 differed from the areas sampled from 2011 to 2017. From 2011 to 2017, three transects were sampled at each demography site each year. In 2018 and 2019 at the BKS tract, all three "old" demography transects were sampled, along with an additional five transects placed in other wetland units, while beginning in 2020 only two "old" demography transects (BKS 2 and 3) were sampled, along with three of the additional transects sampled in 2018 and 2019. These same five transects sampled at BKS in 2020 were also sampled from 2021 to 2023, except for one of the additional transects, which was not sampled in 2021 (only four BKS transects were sampled in 2021).

At Lucich North, only one of the three "old" demography transects (Lucich North 4) has been sampled during the past 6 years; however, seven additional transects were added to wetlands at this tract in 2018. Lucich North 4 was sampled every year from 2018 to 2023 except for 2021. The seven additional transects added at Lucich North in 2018 were all sampled in 2018 and 2019, six were sampled in 2020 and 2022, five were sampled in 2023, and four were sampled in 2021. Within Lucich South, one of the three "old" demography transects (Lucich South 3) was sampled each year from 2018–2023, and two additional transects were added to canals in 2018. Both of these additional transects were sampled in 2018, 2019, 2022, and 2023, while only one was sampled in 2020 and 2021. At the Natomas Farms tract, one "old" demography transect (Natomas Farms 1) was sampled in 2018, 2019, 2020, and 2023, three "old" demography transects (Natomas Farms 1, 2, and 3) were sampled in 2021, and two "old" demography transects (Natomas Farms 1 and 2) were sampled in 2022. In addition to these "old" demography transects, one additional wetland transect was sampled at Natomas Farms in each year from 2018 to 2023. At the Sills tract, two "old" demography transects (Sills 2 and 3) were sampled in 2018 and 2019 while no "old" demography transects were sampled from 2020–2023. However, three additional transects were added to canals at Sills in 2018 and all three were sampled each year from 2018–2023.

These changes made to the study's sampling methods allowed a broader area to be surveyed at most of the "old" demography sites (except in 2020 when the entire study was truncated); however, they also meant that some areas sampled from 2011–2017 were not covered by trap arrays from 2018–2023. As noted above, these changes present ramifications for modeling giant garter snake demography and interpreting changes in abundance estimates, as described below in Section 3.2.2, *Analytical Methods.*

Livetrap transects were positioned along banks of aquatic habitat, edges of emergent vegetation in wetlands, or along the edges of canals as giant garter snake forages along habitat edges. Habitat edges also act as natural drift fences that direct snakes to traps. Traps were checked daily.

Environmental conditions relevant to giant garter snake behaviors were monitored daily at each transect including water and air temperatures and fluctuations in water level. Contents of every fifth trap were recorded to obtain a measure of the relative abundance and diversity of potential local aquatic prey. All other traps were monitored, but prey items such as fish, amphibian larvae, and small frogs were left in the traps so that they became naturally "baited" over time. In some instances, large fluctuations in water level (draining of wetlands, canals, or ditches) necessitated opening traps temporarily or relocating transects to a suitable nearby location within the selected site.

Universal Transverse Mercator (UTM) coordinates of all trap locations were recorded, and vegetation and habitat surveys were conducted at points within and adjacent to each transect. Percent cover of habitat types (water, submerged aquatic vegetation, floating aquatic vegetation, emergent vegetation, terrestrial vegetation, rock, or bare ground) and vegetative composition (species or higher taxonomic category) were estimated within a 0.5-meter radius of every fifth trap. A point was selected at a random perpendicular distance of 2–5 meters towards the terrestrial-side or the aquatic-side of the transect within each habitat and vegetation type along the transect, and percent cover of habitats and vegetative composition was estimated within a 1-meter radius of this point to better characterize microhabitat characteristics of the trap locations.

Each giant garter snake captured was measured, sexed, weighed, and uniquely marked. Scale measurements in Rossman et al. (1996) were used to verify the species of each captured animal. The snout-vent length (SVL) and tail-vent length (TVL) of each individual were measured to the nearest millimeter, and each individual was weighed to the nearest gram. Sex was determined by probing the cloaca to detect the presence or absence of hemipenes. After examination, individuals showing no sign of previous capture were given a unique brand on the ventral scutes (Winne et al. 2006) and, if large enough (>35 grams), implanted with a passive integrated transponder (PIT) tag. PIT tags were implanted using syringe injector needles swabbed with alcohol before each use, and the injection site on the snake was swabbed with alcohol prior to tag insertion. The tag was injected subcutaneously, approximately one-third of the SVL anterior to the cloaca. After insertion of the tag, cyanoacrylate glue was applied to the insertion site to seal the dermis and prevent tag loss. Most individuals were processed in the field within a few minutes of their capture. Snakes held for more than a few minutes were kept in the shade in cooled and insulated containers to prevent overheating until they could be examined and released. Each individual was released at its capture location immediately after processing.

3.2.2 Analytical Methods

Most analyses were conducted in a Bayesian analytical framework. In Bayesian analyses, the probabilities are interpreted slightly differently than traditional frequentist statistical analyses. The *posterior probability* is the probability of a random event or uncertain proposition given the data at hand and is most analogous to the probabilities used in frequentist statistics. The posterior probability is how most people intuitively think about probability (e.g., how people interpret a weather forecast). Bayesian analyses also require specification of a *prior* probability distribution, which allows for the inclusion of information obtained through other sources into the analysis. The prior can be an *informative prior* (i.e., a distribution based on previously collected data or a hypothesis about the probability distribution of interest) or an *uninformative prior* (i.e., a probability

distribution that will have no effect on the outcome of the analysis). Unless otherwise noted, for all parameter estimates posterior medians are reported with equal-tailed 95% credible intervals in parentheses.

3.2.2.1 Demography

Abundance of giant garter snake was estimated at each site where the species was detected using Bayesian analysis of CMR data, closed population models, and data augmentation (Royle and Dorazio 2008; Kéry and Royle 2016).[2] In contrast to occurrence, where site was defined as the area between two water control structures, for the purposes of this analysis, site refers to clusters of transects that snakes could likely move between (see below). Closed population models are those that assume no migration in or out of the population of interest over the sampling period. These models are used to estimate abundance using simplifying assumptions. A single model was used to estimate abundance for each site, and information on capture probability was shared among sites which resulted in more precise estimates of abundance at each site.[3] The effects of water temperature, SVL, sex, and a behavioral response on capture probabilities were tested. Models also included temporal variation in capture probability (i.e., variation in capture probability among days of sampling) and individual heterogeneity in capture probability (i.e., variation in capture probability among individual snakes).

Because some transects were proximate to one another, seven snakes were caught in multiple transects, and it is likely that other individuals moved between transects as well. To account for demographic linkage between nearby transects, captures of snakes were grouped into eight "demographic clusters," and abundance was estimated for each cluster. Clustering transects avoided duplicate counting of snakes captured at more than one transect and provided abundance estimates relevant to larger reserve areas rather than a single section of a canal or wetland. Because larger areas were sampled at BKS, Lucich North, and Sills in 2018 and 2019 compared to 2011–2017, less area was sampled overall in 2020 due to the COVID-19 pandemic, and because not all of the old demography transects were sampled from 2018 to 2023, abundance estimates for these tracts from 2018 to 2023 are not directly comparable to previous years.

[2] Data augmentation is an approach to CMR analysis in which a large number of all-zero capture histories is appended to the observed capture histories. This approach is much more flexible than other approaches to estimation of demographic rates and allows a unified framework for analysis of detection-nondetection and CMR data (Royle and Dorazio 2008).

[3] To estimate abundance accurately, the probability of capturing a giant garter snake must also be estimated. Investigators fit a single "multinomial N-mixture model" (Kéry & Royle 2016) using capture data from all eight demographic cluster sites, with random effects of site, date, and individual on capture probability. This type of joint model has the advantage of sharing information on capture probability among sites, which allows for more precise estimates of capture probability and abundance at each site. This model has proven effective at estimating abundance of giant garter snake (Rose et al. 2018c). The capture histories of trapped individuals were augmented with enough all-zero capture histories to give a total pool of 1,200 individual snakes. The number of pseudo-individuals was deemed adequate because the posterior density for abundance fell far below the number of augmented individuals. Uninformative priors were used for all parameters of all models: Uniform (0,1) for probabilities, N (0,1.648) for regression coefficients, and half-Cauchy (0,1) for standard deviations. The closed population model was run on four independent chains of 25,000 iterations after a burn-in of 10,000; each chain was thinned by a factor of 10 to give a final output of 10,000 samples for inference. The model was analyzed by calling JAGS 4.3.0 (Plummer 2003) from R 4.2.2 (R Core Team 2021) using the package "runjags" (Denwood 2016). Posterior distributions were summarized with the posterior median and 95% credible interval (2.5% and 97.5% quantiles of the posterior distribution).

In addition to abundance estimates from closed population models, we estimated the density of giant garter snake in all tracts sampled from 2018 to 2023 using spatially-explicit capture-recapture (SECR) models. SECR models use the spatial locations where animals are captured or observed to estimate their "activity centers" as a measure of their use of space. Importantly, SECR models account for both the location of traps and the period during which each trap was active and therefore able to capture an animal. A separate SECR model was fit for each year from 2018 to 2023 in which capture probability and movement scale parameters differed between wetland and canal traplines and allowed snake density (*D*) to vary among tracts. If a tract included both wetland and canal traplines (e.g., at BKS we trapped in one canal and three wetland units), separate snake density values were estimated for the canals and wetlands. Giant garter snake habitat was defined by creating polylines corresponding to canal habitat in ArcMap version 10.8 (ESRI®). For habitat in wetlands, the wetland edge was digitized as a line feature, and density was calculated as the number of snakes per kilometer (snakes/km) of edge habitat. This approach for habitat in wetlands enabled all data to be fit in the same model. The most prudent comparison of snake densities from these models is within the same habitat type among tracts (i.e., canals compared to canals, wetlands compared to wetlands). SECR models were fit using the "secr" R package version 4.6.4 (Efford 2023) and report the mean, standard error, and 95% credible interval of the density of snakes.

Since the revision of the study design implemented in 2018, five annual intervals of mark-recapture data have been collected. This allowed estimating apparent survival using open-population models. Although there is overlap between the areas sampled from 2011 to 2017 and the areas sampled from 2018 to 2023, the change in spatial coverage could lead to biased estimates of these vital rates. For example, individual giant garter snakes with home ranges overlapping trapping arrays in 2016 and 2017 that were not captured in subsequent years could be treated as mortalities by the open-population CMR model, when in reality they survived this time interval but were unlikely to be caught in traps based on the new trapping locations from 2018 to 2023. Therefore, estimates of apparent survival, annual recapture probability, and availability for capture (i.e., presence "on site") are only based on capture data from 2018 to 2023.

Estimates of apparent survival were calculated using CMR data each year from 2018 to 2023 at four tracts (BKS, Lucich North, Lucich South, and Sills) that had greater than 15 individual giant garter snakes captured over this period and more than one giant garter snake recaptured subsequent to its first year of capture. All other tracts had fewer than 15 individuals captured over the period from 2018 to 2023. Apparent survival (ϕ) was estimated using a robust-design CMR model designed to give unbiased estimates of survival by accounting for availability of individuals for capture (γ, i.e., temporary emigration) in addition to recapture probability (Riecke et al. 2018). Separate survival rates were estimated for female and male giant garter snake, and the apparent survival estimate also varied by site and year according to random effects of each. A single shared recapture probability parameter (p) was estimated for the two sexes, because preliminary model runs and analyses from previous years indicated no difference in recapture probability between female and male giant garter snake.[4]

[4] The robust-design model used uninformative Beta(1,1) prior distributions for the probabilities of apparent survival (ϕ), recapture (p), and availability on site during sampling (γ). All random effects parameters were drawn from normal distributions centered on zero with a standard deviation estimated from the data. Standard deviation parameters had Exponential(1) priors to shrink values toward zero if variation among sites and years was minimal but allow for larger values if warranted by the data. The model included random effects of year and site on ϕ, p, and γ. The robust-design model was fit using JAGS 4.3.0 (Plummer 2003) from R 4.2.2 (R Core Team 2021) using the R package runjags (Denwood 2016). The model was fit using five independent chains of 20,000 iterations each after a

Sex ratios and size distributions were calculated using data from all captured individuals, regardless of method or date of capture. Bayesian analytical methods were used to estimate sex ratios with binomial tests of proportions for all sampling locations within the Basin.[5] Bayesian methods were also used to describe the mean SVL and mass of giant garter snakes of each sex from all sampling locations within the Basin.[6] Sexual size dimorphism in SVL and mass was examined throughout the Basin using separate means and variances for males and females. These tests are equivalent to t-tests with unequal variances (Kéry 2010).[7] Sexual size dimorphism, sex ratios, mean SVL, and mass were not examined at individual sites because of the uncertainty associated with estimating means using small sample sizes.

3.2.2.2 Distribution of Giant Garter Snake on Reserve Lands

The probability of occurrence of giant garter snake on TNBC reserves in 2023 was estimated using Bayesian analysis of single-season occupancy models (Royle and Dorazio 2008; Kéry 2010). The probability of occurrence was modeled as a linear function of selected habitat variables, and the probability of occurrence was allowed to vary among reserve areas (North Basin, Central Basin, and Fisherman's Lake). Habitat effects were initially modeled only to identify supported habitat variables, then a fixed effect of reserve area was added to a model containing only supported habitat variables. The habitat variables included effects of wetland or rice habitat and the percent cover of emergent vegetation, floating aquatic vegetation, open water, and terrestrial vegetation on the probability of occurrence of giant garter snake. Priors for the occupancy component of each model were chosen to be uninformative (Table 32-).[8]

In addition to the single-season occupancy models evaluated above, a Bayesian state-space dynamic occupancy model (MacKenzie et al. 2006; Royle and Kéry 2007; Kéry and Schaub 2011) was evaluated to identify any evidence for changes in the probability of occurrence of giant garter snake on TNBC reserves over time from 2011 to 2023. Occurrence of giant garter snake among various wetland units can change between years due to colonization of sites that were previously unoccupied and extinction at sites that were previously occupied. Accordingly, the dynamic occupancy models account for these changes and are used to estimate the rates at which these

burn-in of 10,000 iterations. Each chain was thinned by a factor of 10, resulting in a final posterior sample of 10,000 iterations.

[5] The binomial model assumes sampling with replacement (Skalski et al. 2005); accordingly, counts of captures rather than individuals were used for analysis.

[6] Lognormal models were fit for each size measurement (mass and SVL), and the goodness of fit of each model was examined with a Bayesian p-value. Normal models fit well to the mass and SVL data, with Bayesian p-values of 0.645 and 0.544 for mass and SVL, respectively.

[7] Each model was run on three independent chains of 22,000 iterations after a burn-in of 2,000; each chain was thinned by a factor of five. Each model was analyzed by calling JAGS 4.3.1 (Plummer 2003) from R 4.3.2 (R Core Team 2023) using the R package jagsUI (Kellner 2016). Posterior distributions were summarized with the posterior median and 95% credible interval.

[8] All continuous variables were standardized to improve behavior of the Markov Chain Monte Carlo (MCMC) algorithm and to allow direct comparison of model coefficients. The posterior probability of each subset of the full model was calculated using indicator variables on model parameters (Kuo and Mallick 1998; Royle and Dorazio 2008). The single-season occupancy model was run on three independent chains of 44,000 iterations each after a burn-in of 2,000; each chain was thinned by a factor of 5, resulting in a final total of 132,000 samples for inference after pooling chains. Each model was analyzed by calling JAGS 4.3.1 (Plummer 2003) from R 4.3.2 (R Core Team 2023) using the package runjags (Denwood 2016). Posterior distributions were summarized with the posterior omedian and 95% symmetrical credible interval.

changes occur and the annually varying colonization and extirpation probabilities.[9] The effects of the same habitat variables that were evaluated using static occupancy models were evaluated to determine if they were related to extinction and colonization probabilities, and we used uninformative priors for the parameters related to occurrence, site-survival, site-colonization, and detection components of the model.

3.2.3 Habitat Assessment

3.2.3.1 Habitat Distribution and Abundance

The distribution and abundance of land cover/crop types throughout the Natomas Basin, both on and off reserve lands, are documented annually (see Chapter 2, *Land Cover Tracking*). These data are used to identify and document large-scale changes in the distribution and abundance of suitable giant garter snake habitat on reserve lands and throughout the Basin.

3.2.3.2 Habitat Connectivity

Connectivity among and between tracts and reserves was assessed by examining habitat variables along the major linear water conveyance features based on assessment in the field and using aerial imagery available from Google Earth®. All culverts crossing major roadways were examined during field checks.

3.3 Results

In 2023, 166 individual giant garter snakes were captured 271 times by hand or trap at 40 sites on TNBC reserve tracts over the course of 41,179 trap days in 2023 (Table 3-1; Figure 3-2). The 2023 monitoring year had a similar number of trap days to 2022 (42,997) but was still lower than any year from 2011 to 2019, likely contributing to low numbers of both unique giant garter snake individuals captured, and total captures compared to the years prior to the COVID-19 pandemic. The catch-per-unit effort (snakes captured per trap-night) across the Basin was 0.0066 in 2023. For comparison, catch-per-unit effort was 0.0037 in 2022; 0.0049 in 2021; 0.0068 in 2020; 0.0062 in 2019; and 0.0056 in 2018. In comparison, catch-per-unit effort prior to the recent revisions in study design in 2018 was 0.0047 in 2017, 0.0037 in 2016, 0.0017 in 2015, 0.0033 in 2014, 0.0035 in 2013, 0.0028 in 2012, and 0.0031 in 2011. Appendix C contains giant garter snake capture data for 2023.

3.3.1 Demography

3.3.1.1 Estimates of Abundance Using Closed Population Models

Capture probability - the most influential variable on estimates of all demographic parameters - averaged was 0.008 (0.003–0.023) over all sites. Standard deviation of capture probability among sites (0.008 [0.002–0.035]) was slightly higher than the standard deviation of capture probability

[9] All probabilities were given U(0,1) priors. The dynamic occupancy model was run on five independent chains of 820,000 iterations each after a burn-in of 20,000; each chain was thinned by a factor of 400, resulting in 10,000 samples for inference. Each model was analyzed by calling JAGS 4.3.0 (Plummer 2003) from R 4.2.2 (R Core Team 2021) using the package R2jags (Su and Yajima 2015). Posterior distributions were summarized with the posterior median and 95% symmetrical credible interval (2.5% and 97.5% quantiles of the posterior distribution).

among days (0.005 [0.002–0.015]) and individuals (0.004 [0.001–0.010]). There was evidence for a positive ephemeral behavioral response to capture and a positive effect of water temperature on capture probability (Figure 3-3; Table 3-3).

Seven instances of giant garter snakes moving between transects were detected in 2023. Five snakes were captured in multiple traplines within the Sills tract, one snake was detected moving between a trapline in the BKS tract to a trapline in the Frazer South tract, and one snake moved from a transect in the Bennett North tract to a transect in the Nestor tract. Transects in close enough proximity that giant garter snakes did or would be expected to move between transects were grouped together and treated as a single site for this analysis (e.g., all transects in the Lucich North wetland complex; one transect in the Frazer South tract was grouped with transects in the BKS tract), resulting in seven demographic "clusters." Estimates of abundance at each of the seven demographic clusters where giant garter snakes were captured are summarized in Table 3-4.

At the five transects within the BKS cluster (including one transect from Frazer South), 68 individuals were captured 97 times over 5,249 trap days (Table 3-4). For comparison, in 2022, 79 individuals were captured 87 times over 6,300 trap days at six transects. Of the 79 individuals that were captured in 2022, 5 were recaptured in 2023. Six snakes captured at BKS in 2021 were recaptured in 2023, three snakes captured in 2020 were recaptured in 2023, two snakes captured in 2019 were recaptured in 2023, and two snakes first captured in 2018 were recaptured in 2023. The estimated abundance in sampled areas at BKS in 2023 was 115 (82–172) individuals (Figure 3-4, Table 3-4). The estimated abundance at BKS was 385 (211–681) in 2022, 200 (147–352) individuals in 2021, 566 (256–1,303) individuals in 2020, and 559 (374–944) individuals in 2019.

At four transects within the Sills cluster (including one transect in the Tufts tract), 37 individuals were captured 67 times over 4,163 trap days in 2023 (Table 3-4). For comparison, 31 individuals were captured 48 times over 4,752 trap days in 2022. Of the 31 individuals captured at Sills in 2022, 9 were recaptured in 2023. Five snakes captured at Sills in 2021 were recaptured in 2023, two snakes captured at Sills in 2020 were recaptured in 2023, and no snakes captured at Sills in 2018 or 2019 were recaptured in 2023. The estimated abundance at Sills in 2023 was 63 (48–93) snakes (Figure 3-5, Table 3-4). The abundance in 2022 was higher, with an estimated 148 (76–267) snakes. In 2021, the abundance was comparable to 2023, with an estimated 74 (51–137) snakes.

At 9 transects within the Lucich North cluster (including two transects in the Frazer North tract and one in the Nestor tract), 19 individuals were captured 30 times over 9,093 trap days in 2023 (Table 3-4). For comparison, in 2022 eight individuals were captured nine times in over 10,241 trap days. Of the eight individuals captured at Lucich North in 2022, none were recaptured in 2023. One snake captured at Lucich North in 2023 was previously captured in 2020. The estimated abundance at Lucich North in 2023 was 34 (25–50) individuals (Figure 3-6, Table 3-4). For comparison, the estimated abundance in 2022 was 46 (23–83) individuals and the estimated abundance in 2021 was 31 (19–55) individuals.

At three transects within the Lucich South demographic cluster, 16 individuals were captured 33 times over 2,981 trap days in 2023 (Table 3-4). In 2022, nine individuals were captured 15 times over 2,788 trap days. One of the 16 snakes captured at Lucich South in 2023 was also captured in 2022, and one individual was previously captured in 2020. The estimated abundance at Lucich South in 2023 was 27 (19–41) individuals (Figure 3-7, Table 3-4). For comparison, the estimated abundance in 2022 was 46 (22–84) individuals, and the estimated abundance at Lucich South in 2021 was 23 (12–43) individuals.

In the Fisherman's Lake Reserve area, no giant garter snakes were captured at 8 transects in the Cummings, Natomas Farms, and Rosa tracts over 8,196 trap days in 2023. Likewise, in 2022, 2021 and 2020, no giant garter snakes were captured at the three tracts (Cummings, Natomas Farms, and Rosa) over 8,293 trap days (2022) 8,335 trap days (2021) and over 2,798 trap days (2020). In 2019, one giant garter snake was captured at two transects, while in 2018, no giant garter snakes were captured at either transect in the Fisherman's Lake Reserve area.

Snakes were also captured at transects in the Bennett North, Bianchi West, and Huffman West tracts. At Bennett North, four individuals were captured a total of five times, and the median estimated abundance was 22 (12–36) snakes (Table 3-4). At Huffman West, three individuals were captured a total of five times, and the median estimated abundance was 23 (13–36) snakes (Table 3-4). At Bianchi West, 19 individuals were captured a total of 35 times, and the median estimated abundance was 32 (23–48) snakes (Table 3-4).

3.3.1.2 Estimates of Density Using SECR Models

Based on SECR analysis of 2023 capture data, the capture probability for giant garter snake was higher in canals (mean = 0.0025, 95% CI = 0.0019–0.0032) than wetlands (mean = 0.0010, 95% CI = 0.0006–0.0014). The 2023 SECR analysis also showed the scale of giant garter snake movement was greater in canals than wetlands, indicating snakes moved longer distances within canals than wetlands. The highest density of giant garter snake in the Natomas Basin in 2023 was in wetlands at BKS, with a mean estimate of 34.5 snakes/km of wetland edge (25.2–47.3 snakes/km). The BKS wetlands had the highest density of giant garter snake each year from 2018 to 2023 (Table 3-5). Snake density was also high in wetlands at Lucich South, with a mean density estimate of 23.4 snakes/km (11.5–47.6 snakes/km). The Lucich North and Bennett North wetlands had very low density estimates of < 0.01 snakes/km (Table 3-5), with very few captures of giant garter snake in 2023 despite substantial trapping effort. Density estimates in occupied canals ranged from highs of 22.9 snakes/km (14.7–35.6 snakes/km) at Bianchi West and 13.8 snakes/km (8.8–21.8 snakes/km) at Frazer South, to lows of < 0.1 snakes/km at a canal in the BKS tract adjacent to wetlands, 2.3 snakes/km (0.7–7.3 snakes/km) at Huffman West, and 2.9 snakes/km (1.1–7.6 snakes/km) at a canal adjacent to the Lucich South wetlands (Table 3-5). Canals in the Nestor East (mean = 8.2 snakes/km, 95% CI = 4.9–13.6 snakes/km) and Sills (mean = 6.7 snakes/km, 95% CI = 4.4–10.2 snakes/km) tracts had intermediate densities of giant garter snake (Table 3-5).

3.3.1.3 Size Distribution and Sex Ratio

The overall sex ratio of captured snakes in the Natomas Basin was slightly female-biased. The sex ratio was 0.89 (0.65–1.19) males per female for all sites in the Basin combined. Basin-wide mean SVL was 567 mm (546–589 mm), and Basin-wide mean mass was 100.28 g (88.94–112.96 g). Mean female SVL (599 mm [563–638 mm]) was 68 mm (27–111 mm) greater than mean male SVL (531 mm [512–551 mm]) and mean female mass (124.72 g [102.79–151.01 g]) was 46.9 g (22.72–74.22 g) greater than mean male mass (77.79 g [69.58–87.08 g]; Figure 3-8).

3.3.1.4 Survival Estimates from 2018–2023

Average annual recapture probabilities, given 21 days of sampling at a site, were 0.20 (0.10–0.47). There was no support for a difference in apparent survival rate between female and male giant garter snake. Apparent survival varied among years and sites. At BKS, apparent survival was highest from 2018 to 2019 and lowest from 2021 to 2022 (Figure 3-9). At Lucich North, apparent survival

was similar over each of the year-long intervals (Figure 3-10). At Lucich South, apparent survival was highest from 2020 to 2021 (Figure 3-11). At the Sills tract, apparent survival estimates were highest for the interval from 2019 to 2020 (Figure 3-12). The probability a snake was available on site for capture (γ) was higher for female than male giant garter snake (Table 3-6). As with the closed CMR model, there was a positive relationship between capture probability and water temperature (Table 3-6).

3.3.2 Distribution of Giant Garter Snake on Reserve Lands

Giant garter snake was detected at 17 of 40 sites sampled in 2023 (Figure 3-2). Of the 36 sites surveyed in both 2022 and 2023, giant garter snake was detected at three sites in 2022 where the species was not detected in 2023. There were no detections of giant garter snake in 2023 at sites where the species was not detected in 2022. Of the four sites that were surveyed in 2023, but not surveyed in 2022, giant garter snake was detected at two sites. Of all the sites monitored in 2023, 18 (17–22) were estimated to be occupied (Figure 3-13).

The effects of habitat variables on the probability of occurrence were not supported in 2023 (Table 3-7). Water temperature had a positive effect on daily detection probability, but the effect of date of sampling on daily detection probability was not supported (Table 3-8; Figure 3-14). Daily detection probabilities for giant garter snake in 2023 at an occupied site on a day with average conditions (e.g., average water temperature) were 0.33 (0.13–0.53). Over 21 days of trapping, this corresponded to a cumulative probability of detecting giant garter snake at least once, given the species occurred at a site in 2023, of 0.99 (0.95 – >0.99).

The probability of occurrence of giant garter snake varied by reserve (i.e., North Basin, Central Basin, and Fisherman's Lake). The probability of occurrence in wetlands in the North Basin Reserve was 0.35 (0.11–0.67), the probability of occurrence in wetlands in the Central Basin Reserve was 0.88 (0.49–0.99), and the probability of occurrence in wetlands in the Fisherman's Lake Reserve was 0.08 (0.01–0.4). Most sites in the Fisherman's Lake Reserve were wetland sites (6 of 8), whereas most sites in the Central Basin Reserve were rice sites (7 of 10), and sites were nearly evenly divided between the two types in the North Basin Reserve (12 of 22 sites were wetlands).

The dynamic occupancy model indicated evidence for a slight decrease in the probability that sites on TNBC reserves were occupied by giant garter snake from 2011 to 2013, followed by a period of stability from 2013 to 2018, an increase from 2018 to 2019, a decrease from 2019 to 2021, and an increase in 2022 that remained stable into 2023. The number of occupied sample sites followed a similar pattern, with a decrease from 2019 to 2021 and an increase in 2022 that was stable in 2023 (Figure 3-15). Both occupancy parameters were estimated with much greater precision in 2018 and 2019, when the number of sites increased to 60 as part of the revised sampling design. Conversely, precision of these parameters was much lower between 2020 and 2023 compared to 2018 and 2019, due to decreasing the number of sites to 40 (2020), 45 (2021), 41 (2022), and 40 (2023) because of the COVID-19 pandemic and stochastic weather patterns.

The annual probability that occupied sites would become unoccupied (site extirpation) was generally low and stable between 2011 and 2019; although it was higher from 2020 to 2023 as compared to previous years, site-extirpation probability has consistently declined since 2020 (Figure 3-14). The annual probability that unoccupied sites were colonized exhibited no trend from 2011 to 2018; increased from 2018 to 2020; decreased from 2020 to 2021; increased from 2021 to 2022; and decreased from 2022 to 2023 (Figure 3-14). The mean intrinsic growth rate of occupancy

from 2011 through 2023 was -0.041 (-0.073 to -0.001; Figure 3-16), indicating a small but significant decline in occupancy over time. The posterior probability that occupancy declined, on average, from 2011 – 2023 was 0.986. Occupancy growth was most negative between 2019 and 2020, potentially because of the reduction in the number of sampled sites, and although it has rebounded slightly since the 2020–2021 period, it remains negative (Figure 3-16).

There was no support for effects of habitat on site-survival probabilities nor strong evidence for effects of habitat variables on occupancy dynamics (Table 3-9).

3.3.3 Habitat Assessment

3.3.3.1 Habitat Distribution and Abundance

TNBC reserve lands provide better giant garter snake habitat than that present in the Basin as a whole. Created marsh, seasonal wetlands, and other emergent wetlands are the highest quality giant garter snake habitat and constituted 12.9%[10] (667 acres) of reserve properties' acreage but just 1.6% (789 acres) of non-reserve lands. TNBC reserves provided 46% of the wetland habitat within the Basin. Rice cultivation, along with its supporting infrastructure of canals, provides the only suitable giant garter snake habitat remaining in the Basin, and comprised 58.7% (3,027.6 acres) of the area of reserve properties compared to 33.6% (16,375.3 acres) of the non-reserve lands. While there was a large reduction of active rice cultivation habitat in 2022 (30.5% [1,573.3 acres]) due to fallowing of rice fields, this was only a transient effect likely caused by low water availability that year, as the amount of rice grown in 2023 is comparable to rice habitat availability in 2021 (56.7% [2,606.4 acres]).

Overall, 3,694.3 (71.7%) of the total acres of TNBC reserve lands were potential giant garter snake habitat (compared to 2,281.3 acres (44.3%) in 2022), while only 35.2% (17,264.4 acres) of the total acres of non-reserve area in the Basin were potential habitat. It should be noted that only marsh and a fraction of the linear water conveyance features that make up a very small proportion of the total acreage in rice cultivation provide suitable giant garter snake habitat in all seasons, and that even these land cover types are only suitable if they contain adequate water to provide usable giant garter snake habitat (i.e., a non-negligible amount of surface water immediately adjacent to emergent vegetation or steep canal banks). Giant garter snake requires enough water to submerge for foraging and predator escape and requires this water to be immediately adjacent to basking and hiding sites, like emergent vegetation and steep canal banks. If water is not properly and actively managed to ensure that all components of giant garter snake habitat are present, marshes and canals do not function as giant garter snake habitat. Rice fields and their associated linear water conveyance features provide almost no giant garter snake habitat for much of the year (i.e., September through June), so the amount of created marsh with adequate water is a better measure of giant garter snake habitat for comparison than the sum of created marsh and rice. As noted above however, the total acreage of created marsh is an overestimate of giant garter snake habitat if it does not contain enough water, or, conversely if it is flooded.

Tracts in the Fisherman's Lake Reserve cover approximately 442 acres of which 109.0 acres (24.7%) were created as marsh in 2023. No rice cultivation existed in the Fisherman's Lake Reserve tracts in

[10] The fresh emergent marsh (created) land cover type includes some, but not all, of the associated uplands for most, but not all, tracts with created marshes. Therefore, this number is not representative of the percentage of reserve lands in created marsh for purposes of assessing compliance with the terms of the NBHCP.

2023. Recently constructed wetlands (SAFCA wetlands plus the Anne Rudin tract) constitute much of the landscape immediately southeast of the Natomas Farms tract and between the Natomas Farms and Cummings tracts, and these wetlands have developed into suitable occupied giant garter snake habitat. Of the seven tracts in the Fisherman's Lake Reserve, three (Alleghany, Rosa Central, and Rosa East) contained no habitat for giant garter snake in 2023 while four contained habitat suitable for the species.

Tracts in the Central Basin Reserve cover approximately 1,423 acres. A total of 140 of these acres (9.8%) were created marsh and 1,058.3 acres (74.3%) were active rice. This represents an increase of 507 acres (47%) compared to the 551 acres (38.7%) of rice cultivation that existed in the Central Basin Reserve in 2022 and is comparable to the amount of rice grown in 2021 (1,058 acres (74.3%). Overall, 1,118.3 acres (83.3%) of the total acreage of the Central Basin Reserve was potential giant garter snake habitat in 2023, although—as noted above—only created marsh and some canals associated with rice agriculture provide suitable habitat in all seasons. All 8 tracts in the Central Basin Reserve contained habitat suitable for giant garter snake in 2023.

In 2023, 18 tracts in the North Basin Reserve covered approximately 2,332 acres of which 414 acres (17.8%) were created as marsh and 1,262 acres (54.1%) were in active rice cultivation. A total of 13.2 acres of the North Basin Reserve were fallowed rice fields in 2023. This represents a decrease of 750.0 acres from the 764.1 acres that were classified as fallowed rice in 2022. Overall, 1,691.9 acres (72.5%) of the total acreage of the North Basin Reserve was potential giant garter snake habitat in 2023. All 18 tracts contained suitable habitat for giant garter snake in 2023.

3.3.3.2 Habitat Connectivity

An assessment of habitat connectivity is incomplete without addressing the different means by which animal populations are connected. Connectivity generally occurs via the dispersal of individuals across the landscape. Little is known about reptile dispersal, but radio-telemetry studies suggest that most giant garter snakes have small home ranges (Valcarcel 2011), although individuals can move several kilometers through appropriate habitat if necessary (Reyes et al. 2017). Two distinct forms of connectivity must also be considered. *Demographic connectivity* refers to the movement of individuals among (sub)populations to the extent that migration plays a role in population dynamics, potentially rescuing local populations from extirpation through migration into them from a source population (Mills 2007). *Genetic connectivity* is the dispersal of enough individuals among populations to prevent genetic differentiation among them. A one-migrant-per-generation rule is often considered an adequate amount of connectivity to avoid the negative effects of inbreeding (Mills 2007). In general, demographic connectivity requires the exchange of far more individuals than genetic connectivity. Both forms of connectivity are addressed in the following discussion.

Although portions of TNBC's reserve system are well-connected, some notable exceptions exist (Figure 3-17). Surface water connects the Fisherman's Lake Reserve with other reserve areas as the northernmost suitable Fisherman's Lake Reserve tract (Natomas Farms), is approximately 15 kilometers (by canal) south of the nearest suitable Central Basin Reserve tract known to be occupied by giant garter snake (Elsie). Giant garter snakes have small home ranges and typically move relatively short distances (Valcarcel 2011; Reyes et al. 2017), but nonetheless can exhibit movements up to 5 kilometers over multiple days (U.S. Geological Survey unpublished data).

Given the stretches of marginal habitat in canals that connect tracts, the surrounding land uses that are inhospitable to giant garter snake, potential fragmentation caused by I-5, and the distance between tracts of the Central Basin Reserve and the Fisherman's Lake Reserve, it is unlikely that the Fisherman's Lake Reserve is currently demographically connected to the other reserves. Connectivity between the Fisherman's Lake Reserve and other habitats north of I-5 may have improved with the completion of the Giant Garter Snake Drainage Canal, constructed as mitigation for the NLIP project that connects the North Drainage Canal just south of the Sacramento/Sutter County line with the West Drainage Canal just north of I-5. The majority of this new canal was categorized as suitable habitat for giant garter snake from 2020 to 2023. The canal connects to the Fisherman's Lake Reserve through the West Drainage Canal, which was categorized as suitable habitat from 2020 to 2023 (Figure 3-17).

Within the Fisherman's Lake Reserve, three of the suitable tracts (Natomas Farms, Anne Rudin Preserve, and Cummings) are connected by approximately 3.5 kilometers of canal habitats that compose Fisherman's Lake, and by the intervening SAFCA wetlands. The eastern boundary of the fourth suitable tract, Souza, is adjacent to the northernmost wetlands of the Natomas Farms and SAFCA tracts. The creation of the SAFCA wetlands provides much greater continuity of habitat within the Fisherman's Lake area than was previously present. Movement data from radio-tagged snakes translocated to the SAFCA wetlands between 2019 and 2021 showed individual snakes moved between the Natomas Farms, SAFCA, and Cummings wetlands, but did not show signs of migration out of Fisherman's Lake Reserve (Nguyen 2023a).

In contrast to the Fisherman's Lake Reserve tracts, the Central Basin Reserve Tracts are near those of the North Basin Reserve, and these two areas are linked by a dense network of canals. The tract at the eastern edge of Ruby Ranch in the North Basin Reserve is only approximately 3 kilometers (by canal) from the Sills and Tufts tracts of the Central Basin Reserve. Within the Central Basin Reserve, tracts are nearly contiguous, with the exception of a 0.8-kilometer gap between the Bianchi West and Frazer South tracts. The intervening tract consists of rice agriculture and a canal with marginal habitat, so demographic connectivity among these tracts is likely and genetic connectivity is nearly certain. Perhaps a greater barrier to connectivity among Central Basin tracts is SR 99, which lies between the Bianchi West and Sills tracts.

Although this highway is a formidable barrier, it is possible for giant garter snakes to cross it. A female giant garter snake initially marked in 2010 at Bianchi West (east of SR 99) was captured at Sills (west of SR 99) three times in 2011. This individual almost certainly crossed through the 132-meter-long single box culvert under SR 99, providing strong evidence for genetic (and possibly even demographic) connectivity across SR 99 in the Basin (Halstead et al. 2013b). No such movements were detected in 2023. Given that the Sills tract and BKS tract contain the two most abundant populations of giant garter snake in the Central Basin Reserve, connectivity across SR 99 could increase the probability of persistence of giant garter snake in this region as a whole.

Like the Central Basin Reserve tracts, the North Basin Reserve tracts are well-connected. No major highways fragment the North Basin tracts, and the only discontinuity between tracts containing suitable habitat is 1 kilometer between the Lucich North and Nestor tracts. This gap occurs along the North Drain, which has improved from marginal giant garter snake habitat in 2020 to suitable habitat in 2021 and has remained suitable through 2023; this improvement of habitat suitability will likely contribute to improved connectivity between the two areas. A snake was captured in the Nestor tract in 2018 that was originally marked in the Lucich North tract in 2012, demonstrating connectivity between these two areas. It is highly likely that all tracts in the

North Basin Reserve are genetically connected, and nearly all tracts are demographically connected with at least one other tract as well. Resumption of rice agriculture on the Nestor tract likely enhances the connectivity of the North Basin Reserve tracts.

Overall, it is very likely that all tracts in the Central Basin and North Basin Reserves are genetically connected and that these tracts are also demographically connected to at least one other tract. These conditions help to promote genetic diversity, limit the effects of genetic drift and inbreeding depression, and may rescue small populations on some reserves by the migration of individual giant garter snakes from neighboring reserves. In the future, maintaining this connectivity and its benefits to giant garter snake will require the continued availability of suitable habitat in canals that link wetland reserves.

In contrast to the North Basin and Central Basin Reserves, connectivity between the Fisherman's Lake Reserve and the other reserves is far more tenuous. Although Natomas Farms and Cummings are almost certainly genetically connected and possibly demographically connected, the very small population in this area and isolation of these reserves from demographic rescue and genetic input from other, more abundant giant garter snake populations to the north leaves them at risk for founder effects, inbreeding depression, and fixation of deleterious alleles through genetic drift, and it renders them very sensitive to both demographic and environmental stochasticity (e.g., random variation in birth/death rates or climatic conditions).

It is hoped that the establishment of these reserves and the additional marsh habitat created by SAFCA can provide the conditions that will allow this population to recover, but detailed demographic study of this population will ascertain whether more intensive management strategies (such as augmentation of the population with genetically distinct individuals to increase genetic diversity [Madsen et al. 1996, 2004]) are warranted in the Fisherman's Lake area.

The radio-telemetry study that began in 2018 is an important first step to determine the potential effectiveness of translocation of individuals from more abundant and presumably more genetically diverse populations, as a means to "rescue" sparse populations in the Fisherman's Lake Reserve. Individuals from the Central Basin Reserve were translocated to the SAFCA wetlands in the Fisherman's Lake Reserve in 2019 and 2020 and tracked using radio-telemetry through 2021. Survival was much lower for these translocated individuals (8% of adult snakes survived >801 days) when compared to resident snakes (39% of adult snakes survived >1,154 days); however, juvenile snakes raised in captivity and released into the SAFCA wetlands had a relatively high survival rate of 60% during the 4-month period in which they were monitored (Nguyen 2023b). Based on these results, captive rearing might be an effective method for supplementing populations within the Fisherman's Lake Reserve, but more research is needed, particularly on how these supplemented individuals might affect the genetic makeup of the local population.

Although some sections of canal in each reserve were downgraded from suitable to marginal habitat from 2022 to 2023, many canals in each reserve were upgraded from marginal to suitable habitat in 2023; overall, the continuity of suitable habitat for giant garter snakes remained similar from 2022 to 2023. The most notable downgrade in habitat suitability in the North Basin Reserve occurred in the Frazer North tract where a section of canal classified as unsuitable in 2021 that had improved to suitable in 2022 returned to unsuitable in 2023.

Throughout the rest of the North Basin Reserve there were relatively equal numbers of canals that switched from marginal to suitable habitat and vice versa from 2022 to 2023. There was no apparent pattern to these changes, likely indicating expected fluctuations in habitat quality between

years due to vegetation growth and habitat changes related to fallowing of rice fields in 2022. No canal sections were downgraded to unsuitable habitat in the Fisherman's Lake and Central Basin Reserves tracts. One section of canal along the Elsie and Paulsen South tracts that was as no longer classified a canal in 2021 returned to marginal habitat in 2022 and remained so in 2023.

For the remainder of the Central Basin Reserve there was a roughly equal split between habitat that switched from marginal to suitable and habitat that was downgraded from suitable to marginal between 2022 and 2023. These changes occurred throughout the Central Basin Reserve and did not appear to be concentrated in a certain area or set of tracts, which could be indicative of natural habitat fluctuations between years. In the Fisherman's Lake Reserve, one section of canal was upgraded from marginal to suitable habitat, one was downgraded from suitable to marginal habitat, and no canal sections were downgraded to unsuitable habitat. As seen in previous years, the habitat dynamics of canals with respect to giant garter snake can both improve or degrade from year to year based on annual fluctuations in water availability and growth of emergent vegetation. Monitoring these changes over time will be important to determine if any long-term trends exist and whether those trends are positive or negative for giant garter snake persistence.

3.4 Discussion

3.4.1 Demography

3.4.1.1 Abundance and Density

Abundance varied substantially among sites. For two of the seven demographic clusters, four or fewer snakes were captured, and abundance was estimated to be 12–36 individuals. Similar abundance estimates were obtained for Lucich North and Lucich South, at which only 19 and 16 individuals were captured in 2023, respectively. For two sites with more than 30 individuals captured, abundance was estimated to be much greater, with more than 60 individuals (Sills), or over 110 individuals (BKS). The daily capture probability of marked giant garter snake in 2023 was higher than in 2022 and the abundance estimates consequently were generally lower and had narrower credible intervals in 2023 compared to 2022. The average number of captures per individual in 2023 (1.63) was higher than in 2022 (1.25 captures per individual) and 2020 (1.26 captures per individual) and more comparable to 2021 (1.57 captures per individual). The number of captures per individual was intermediate in 2019 (1.44) and 2018 (1.41).

Capture probabilities varied substantially in space and time, with more variance attributable to variation among sites than temporal variation (fluctuations from day to day). The random variation in capture probability among days likely reflects day-to-day changes in the weather that influence the behavior of giant garter snake. On cool, cloudy days, snakes are less likely to forage in the water and thus are less likely to be captured in traps than on hot days when they spend more time foraging. Capture probability might differ among sites due to differences in habitat that influence the effectiveness of traps (e.g., how well traps are able to fit flush to the canal or wetland bank to funnel foraging snakes into the trap).

The ability to share information on capture probabilities among sites is valuable as it allows for increased precision in estimates of abundance, as well as the effect of habitat covariates on capture

probability. Heterogeneity in capture probability among individual giant garter snakes could result from differences in behavior, with some individuals foraging along habitat edges more frequently or learning to forage in traps because they contain concentrations of prey. Heterogeneity can also result from spatial overlap between individual home ranges and traplines. Snakes with home ranges centered in the middle of a transect would be expected to be captured more frequently than snakes with a home range that only partially overlaps one end of a transect. This variation in individual home ranges is addressed explicitly in the SECR models used to estimate snake density.

SECR models explicitly account for the spatial locations of traps and where snakes are captured, which enables them to estimate the density of snakes within a defined area. Density estimates from SECR models are more suitable for comparisons among sites because they account for differences in the area sampled at each site. BKS had both the greatest estimated abundance of giant garter snake and the highest density (i.e., snakes/km of edge habitat) in 2023 and previously from 2018 to 2022. A comparison of Sills and Lucich South is instructive of the value of SECR models. The estimated abundance of snakes at Sills was higher than at Lucich South (median value of 63 compared to 27), but the estimated density of snakes was higher in wetlands at Lucich South than in the Sills canals. The higher estimated density in Lucich South reflects that capture probability is lower in wetland habitats than in canals like those at Sills. The density of snakes at Lucich North was estimated to be much lower than the density of snakes at Lucich South in 2023. The lower estimated density at Lucich North from the SECR model results from the much greater area sampled and trapping effort at Lucich North compared to Lucich South. In the future, adding landscape-level covariates on snake density could help inform what habitat management actions are most likely to support dense, healthy populations of giant garter snake.

In contrast to 2018–2021, there was support for an effect of water temperature on capture probabilities in 2022 and 2023. The effect of water temperature on snake behavior is likely more important in the spring, when cooler weather may prevent snakes from reaching a high enough body temperature to forage in cool water. In 2022 and 2023, trapping began a week earlier in May than in 2021, which could partially explain the greater importance of water temperature to snake capture probability in 2022 and 2023.

As in each year from 2018 to 2022, there was evidence of a positive ephemeral behavioral response to capture ("trap-happiness") in 2023. This pattern is likely observed simply because the individuals were in the vicinity of the trap array immediately after release and happened to enter another trap, or because individual snakes might forage for several consecutive days within a relatively small area, then shelter in burrows to digest their meals or shed. The behavioral response could also be caused by individuals that entered traps being rewarded with an easy meal; these individuals were therefore more likely to search for prey within traps the following day—and be trapped—than individuals that had not been trapped the previous day. This effect of behavioral response is a common theme across all years of monitoring. In 2023, there was little support for an effect of giant garter snake sex or SVL on capture probability, which matches our findings in 2022.

3.4.1.2 Size Distribution and Sex Ratio

The sex ratio of giant garter snake in the Natomas Basin in 2023 was slightly lower than one male per female and higher than in 2022. The credible interval overlapped 1 substantially in 2023, indicating no strong sex bias. Regardless, a female-biased sex ratio should not limit the reproductive potential of the species, given the mating system in garter snakes, where both females and males can mate with multiple partners (Schwartz et al. 1989; Shine et al. 2001). The slightly biased sex ratio is

largely a result of a low proportion of males among the snakes captured at two sites: Lucich North (12 females and seven males) and Lucich South (12 females and four males). Trapping within Lucich North in which moderately more female giant garter snakes were captured in 2023 occurred later in the summer (i.e., late June to late August). During this time of year, females are likely to be foraging after giving birth (parturition) to improve their body condition. The likelihood that large adult females foraging after reproduction partially influenced the sex-bias in captures is further supported because the average SVL and mass of captured females were higher in 2023 (599 mm SVL, 124.72 g mass), 2022 (674 mm SVL, 150.9 g mass), 2021 (611 mm SVL, 131.76 g mass), 2020 (616 mm SVL, 117.45 g mass), 2019 (630 mm SVL, 164.5 g mass), and 2018 (665 mm SVL, 161.9 g mass) than in 2017 (586 mm SVL, 115.5 g mass), and the size distribution of females was shifted toward longer and heavier individuals between 2018 and 2023 (with the revised sampling design) than in 2017, when greater trapping effort occurred earlier in the active season. Continued monitoring of giant garter snake sex ratios is warranted, but differences in seasonal activity patterns between the sexes must be considered when interpreting the sex ratio of captured individuals. Although managing unharvested populations for sex ratio is not generally feasible, continued monitoring of sex ratios on TNBC reserves could warn of sex-biased mortality factors (assuming an equal sex ratio at birth [Halstead et al. 2011a; Rose et al. 2018a]).

Size distributions of giant garter snake on TNBC reserves indicate the presence of a mixed-age population. Size distributions indicate the presence of both younger, smaller snakes and larger, older individuals in the population. Small yearling snakes were caught in spring 2023 that were likely born in summer 2022, and neonate snakes likely born in summer 2023 were captured in August 2023. The evidence of recruitment of young individuals provided by size distributions is important supplemental information to determine if recruitment is occurring (at least in part) through in-situ reproduction. It should be noted, however, that inferring the health of a population (i.e., population growth rate) from size (or age) distributions alone is unwarranted (Caughley 1974).

3.4.1.3 Survival Rate of Giant Garter Snake

The additional year of sampling in 2023 provided an opportunity for increased precision in estimates of giant garter snake apparent survival (the probability of surviving and remaining available on site for capture). Although survival varied over time at most sites, there was no clear pattern in survival that applied to all sites. One clear result from the survival estimates was that apparent survival was much higher at BKS from 2018–2019 than in the subsequent years. This decrease in apparent survival could be driven by the decrease in sampling effort in BKS in 2020 (six transects for approximately 14 days each), 2021 (five transects), 2022 (six transects), and 2023 (five transects) compared to 2018 and 2019 (nine transects). The higher sampling effort in 2018 and 2019 led to a higher recapture rate of snakes in 2019 compared to subsequent years.

Therefore, it is possible that some of the snakes that were first captured and marked in 2018 and 2019 survived until later years but either (1) were not available for capture in the more limited area sampled from 2020–2023, or (2) evaded capture during the shorter sampling period in 2020. Trapping effort was more consistent in the Sills tract, and survival was higher from 2019–2020 than in other years. Survival was highest from 2020 to 2021 at Lucich South, despite lower trapping effort in 2020 and 2021 compared to all other years in this study. Trapping effort at Lucich North in 2022 and 2023 was higher and comparable to 2018 and 2019. Despite fluctuations in trapping effort at Lucich North, annual survival was consistent each year from 2018 to 2023. There were no data indicating a difference in survival among male and female giant garter snake. However, data obtained did indicate a higher availability for capture for female giant garter snake than male giant

garter snake. One potential explanation for this finding is that male giant garter snakes disperse farther and are more likely to emigrate from trapped areas.

3.4.2 Distribution of Giant Garter Snake on Reserve Lands

The occupancy analysis for 2023 indicated that giant garter snake is expected to occur in approximately 51% of wetland and rice units on reserve lands, with occupancy highest in the Central Basin Reserve. It is notable that there was great uncertainty on the effects of whether sites classified as "rice" (i.e., canals next to rice) were more or less likely to be occupied than wetland sites, after accounting for variation in occupancy rates among the three reserves. The results suggest that the presence of rice likely did not affect the occurrence of giant garter snake in 2023. This, however, does not minimize the importance of rice agriculture as an alternative wetland habitat for this conservation-reliant species (Halstead et al. 2019). It should also be noted that the Central Basin Reserve has historically had the highest proportion of sites occupied and the highest proportion of sites that are considered rice agriculture; these patterns remained evident in 2023. Because the Central Basin Reserve is dominated by rice and Fisherman's Lake Reserve is dominated by wetlands, it is difficult to fully disentangle the effects of rice cultivation habitat from geographic variation in probability of occurrence.

The lack of a strong effect of emergent vegetation on occurrence was notable in 2023. In 2021 and 2022, emergent vegetation was not found to be an important variable for explaining occurrence probability. In 2020, a negative effect of emergent vegetation on occurrence was seen, but this habitat covariate was found to have an important positive effect in 2016, 2017, and in years prior to 2014. Given the changes in study design and the range of outcomes between years, further research is required to provide a more definitive result.

Based on our years of research, our capture data indicate that emergent vegetation still provides the best habitat for giant garter snake cover from predators and higher prey concentrations. Radio-telemetry study of giant garter snake movement and habitat selection has shown that giant garter snake preferentially select tule over other vegetation types (Halstead et al. 2016). Because tule marsh is historical habitat for giant garter snake, management for emergent vegetation, particularly tule, is important.

The probability of occupancy was greatest in the Central Basin Reserve, moderate in the North Basin Reserve, and lowest in the Fisherman's Lake Reserve. Both the North Basin Reserve and Central Basin Reserve have a mix of rice and wetland habitat, whereas the Fisherman's Lake Reserve is primarily composed of recently created freshwater marsh. Notably, giant garter snake was not detected at three sites (Bennett North Central East, Bennett South East, and Lucich North 4) in the North Basin Reserve in 2023 where it had been detected in 2022.

Based on the dynamic occupancy model, the proportion of occupied wetland units on reserve lands has decreased annually by an average of 4% from 2011 through 2023. Relative to previous years, the probability that occupied sites became unoccupied (site extirpation) declined from 2022 to 2023 but was still higher than in 2019. The probability that unoccupied sites became occupied (site colonization) in 2023 was lower than in 2022, and the lowest of any monitoring year to date. The average 4% decline in occurrence was not steady, with some increases and decreases in the number of sites estimated to be occupied by giant garter snake. The decline in the number of occupied sites was especially notable from 2011 to 2013 and from 2019 to 2021. Although apparently small in

magnitude, if the long-term average decline in giant garter snake occupancy continues, it would result in only 11 (3–58) occupied sites by 2050, assuming 60 occupied sites in 2011.

One potential mechanism leading to a decrease in the proportion of sites occupied is the extreme drought conditions from 2012 to 2015 and from 2021 to 2022. According to the California Department of Water Resources, California experienced the second driest water year (October 2020–September 2021) in 2021. Although water remained on TNBC reserves during the drought, it is unknown to what extent the source of water (surface water vs. groundwater) affects giant garter snake occupancy or demography, and precipitation may influence the productivity of lower trophic levels including giant garter snake prey. Thus far, occupancy does not appear to have completely rebounded to earlier levels (e.g., 2011), but 2022 showed a clear increase after 2 years of decline in 2020 and 2021 and appears to have remained stable in 2023. This was comparable to 2019, which showed a clear increase after 4 years of stability from 2015 to 2018. The rebound in occupancy in 2019 follows 3 out of 4 years of normal to above-average rainfall (2016, 2017, and 2019). Three years of favorable rainfall in a 4-year period might not be long enough for giant garter snake to recolonize every site from which it was extirpated during the drought, but 2019 showed some positive signs of recolonization.

3.5 Effectiveness

The effectiveness of the NBHCP for conserving giant garter snake is assessed on the basis of acquisition of reserve lands; changes in the abundance or, preferably, demographic rates of giant garter snake; and land management activities to increase the distribution and health of giant garter snake in the Basin.

The primary issue affecting giant garter snake throughout its range is habitat, and the Basin is no different in this regard. Marshes that most nearly approximate natural tule marshes provide the best habitat for giant garter snake, promoting both higher densities and greater body condition than other habitats (Wylie et al. 2010). For example, a recent, long-term study of giant garter snake throughout the Sacramento Valley found that survival was positively related to the percent cover of emergent vegetation at a site (Rose et al. 2018b).

The point estimate of density of giant garter snake was approximately five times greater in created marsh habitats in the BKS tract compared to the estimates for rice and associated canals on the Sills tract, which had the sixth highest density (and second highest in abundance) estimate. Although giant garter snake has persisted in a rice agricultural landscape in the Sacramento Valley, the limited duration of rice fields as appropriate habitat (mid-May through August), the restriction of giant garter snake to structurally simple linear canals during the other 4 months of the active season, as well as fallowing of rice fields in response to drought or late spring rains in recent years likely reduces the suitability of agricultural habitats as compared to natural or well-managed created marshes. Nevertheless, rice agricultural habitats are the only agricultural habitats in which giant garter snake can persist (Halstead et al. 2010), and they provide connectivity between other patches of suitable habitat. Also, the survival rate of radio-tracked giant garter snakes has been found to be positively related to the area of active rice growing surrounding their home range (Halstead et al. 2019).

The Lucich South, Bianchi West, and Frazer South tracts had the second, third, and fourth highest density estimates, respectively, of giant garter snake in 2023, illustrating the importance of rice

agricultural habitats in the Natomas Basin, particularly in the Central Basin Reserve. Nonetheless, giant garter snake density in the Lucich North cluster of sites, which is dominated by created marsh, was lower than many rice sites and almost two orders of magnitude less than the giant garter snake density at BKS. In 2022 there were low water levels at this location, with extensive areas of mudflat or shallow, hot water between emergent vegetation and deeper water. Although water levels in the Lucich North cluster improved dramatically in 2023, there may have been a lag effect from the previous year that contributed to lower giant garter snake densities at this cluster.

TNBC has been effective in providing for the continuation of rice agriculture and creating managed marsh habitats in the Basin. Designing and managing marsh habitats to maximize the open water/emergent vegetation interface and improving water management would further benefit giant garter snake.

Managing habitat for giant garter snake is only effective insofar as adequate water is supplied to these habitats. The persistence of water adjacent to upland cover throughout the active season is important for giant garter snake, and increased water availability has been shown to be related to higher rates of survival for adult female giant garter snake (Reyes et al. 2017; Halstead et al. 2019). Drying of marshes, fallowing of rice fields for more than a year, cultivation of alternative crops (especially if accompanied by lack of water in canals), and low or fluctuating water levels in marshes reduce the availability and quality of habitat for giant garter snake. Reducing the amount of rice grown in an area has the potential to negatively affect the survival of adult giant garter snake (Halstead et al. 2019). TNBC has created managed marsh habitats that can provide relatively persistent aquatic habitat throughout the year if water levels are maintained to provide aquatic foraging and escape habitat next to, and importantly, maintained below basking sites and upland refugia. Flooding of upland refugia and basking sites is detrimental to giant garter snake and renders otherwise suitable habitat unsuitable.

Another important component of giant garter snake habitat is refuge from predators and environmental extremes. Mammal burrows, lodges, and crayfish burrows offer important refugia for giant garter snakes and should be maintained in association with marshes and canals to the maximum extent practical. Unless burrows threaten the integrity of the berms and levees required to maintain water in marshes or canals, or they present a major hazard to humans or livestock, they should be maintained in abundance. Muskrats (*Ondatra zibethicus*), California ground squirrels (*Otospermophilus beecheyi*), and crayfish (*Cambarus* spp.) likely improve habitat quality for giant garter snakes by providing refugia in the form of burrows; muskrats further enhance habitat suitability by constructing lodges and reducing the density of cattails (thereby promoting the emergent vegetation/open water interface) through their foraging activity. Similar to muskrat lodges, tule thatch that accumulates naturally in mature tule marshes (like BKS) may also serve as important refuge from predators and temperature extremes and should be maintained in abundance. Giant garter snakes have been found to actively select tule over other microhabitats available in their environment (Halstead et al. 2016).

Overall, giant garter snake populations in the Central Basin Reserve appear healthy. Fewer individuals were captured in the North Basin Reserve, and no giant garter snakes have been captured in the Fisherman's Lake Reserve since 2017 (Table 3-10). Conversion of additional habitats to created marshes and maintaining proper water levels in the marshes would undoubtedly benefit giant garter snake in the long term, and maintenance of rice agriculture will help achieve connectivity, prey production, high adult survival in canals adjacent to rice fields, and other conservation goals. Continuing to minimize ground disturbance, ensuring aquatic habitat is available

in the spring for foraging upon emergence from winter refuges (Halstead et al. 2019) and maintaining stable, high water levels throughout the active season will also enhance the quality of existing habitats for giant garter snake. Lowering water levels in the early fall may also help to concentrate prey prior to giant garter snake hibernation; the effectiveness of this practice as a management strategy warrants further investigation.

3.6 Recommendations

- Maintain and encourage the expansion of emergent vegetation (primarily tule) to maximize the emergent vegetation/open water interface in wetlands and canals. Giant garter snake selection for tules is stronger than the species' selection of other aquatic vegetation (Halstead et al. 2016).
- Maximize the open water/emergent vegetation interface that increases the probability of occurrence of giant garter snake and has been shown in other studies (Valcarcel 2011) to be positively selected by individual giant garter snakes. Maintaining emergent vegetation at wetland edges, clumps of vegetation in open water, and pockets of open water in stands of emergent vegetation would likely benefit giant garter snake. Importantly, managing to maximize the open water/emergent vegetation interface includes ensuring that water levels are high enough that snakes can forage and escape predators immediately below and adjacent to the emergent vegetation.
- Continue to encourage rice agriculture as an important alternative habitat to tule marshes and to improve habitat connectivity between managed marshes.
- Continue to control mosquito fern and other floating aquatic vegetation where possible. Giant garter snake tends to avoid mosquito fern and other floating aquatic vegetation when it occurs at high densities (U.S. Geological Survey unpublished data), despite apparent positive selection at low densities (Halstead et al. 2016)[11].
- Maintain herbaceous terrestrial bankside vegetation to provide cover for giant garter snake when in terrestrial habitats (Halstead et al. 2016). Minimize mowing during the active season near the edge of marshes to the extent practicable to provide tall grasses for snakes to hide in when moving between aquatic and terrestrial habitats.
- To the extent possible, avoid rapid changes in water levels during giant garter snake's inactive season (October through March) to avoid disturbance to hibernating individuals, and restrict changes in water levels to the minimum number of fluctuations possible.
- Maintain as many muskrat burrows, crayfish burrows, and burrows of California ground squirrel and other small mammals as feasible to provide giant garter snakes abundant summer refuges and winter hibernacula (Halstead et al. 2015). Muskrat lodges also provide potential hibernation, basking, and shelter sites.
- Ensure aquatic habitat is available in wetlands and canals by keeping marsh complexes flooded to design specifications and consistent with Site-Specific Management Plans. If draw down in winter is necessary, ensure marsh complexes are fully flooded by early March when giant garter snakes emerge from burrows and begin foraging. Snake body condition (body mass relative to length) is low at this critical point in the year (Coates et al. 2009), when individuals' energy

[11] Apparent selection of floating aquatic vegetation at low densities is likely an artifact of these vegetation types accumulating along the edges of water, where giant garter snakes forage (Halstead et al. 2016).

reserves are depleted from a long period of overwintering. Likely as a result of poor body condition, the risk of mortality is high for giant garter snake during this time of year (Halstead et al. 2019). Having aquatic habitat available for giant garter snake to forage in during the early spring would likely lead to higher survival rates.

- Continue to minimize management activities in marsh habitats to the extent practicable to minimize disturbance. When wetlands must be drained during the giant garter snake active season, it should be done slowly in the late summer (August or September) to more nearly approximate the historical drying cycle of natural wetlands in the Central Valley. Doing so may provide giant garter snake with an abundance of stranded prey and an important source of energy reserves for hibernation. Try to reflood wetlands as soon as possible and maintain stable water levels throughout the hibernation period.
- Attempt to maintain substantial aquatic habitat adjacent to marsh units drained for maintenance to ensure adequate habitat is available to giant garter snake that might be affected by marsh maintenance activities.
- When excavating marshes during maintenance activities, ensure that slopes are gentle enough for snakes to free themselves from excavated channels. If slopes are too steep, snakes will be trapped. If slopes must be steep, provide periodic (i.e., every 50 meters) shallower slopes that allow entrapped snakes to exit the channel.
- Minimize channel-clearing activities to the extent practicable. Clearing water conveyance channels temporarily degrades giant garter snake foraging habitat.

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Table 3-1. Summary of Giant Garter Snake Captures and Sampling Effort at Natomas Basin Conservancy Reserves, 2023.

Reserve Area and Reserve	Number of Giant Garter snakes		Dates Trapped (2023)	Total Trap Days
	Individuals	Captures		
North Basin				
Bennett North Central West (wetland)	0	0	23 Jul – 13 Aug	1050
Bennett North Central (wetland)	4	5	24 May – 16 Jun	1050
Bennett North Central East (wetland)	0	0	15 Jun – 10 Jul	1050
Bennett North (rice)	0	0	10 Jul – 31 Jul	1000
Bennett South East (canal)	0	0	25 May – 17 Jun	1050
Bolen North	0	0	1 Jul – 24 Jul	1050
Frazer North Wetland Central	0	0	11 Jun – 6 Jul	1049
Frazer North Wetland Southeast	4	4	8 Jun – 1 Jul	1049
Huffman West	3	4	24 Jul – 14 Aug	1050
Lucich North South 1	1	1	20 Jun – 13 Jul	1050
Lucich North South2	0	0	22 Jun – 15 Jul	1049
Lucich North East	1	1	13 Jul – 3 Aug	1000
Lucich North Northeast	0	0	10 Aug – 31 Aug	1050
Lucich North Northeast 2	0	0	17 Jun – 12 Jul	1050
Lucich North 4	0	0	16 Aug – 31 Aug	748
Lucich South North (rice)	5	14	31 Jul – 21 Aug	1048
Lucich South South (rice)	0	0	19 May – 11 Jun	884
Lucich South 3	11	19	15 Jul – 5 Aug	1049
Nestor East	14	24	17 Jul – 7 Aug	1048
Ruby Ranch	0	0	8 Aug – 29 Aug	1050
TNBC5	0	0	4 Aug – 25 Aug	1050
TNBC6	0	0	26 May – 18 Jun	1050
Central Basin				
Bianchi West	19	35	25 Jun – 18 Jul	1047
BKS North Central	16	20	4 May – 25 May	1050
BKS Southwest Central	24	27	7 Jul – 28 Jul	1050
BKS2	3	3	3 May – 24 May	1049
BKS3	5	10	3 May – 24 May	1050
Frazer South North	21	37	28 Jul – 18 Aug	1050
Sills4	17	27	30 May – 24 Jun	1019
Sills5	22	34	4 May – 27 May	1048
Sills6	3	6	9 Jun – 7 Jul	1046
Tufts3	0	0	21 Jun – 14 Jul	1050
Fisherman's Lake				
Cummings East	0	0	29 Jul – 19 Aug	1050
Cummings East Central	0	0	4 Aug – 25 Aug	1047
Cummings West	0	0	8 Jul – 29 Jul	1050

Table 3-1. Continued

Reserve Area and Reserve	Number of Giant Garter snakes		Dates Trapped (2023)	Total Trap Days
	Individuals	Captures		
Natomas Farms North	0	0	14 Jul – 4 Aug	1050
Natomas Farms 1	0	0	13 Jun – 8 Jul	1050
Rosa Central	0	0	30 May – 22 Jun	1050
Rosa Central South	0	0	14 Aug – 31 Aug	849
Anne Rudin Preserve	0	0	7 May – 28 May	1050
Total	**166**	**271**	**3 May – 31 Aug**	**41,179**

Note: Some snakes were captured at multiple sites. The number of giant garter snake individuals in each row describes the unique individuals at each site, and the total describes the number of unique individuals across all sites.

Table 3-2. Prior Probabilities for Parameters of Single-Season Occupancy Models for Giant Garter Snake on Natomas Basin Conservancy Reserve Properties, 2023.

Component	Parameter	Uninformative priors
Detection	β_0	*N(0,1.648)*
	β_{temp}	*N(0,1.648)*
	β_{date}	*N(0,1.648)*
	σ_{site}	*U(0,10)*
Occupancy	β_0	*N(0,1.648)*
	β_{rice}	*N(0,1.648)*
	$\beta_{em.vegergent}$	*N(0,1.648)*
	$\beta_{fl.veg}$	*N(0,1.648)*
	$\beta_{open.water}$	*N(0,1.648)*
	$\beta_{terr.veg}$	*N(0,1.648)*
	β_{north}	*N(0,1.648)*
	$\beta_{central}$	*N(0,1.648)*
	β_{south}	*N(0,1.648)*

Table 3-3. Posterior Distributions for Capture Parameters of Closed Abundance Model of Giant Garter Snake in the Natomas Basin, 2023.

Model Component	Parameter	Median (95% CI)
Capture	p_0	0.008 (0.003–0.023)
	α_{temp}	0.298 (0.120–0.482)
	α_{SVL}	0.064 (-0.190–0.333)
	α_{sex}	-0.266 (-0.787–0.258)
	α_{behav}	1.529 (0.903–2.096)
	σ_{site}	0.963 (0.459–2.158)
	σ_{ind}	0.487 (0.112–0.912)
	σ_{day}	0.648 (0.405–0.902)

Table 3-4. Summary of Giant Garter Snake Captures and Abundance Estimates, 2023.

Site	Indiv	Cap	*N*	Trap Days	Shoreline Sampled (kilometers)
Bennett North	4	5	22 (12–36)	4,150	1.84
Bianchi West	19	35	32 (23–48)	1,047	0.67
BKS	68	97	115 (82–172)	5,249	3.25
Huffman West	3	4	23 (13–36)	1,050	0.79
Lucich North	19	30	34 (25–50)	9,093	6.75
Lucich South	16	33	27 (19–41)	2,981	2.36
Sills	37	67	63 (48–93)	4,163	2.28
Total	**166**	**271**	**316 (242–461)**	**27,733**	**17.94**

Table 3-5. Density Estimates of Giant Garter Snake by Site and Habitat Type, 2018–2023.

Site	Habitat	2018	2019	2020	2021	2022	2023
Bennett North	Canal	0	0	0	0	--	0
Bennett South	Canal	2.3 (0.9–5.6)	1.8 (0.6–5.5)	0.8 (0.1–5.8)	0	0	0
Bianchi West	Canal	2.3 (0.4–12.1)	12.9 (5.4–30.8)	--	--	--	22.9 (14.7–35.6)
BKS	Canal	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bolen North	Canal	0	0	0	--	0	0
Elsie	Canal	8.7 (4.0–19.1)	0	0.3	0.6 (0.0–8.1)	0	--
Frazer South	Canal	4.3 (1.5–12.5)	8.2 (3.7–18.0)	9.7 (4.2–22.0)	3.8 (1.7–8.3)	14.0 (6.6–29.7)	13.8 (8.8–21.8)
Huffman West	Canal	0.8 (0.1–8.7)	0	0	1.5 (0.4–6.0)	1.8 (0.2–13.5)	2.3 (0.7–7.3)
Lucich South	Canal	2.5 (0.9–7.0)	5.1 (2.1–12.5)	0	1.1 (0.1–12.9)	4.7 (1.4–15.6)	2.9 (1.1–7.6)
NACONN	Canal	0	0	0	0	0	--
Nestor East	Canal	8.9 (5.3–15.0)	8.2 (4.4–15.4)	9.6 (4.5–20.6)	3.9 (1.8–8.5)	5.3 (1.8–15.3)	8.2 (4.9–13.6)
Rosa Central	Canal	0	0	0	0	0	0
Ruby Ranch	Canal	0	0	0	0	0	0
Sills	Canal	14.6 (11.0–19.4)	11.4 (7.7–16.8)	14.1 (8.8–22.6)	7.1 (4.8–10.4)	15.6 (9.4–25.9)	6.7 (4.4–10.2)
Vestal	Canal	0	0	--	--	0	0
Tufts	Canal	1.1 (0.1–8.1)	1.8 (0.4–9.2)	0	0	0	0
Bennett North	Wetland	0	0.4 (0.0–9.4)	0	0	1.7 (0.2–12.0)	<0.1
BKS	Wetland	38.3 (31.3–46.9)	54.3 (45.0–65.5)	58.3 (41.8–81.2)	53.8 (41.5–69.9)	29.1 (16.1–52.4)	34.5 (25.2–47.3)
Cummings	Wetland	0	0	0	0	0	0
Frazer North	Wetland	0.9	1.7 (0.5–5.2)	0	0	1.7 (0.2–12.7)	3.8 (1.2–12.1)
Lucich North	Wetland	3.4 (2.0–5.6)	5.0 (2.9–8.4)	2.7 (1.0–7.5)	2.8 (0.9–8.7)	1.3 (0.3–6.0)	<0.1
Lucich South	Wetland	0.1	4.2 (0.6–31.5)	6.8 (1.5–20.6)	0	17.8 (6.1–52.0)	23.4 (11.5–47.6)
Natomas Farms	Wetland	0	1.3 (0.2–8.7)	0	0	0	0
SAFCA	Wetland	0	0	5.4 (1.5–19.6)	1.1 (0.3–3.4)	--	0

Values are mean estimates followed by 95% confidence intervals in parentheses. For three entries, the model could not estimate the 95% confidence interval and only the mean is presented. An entry of "--" indicates the site was not trapped in that year.

Table 3-6. Posterior Summaries for Parameters from the Robust-Design CMR Model, 2018–2023.

Model component	Parameter	Median (95% CI)
Recapture	p	0.011 (0.005–0.030)
	β_{wt}	0.27 (0.16–0.37)
	σ_{site}	0.68 (0.26–1.99)
	σ_{year}	0.34 (0.14–0.62)
Survival	φ_{female}	0.52 (0.38–0.67)
	φ_{male}	0.51 (0.37–0.68)
	σ_{φ}	0.83 (0.39–1.64)
Availability	γ_{female}	0.63 (0.45–0.85)
	γ_{male}	0.33 (0.11–0.78)
	σ_{γ}	0.55 (0.02–1.80)

Table 3-7. Posterior Model Probabilities for Probability of Occurrence of Giant Garter Snake Based on Habitat on Natomas Basin Conservancy Reserves, 2023.

Explanatory Variable					
Rice	Emergent Vegetation	Floating Aquatic Vegetation	Open Water	Terrestrial Vegetation	Posterior Probability
0	0	0	0	0	0.102
0	0	0	0	1	0.086
1	0	0	0	1	0.077
0	1	0	0	0	0.056
1	1	0	0	0	0.052
0	0	1	0	0	0.051

Notes: "1" indicates that the variable was included in the model.
"0" indicates that the variable was left out of the model.
Only those models with posterior probability >0.05 and the null model are presented in the table.

Table 3-8. Posterior Distributions for Parameters of the Final Single-Season Occupancy Habitat Model for Giant Garter Snake on Natomas Basin Conservancy Reserve. Properties, 2023

Model Component	Parameter	Posterior Probability
Detection	μ_p	0.334 (0.132–0.532)
	p*	0.999 (0.949–>0.999)
	α_0	-0.691 (-1.811–0.186)
	α_{temp}	0.541 (0.234–0.839)
	α_{date}	-0.118 (-0.850–0.591)
	σ_{site}	1.535 (0.827–2.666)
Occurrence	$\psi_{North\ wetlands}$	0.353 (0.106–0.674)
	$\psi_{Central\ wetlands}$	0.877 (0.49–0.988)
	$\psi_{Fisherman's\_Lake\ wetlands}$	0.078 (0.006–0.398)
	β_{North}	-0.354 (-2.3–1.609)

Model Component	Parameter	Posterior Probability
	$\beta_{Central}$	2.291 (-0.013–4.537)
	$\beta_{Fisherman's\_Lake}$	-2.238 (-4.685–0.058)
	β_{rice}	0.411 (-2.695–3.252)
	ψ_{all}	0.508 (0.12–0.919)
	N_{occ}	18 (17–22)

Note: Posterior distributions are represented by the posterior median and symmetric 95% credible interval.

Table 3-9. Posterior Model Probabilities for Effects of Habitat on Dynamic Occupancy of Giant Garter Snake on Natomas Basin Conservancy Reserves, 2011–2023.

Explanatory Variable					
Emergent Vegetation	Terrestrial Vegetation	Floating Aquatic Vegetation	Submerged Aquatic Vegetation	Rice	Posterior Probability
0	0	0	0	0	0.2513
0	1	0	0	1	0.2428
0	0	0	0	1	0.0935

Notes: "1" indicates that the variable was included in the model.
"0" indicates that the variable was left out of the model.
Only those models with posterior probability >0.05 are presented in the table.

Table 3-10. Sampling and Capture History of Giant Garter Snake in the Fisherman's Lake Reserve Area 2005-2023.

Year	Cummings	Natomas Farms	Fisherman's Lake	AKT	Sharma	Natomas Farms West
2005	0	2	4	na	na	na
2006	1	2	5	na	na	na
2007	1	2	0	na	na	na
2008	0	0	18	na	na	na
2009	0	0	15	na	na	na
2010	1	0	8	na	na	na
2011	1	1	2	na	na	na
2012	1	0	1	na	na	na
2013	1	0	1	na	na	na
2014	0	1	4	na	na	na
2015	0	0	1	0	0	0
2016	0	0	1	1	0	0
2017	0	0	2	0	0	0
2018	0	0	na	0	0	0
2019	0	1	na	0	0	0
2020	0	0	na	na	0	3
2021	0	0	na	1	0	2
2022	0	0	na	na	na	na
2023	0	0	na	0	na	na

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FIGURE 3-1
Giant Gartersnake (*Thamnophis gigas*)

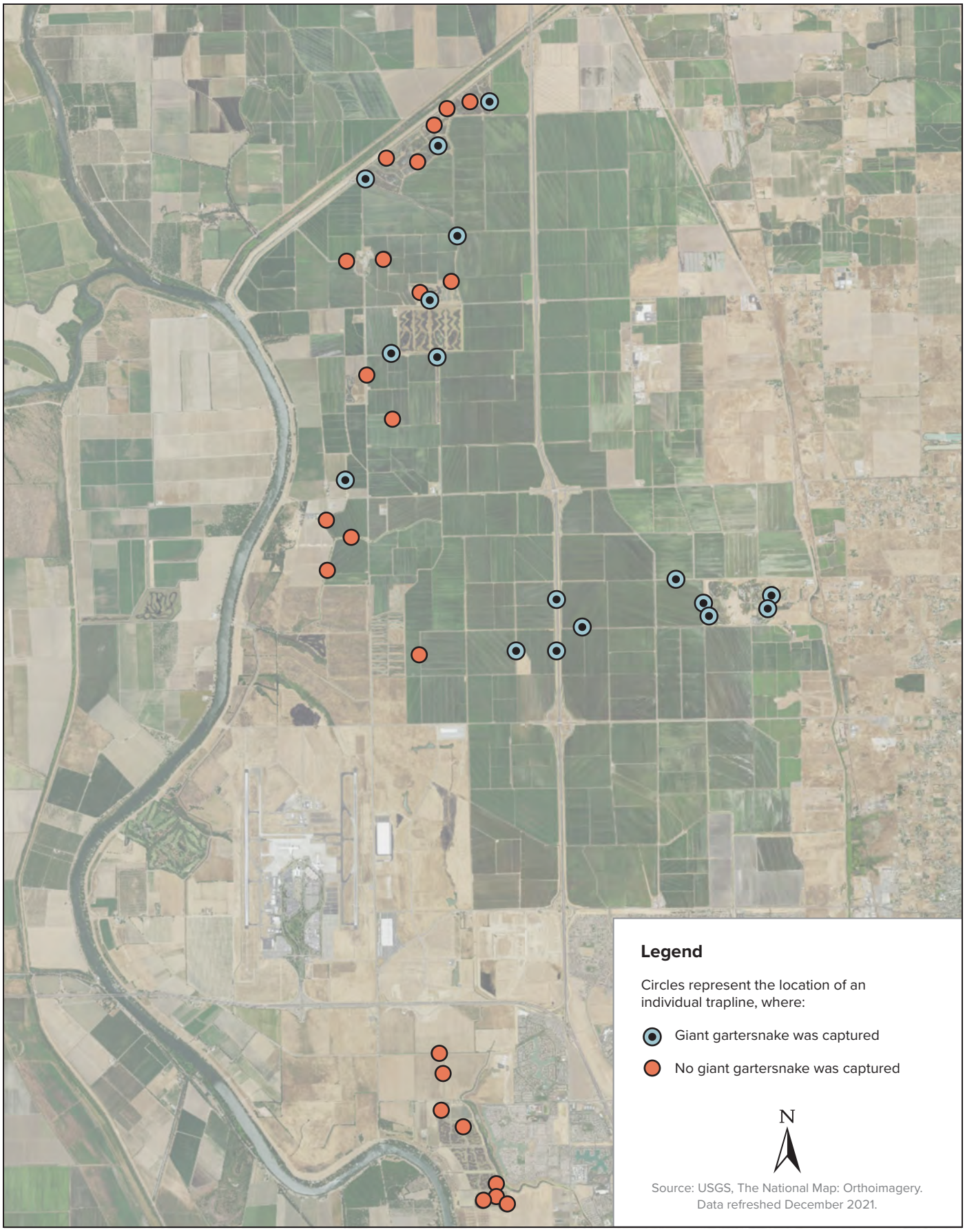

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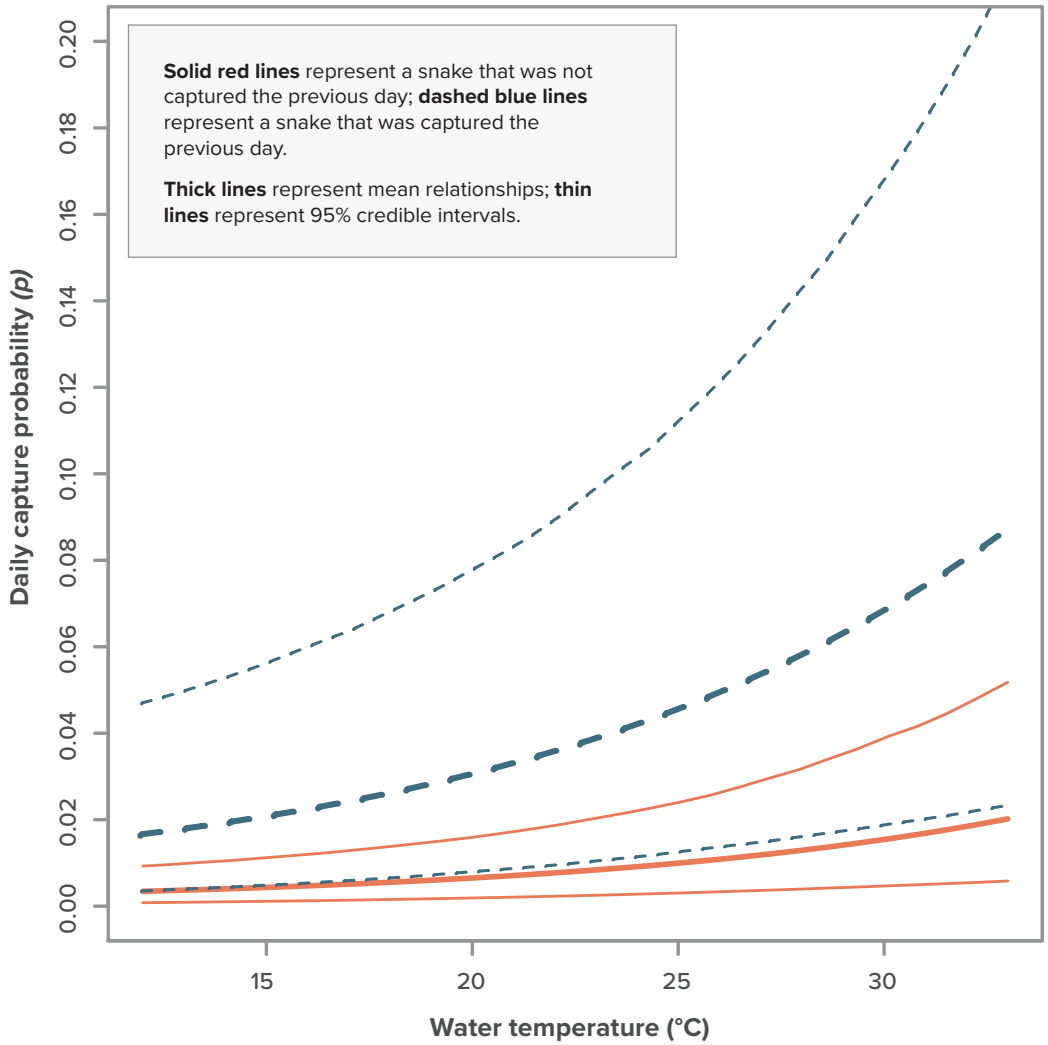
FIGURE 3-2
Areas Sampled for Giant Gartersnake, and Sites Where Giant Gartersnake Was Captured in the Natomas Basin in 2023



NBC 104332 2-16-2024) TG

FIGURE 3-3
Model Averaged Effect of an Ephemeral Behavioral Response and Water Temperature on Giant Gartersnake Capture Probability in the Natomas Basin in 2023

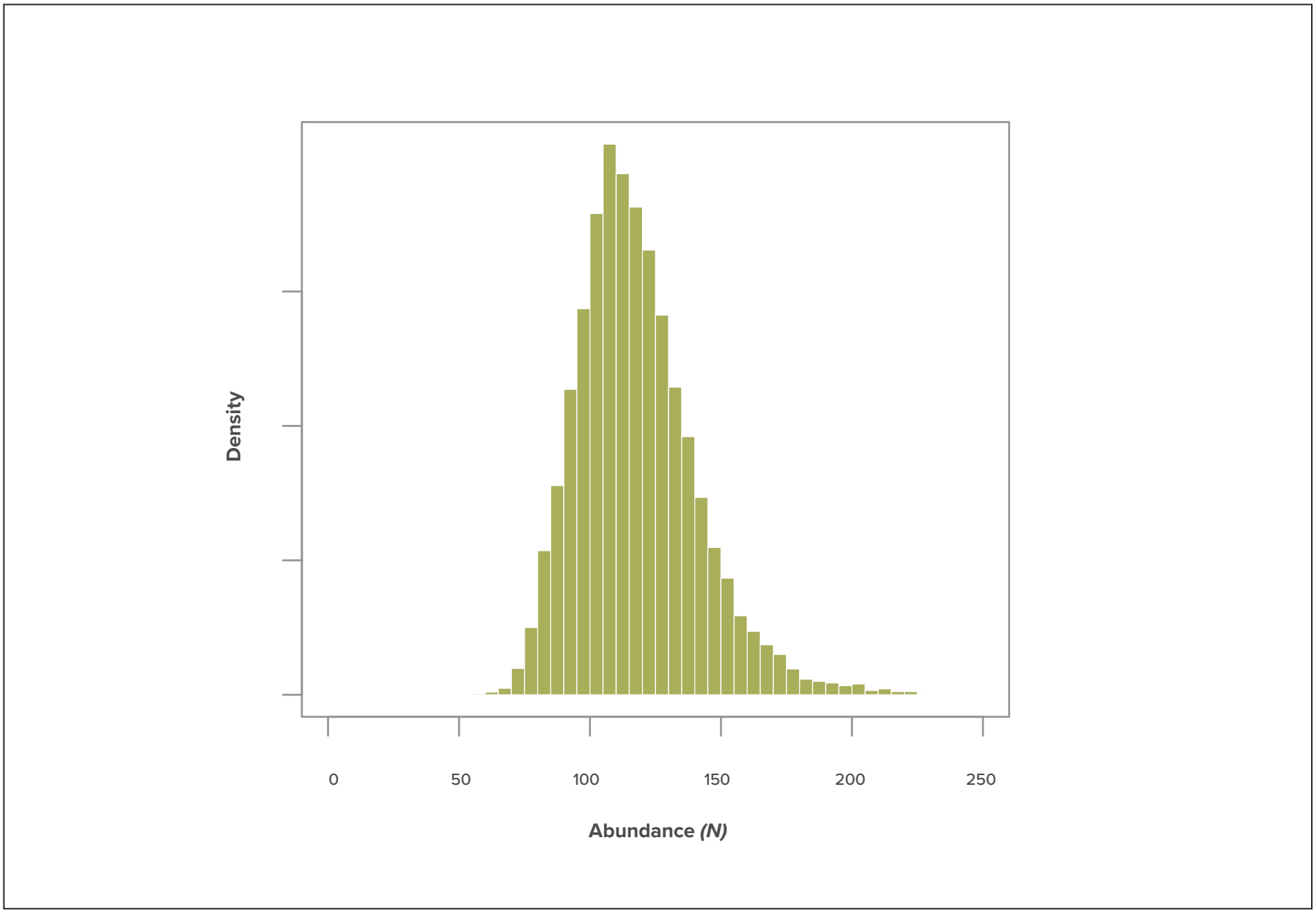


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FIGURE 3-4
Posterior Distribution of Estimated Giant Gartersnake Abundance in the Sampled Area at BKS Based on Closed Population Models in 2023

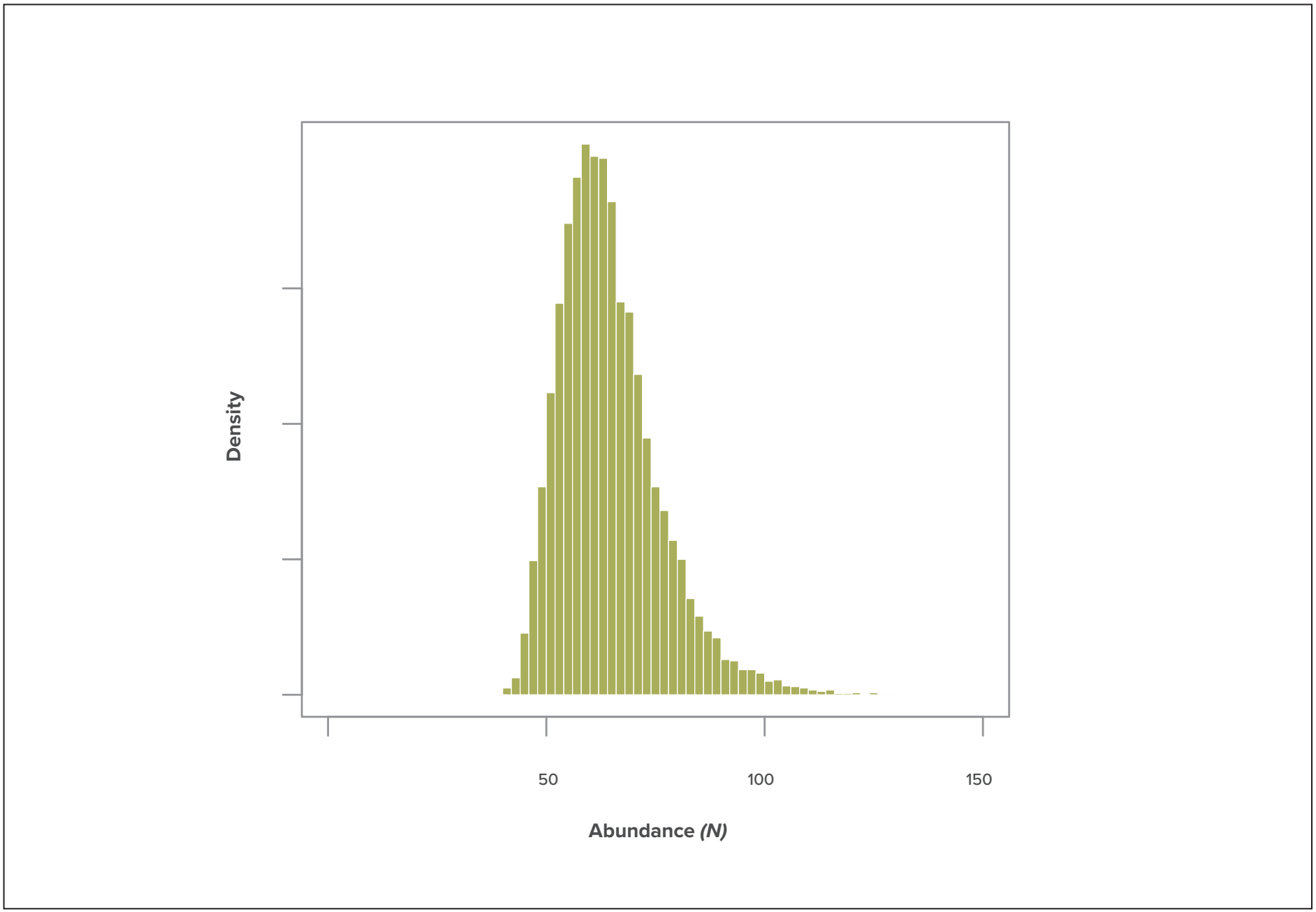

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FIGURE 3-5
Posterior Distribution of Estimated Giant Gartersnake Abundance in the Sampled Area at Sills Based on Closed Population Models in 2023

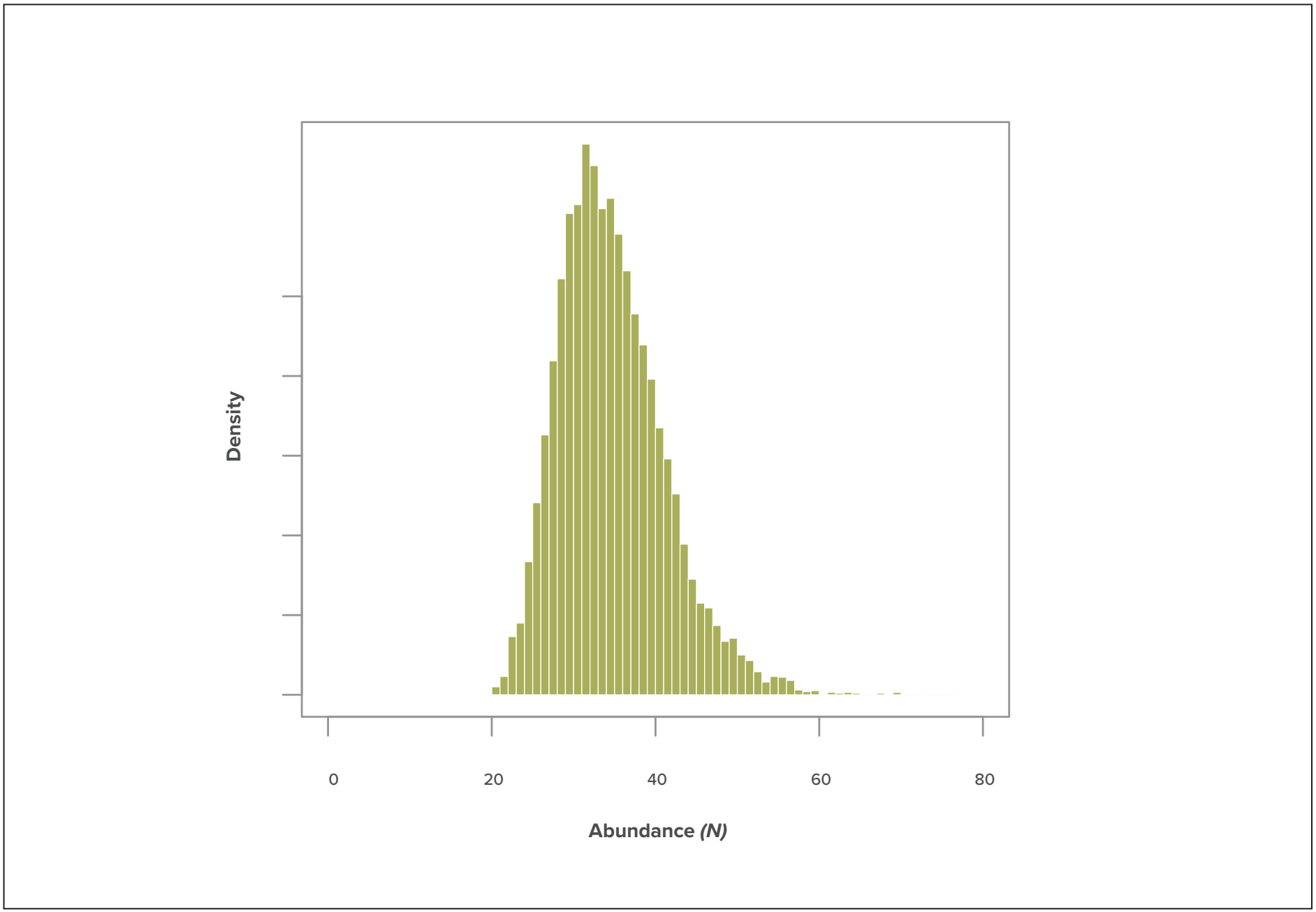

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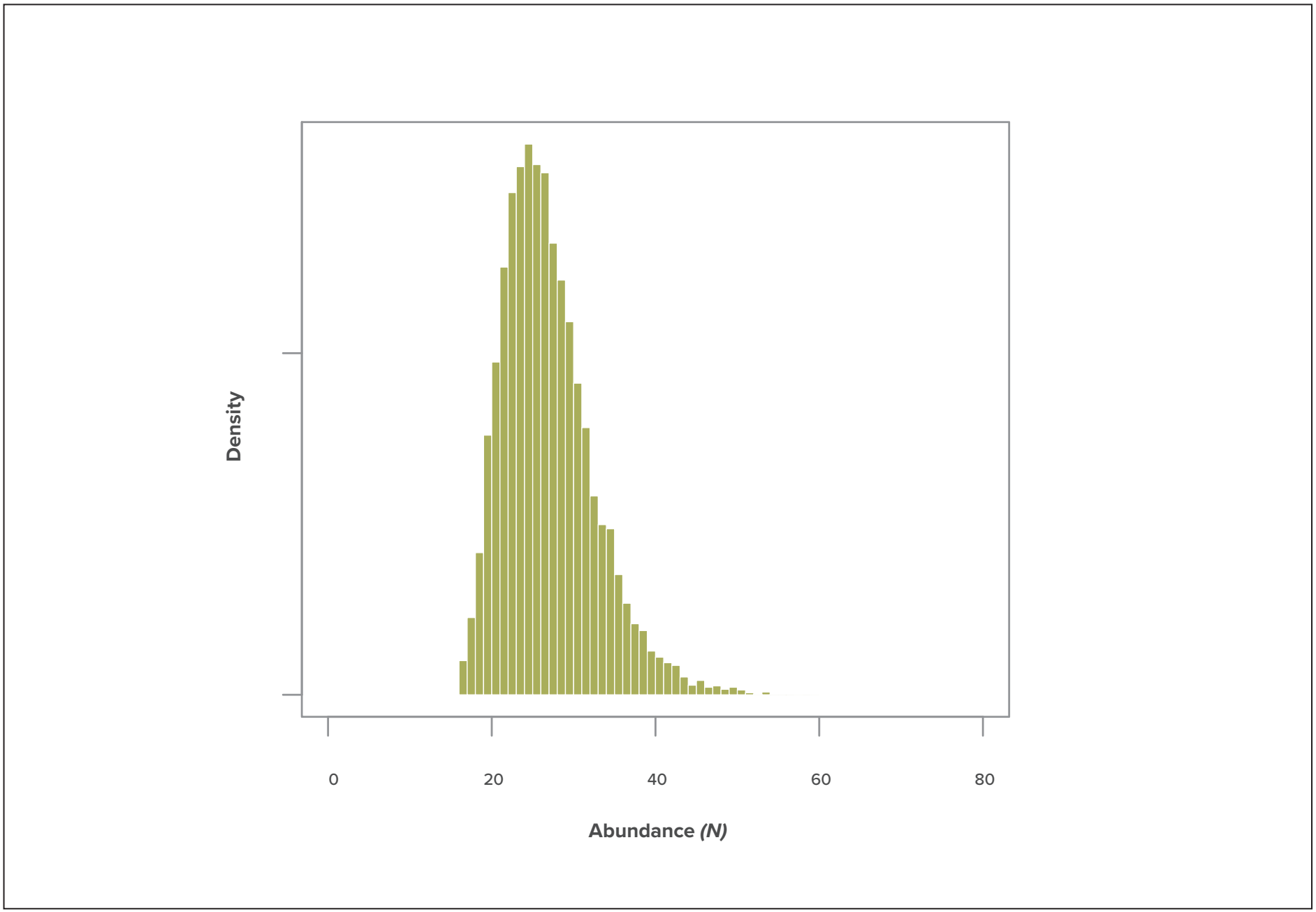
FIGURE 3-6
Posterior Distribution of Estimated Giant Gartersnake Abundance in the Sampled Area at Lucich North Based on Closed Population Models in 2023



NBC 104332 2023 (2-18-2024) TG

FIGURE 3-7
Posterior Distribution of Estimated Giant Gartersnake Abundance in the Sampled Area at Lucich South Based on Closed Population Models in 2023

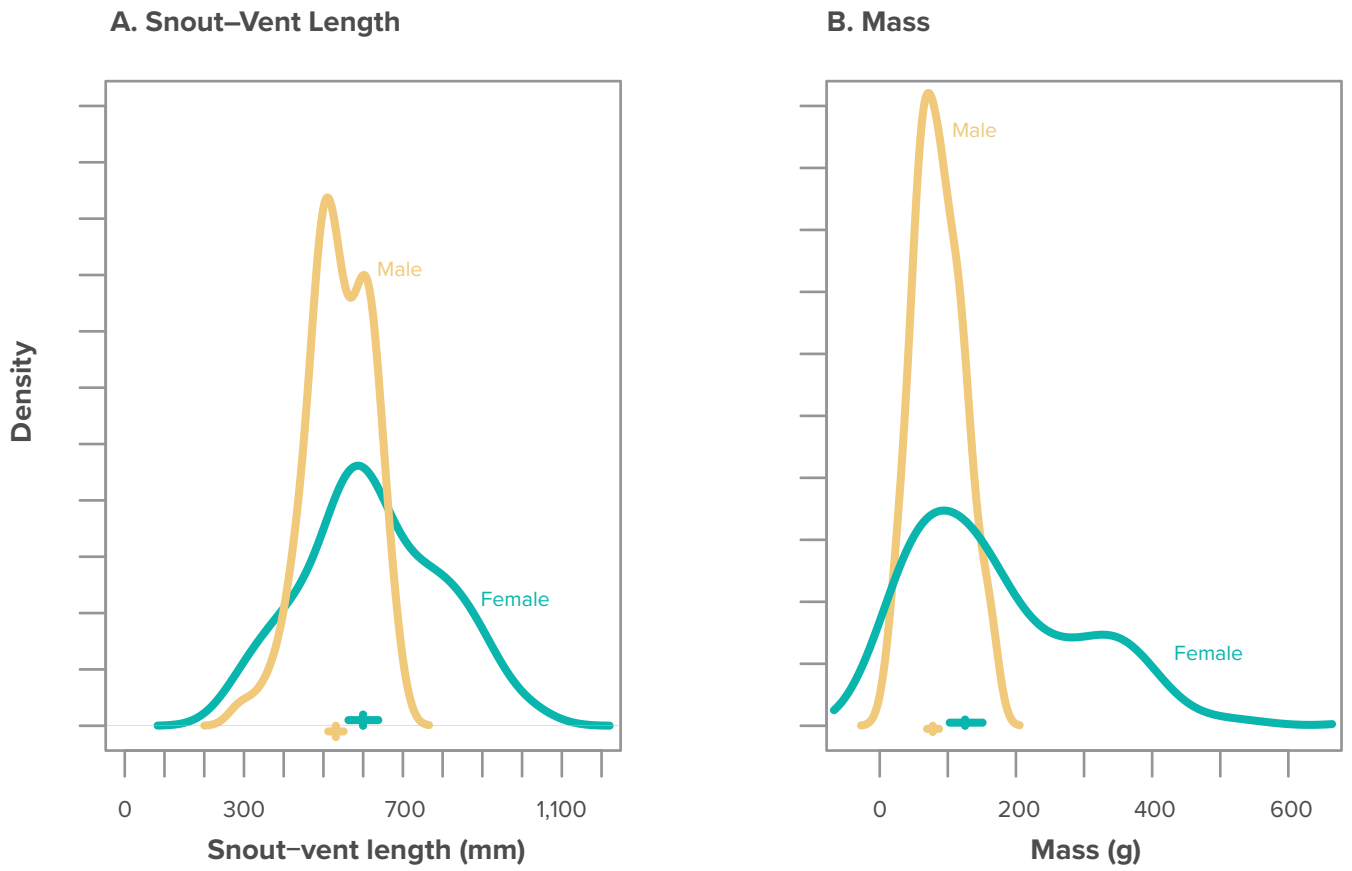


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FIGURE 3-8
Distribution of Male and Female
Snout-Vent Length (A) and Mass (B) in the Natomas Basin, 2023

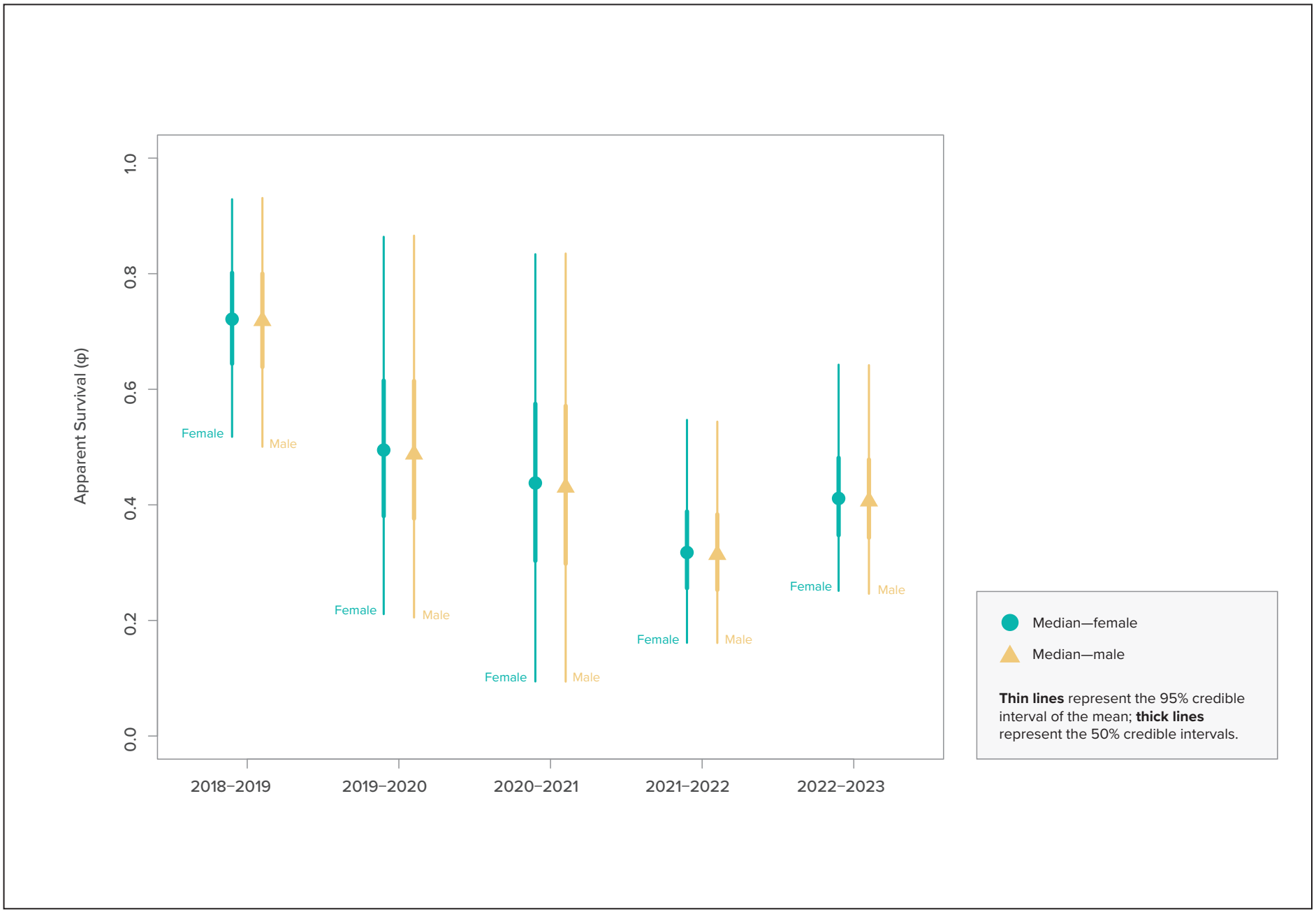

FIGURE 3-9

Posterior Distribution of Estimated Giant Gartersnake Survival in the Sampled Area at BKS Based on Spatially-Explicit Capture-Recapture Models, 2018–2023

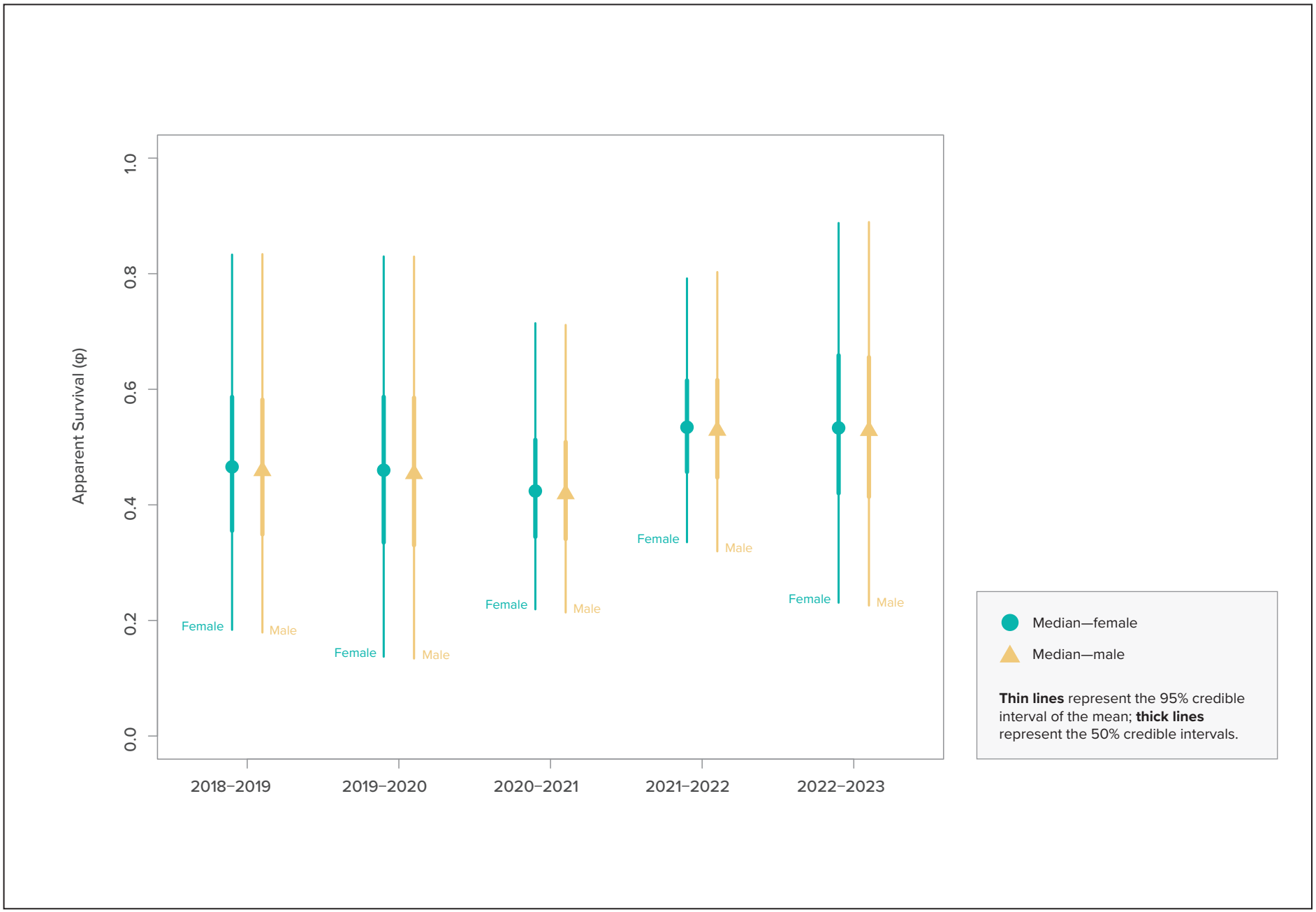

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FIGURE 3-10

Posterior Distribution of Estimated Giant Gartersnake Survival in the Sampled Area at Lucich North Based on Spatially-Explicit Capture-Recapture Models, 2018–2023

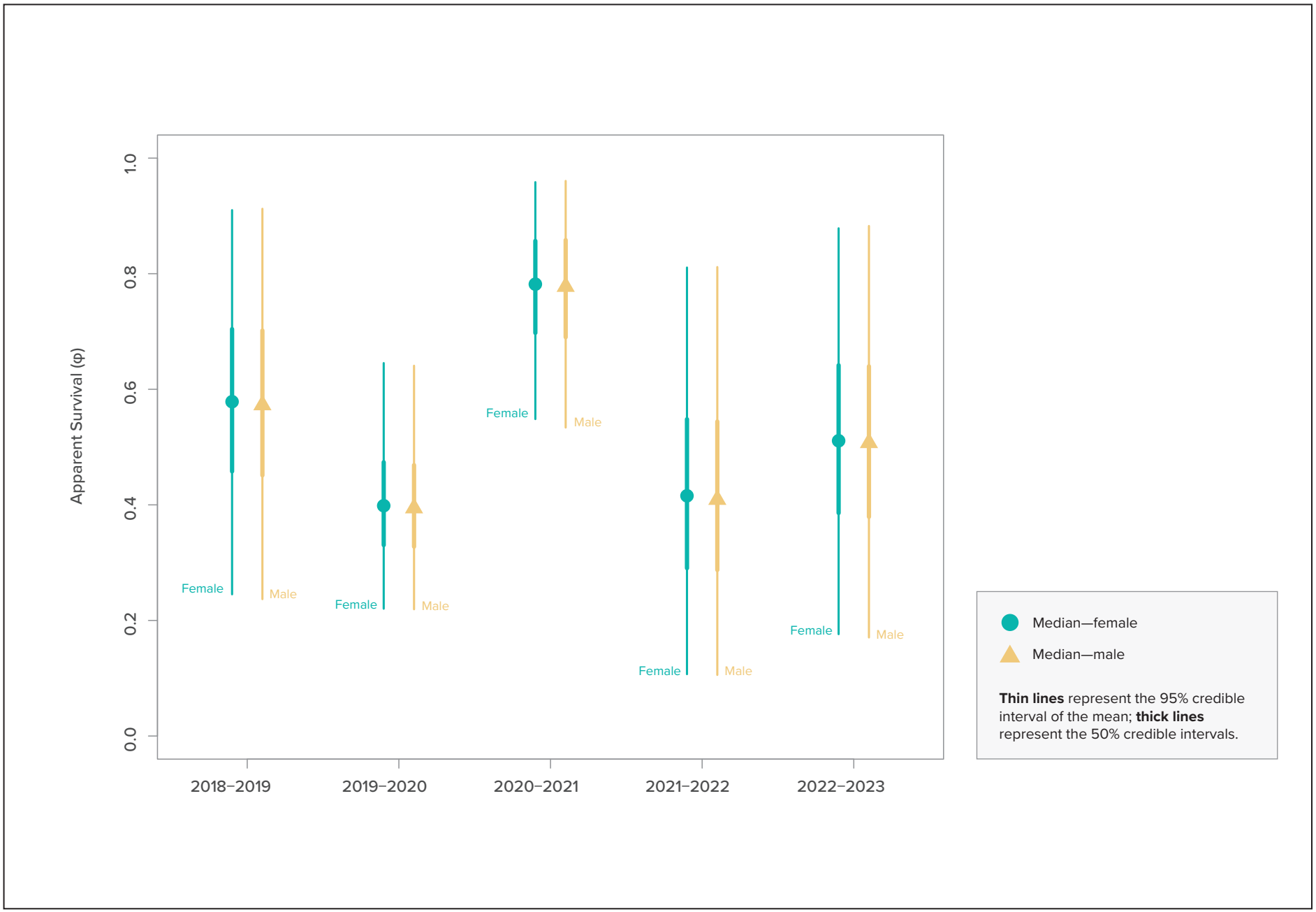

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FIGURE 3-11

Posterior Distribution of Estimated Giant Gartersnake Survival in the Sampled Area at Sills Based on Spatially-Explicit Capture-Recapture Models, 2018–2023

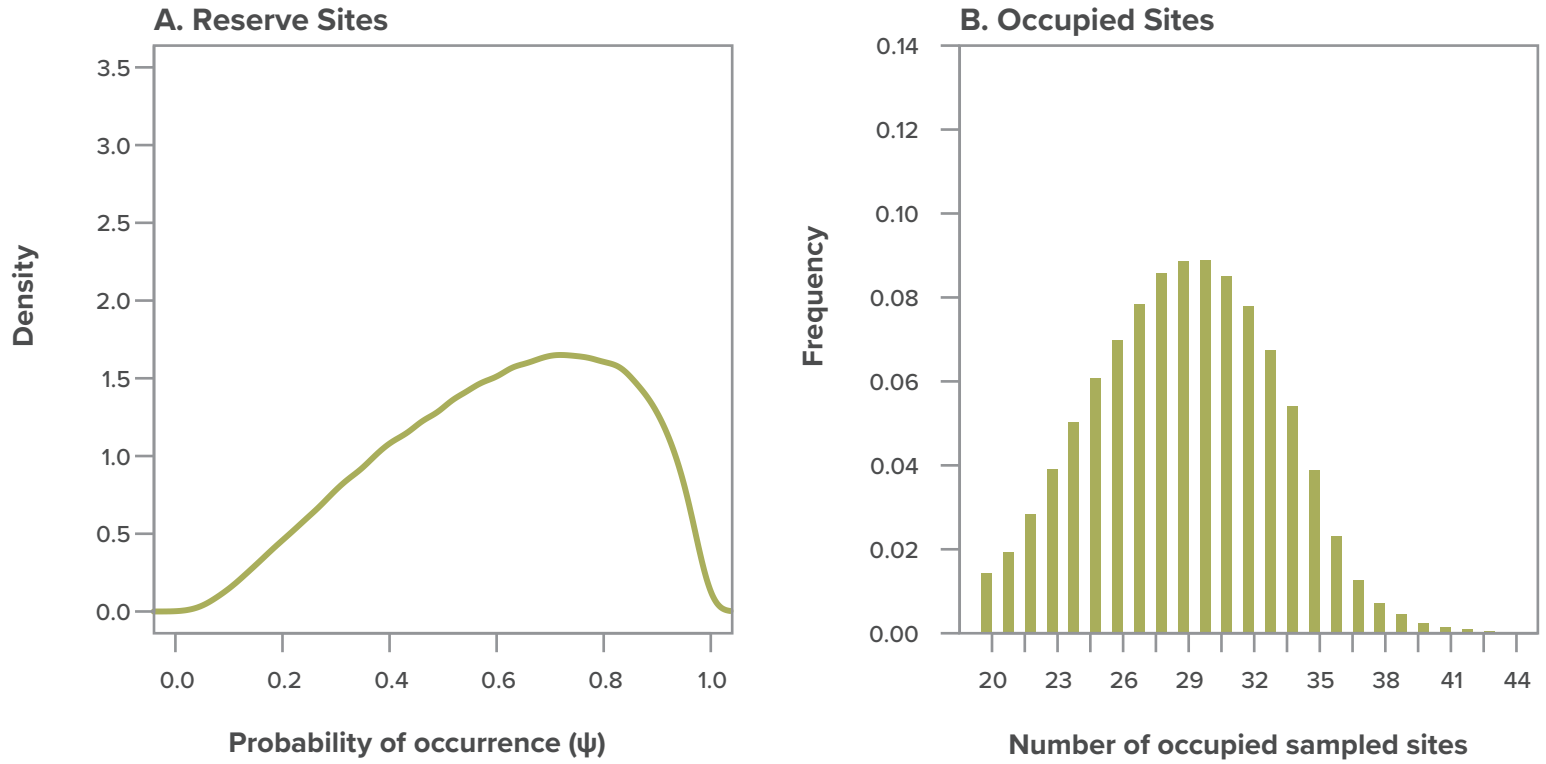

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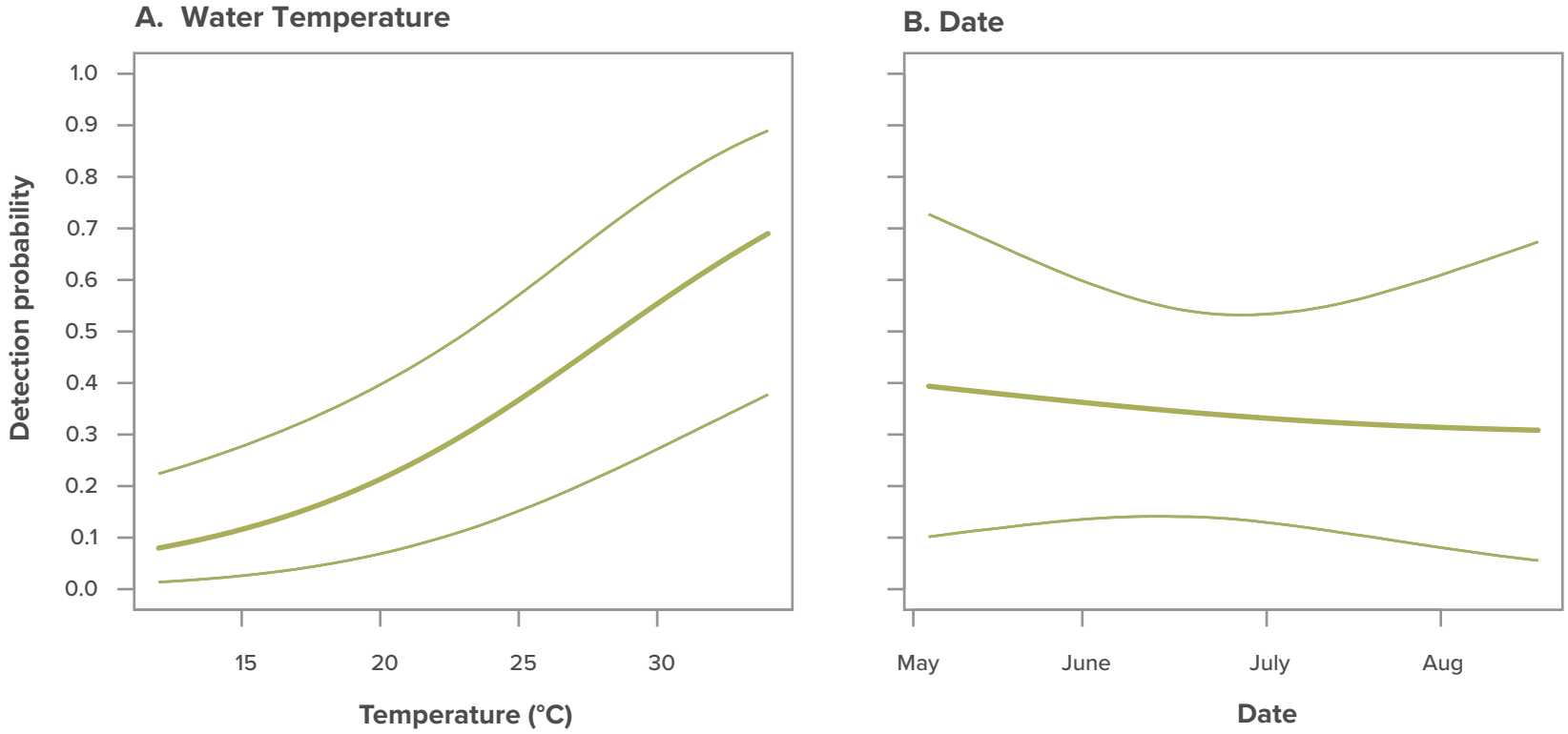
FIGURE 3-12

Proportion of Reserve Sites Occupied (A) and Number of Occupied Sites (B) Based on Static Occupancy Models for the Natomas Basin, 2023



Thick lines represent the median detection probability;
thin lines represent 95% credible intervals.

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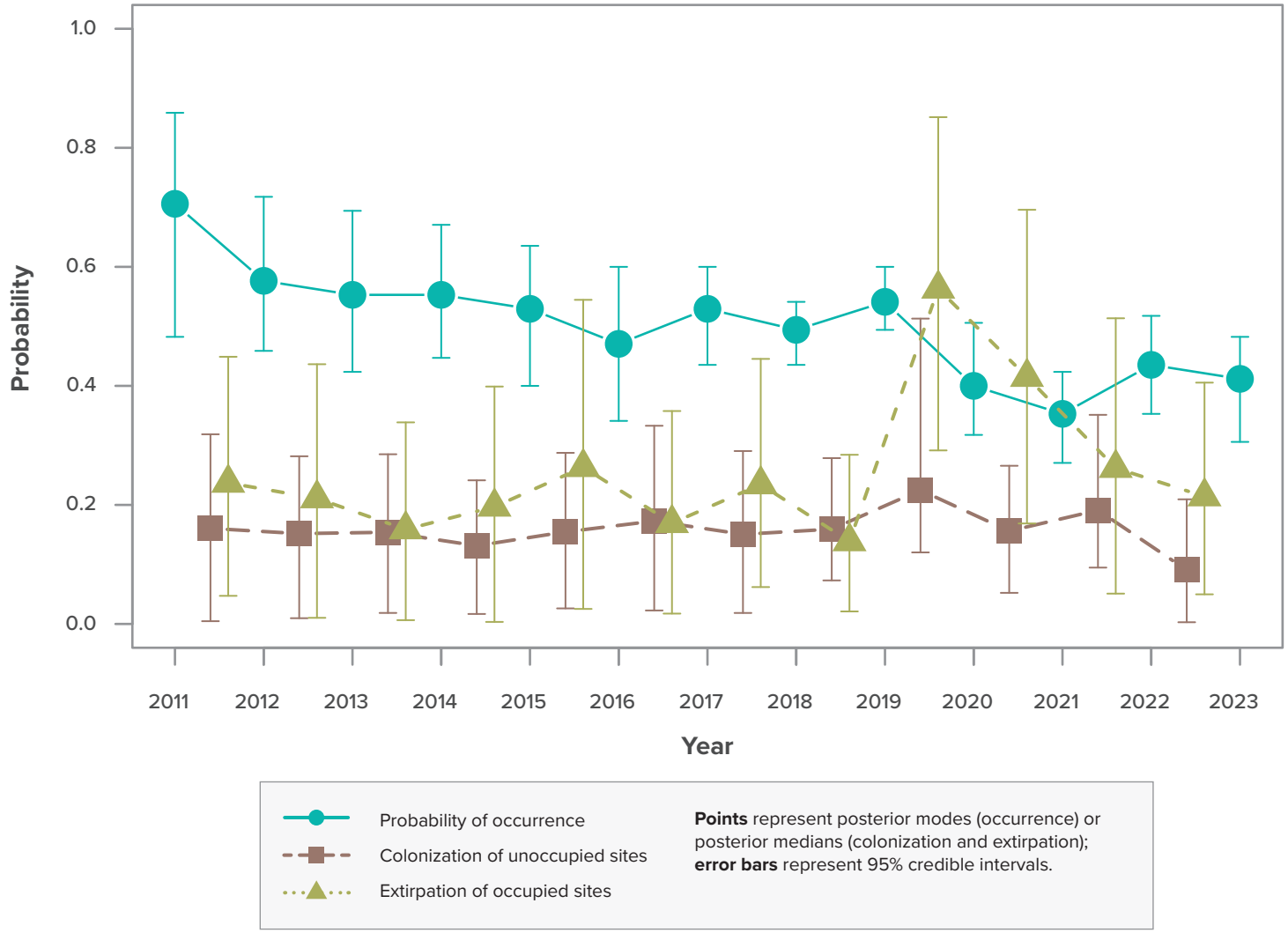
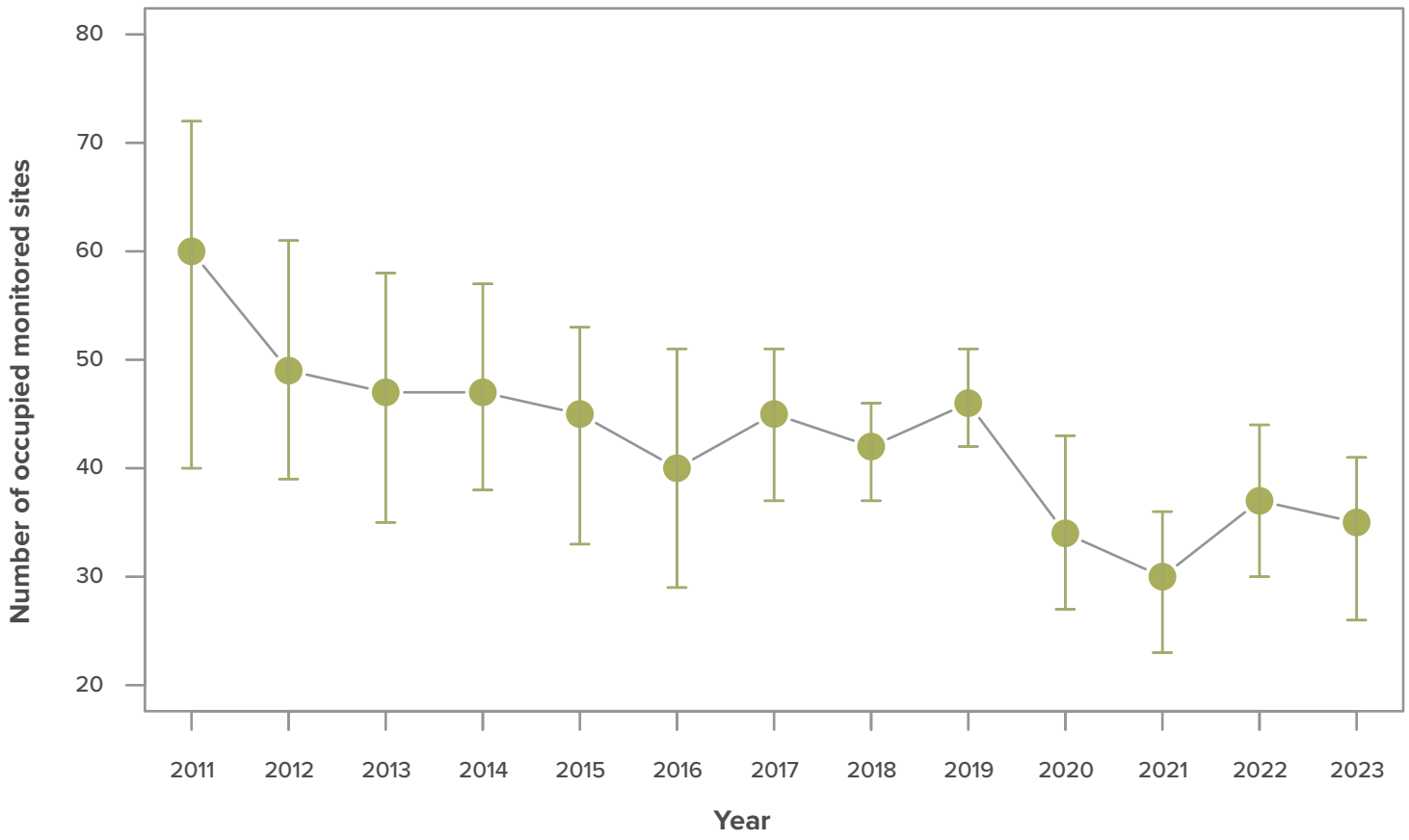
FIGURE 3-13
Effects of (A) Water Temperature and (B) Date on the Detection Probability of Giant Gartersnake in the Natomas Basin, 2023



NBC 104332 2023 (2-22-2024) TG

FIGURE 3-14

Annual Probability of Occurrence of Giant Gartersnake on TNBC Reserves Based on the Dynamic Occupancy Model

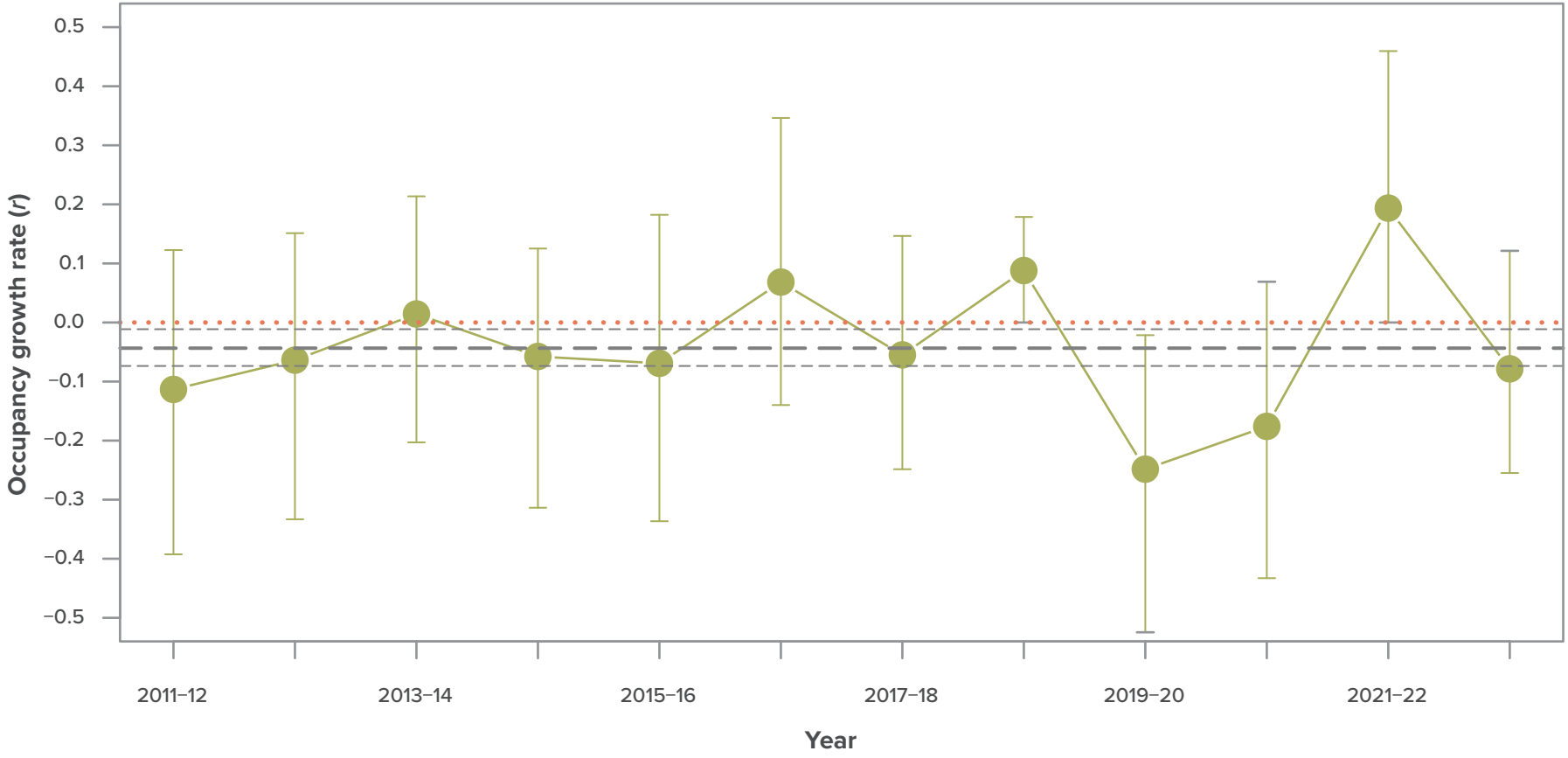


Points represent posterior modes; **error bars** represent 95% credible intervals. Note that 41 sites were sampled in 2022, and a total of 83 unique sites were sampled for giant gartersnake occurrence in at least 1 year from 2011 to 2022.

NBC 104332 2023 (2-22-2024) TG

FIGURE 3-15

Estimated Number of Sampled TNBC Reserve Sites Occupied by Giant Gartersnake



Points represent posterior modes; **error bars** represent 95% credible intervals. The **red dotted line** at 0 indicates no change in occupancy. The mean annual occupancy growth rate from 2011 to 2022 is indicated by the **thick dashed line (mode)** and **thin dashed lines** (95% credible interval).

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FIGURE 3-16

Annual Intrinsic Rate of Occupancy Growth for Giant Gartersnake in Reserves, 2011–2023

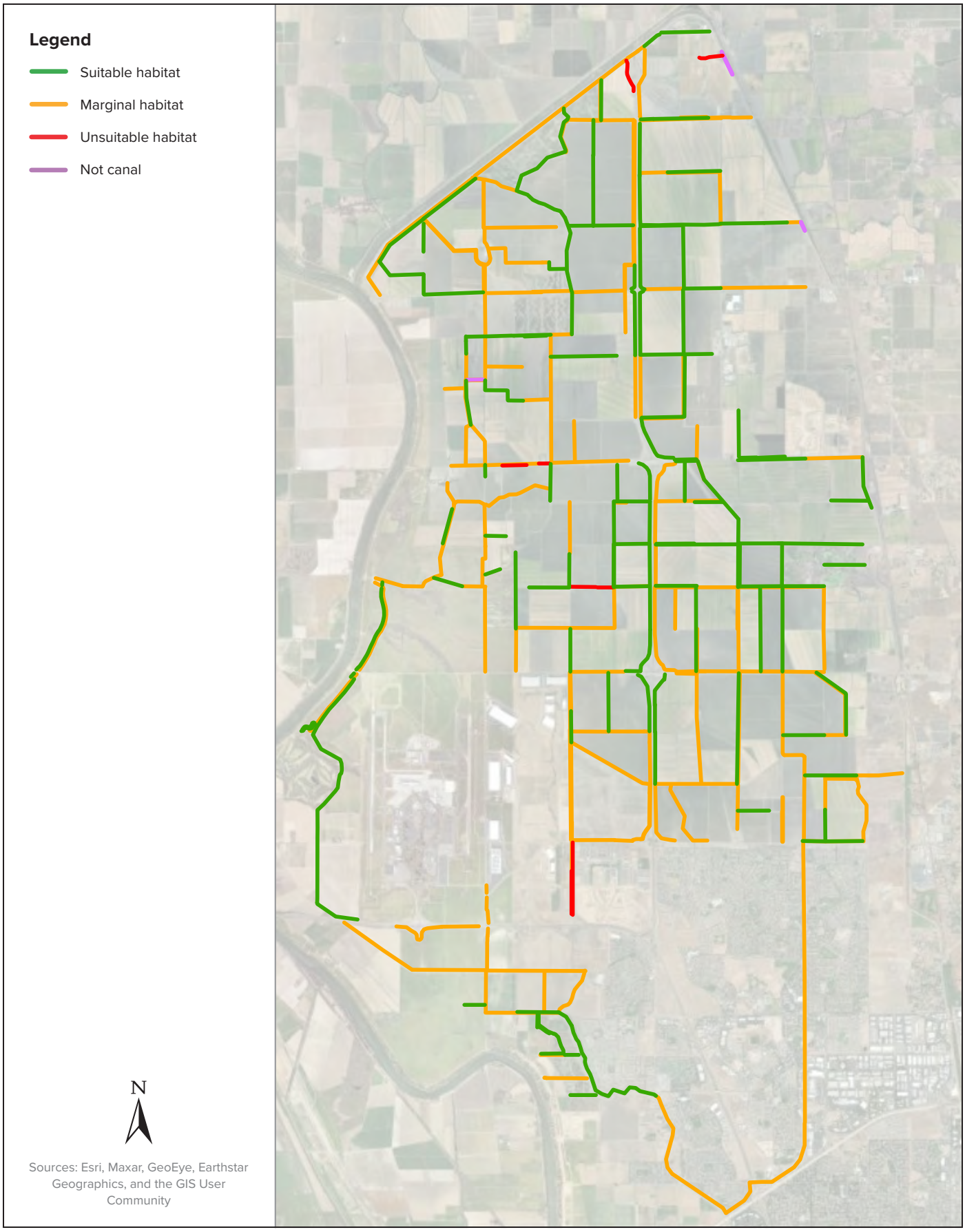

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FIGURE 3-17
Suitability of Habitat in the Canals of the Natomas Basin for Giant Gartersnake in 2023

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Chapter 4
Swainson's Hawk

CHAPTER HIGHLIGHTS

- Following the second largest annual increase in 2022, the number of occupied territories declined slightly in 2023, but remained above the average for the 23-year monitoring period. Overall, data obtained from 1999 to 2023 demonstrate a long-term trend of statistically significant increases in number of occupied territories in the Basin. These data indicate a stable but slightly increasing breeding population of Swainson's hawk in the Basin.
- Most measures of reproductive success showed extreme swings in 2023 – a pattern observed annually since 2011 - dropping to the lowest values observed since comprehensive monitoring began. The total number of Swainson's hawk young that fledged in the Basin in 2023 was 2, well below the average of 49. The number of young produced per occupied territory, per active nest, and per successful nest all now exhibit a statistically significant downward trend over the entire monitoring period (1999-2023), a phenomenon observed across the range of the species in California.
- The number of acres of alfalfa and grass hay - crops with the highest value for Swainson's hawk - has increased on reserve lands primarily due to the acquisition of more agricultural reserves. However, the proportion of suitable foraging habitat in the Basin controlled by TNBC (9%) is likely too small to determine if management of reserve lands is contributing significantly to the success of the Swainson's hawk population in the Basin.
- Provision of future nest trees, planting of suitable crops (e.g., alfalfa, grass hay, lightly grazed irrigated pasture, or winter wheat followed by another row crop), and maintenance of vegetative cover on fallow fields are management actions that are most likely to contribute to the effectiveness of reserve lands in supporting the Swainson's hawk population in the Basin.

4.1 Introduction

4.1.1 Background

The NBHCP and its Implementing Agreement (City of Sacramento et al. 2003) require that an annual survey of nesting Swainson's hawks be conducted throughout the Basin (Chapter VI, Section E [2][a][1] of the 2003 NBHCP). In compliance with the conditions described in the NBHCP, this chapter presents the methods, results, and implications of the results of surveys for Swainson's hawk conducted in the Basin from 1999 through 2023.

It should be noted that the study area for this species differs slightly from the study area used in all other monitoring efforts. For the purposes of conducting Swainson's hawk population monitoring, the study area was expanded in 2001 to include the far side of the peripheral water bodies (i.e., the Sacramento River, the Natomas Cross Canal, and Steelhead Creek) because these areas support nesting habitat for Swainson's hawks that forage in the Basin. Moreover, individual pairs may use

alternate nest sites within given territories that span these water bodies. This expanded study area is referred to as *the Basin* in this chapter.

4.1.2 Goals and Objectives

Monitoring efforts for Swainson's hawk are designed to assess the progress of the NBHCP toward meeting the Plan's biological goals and objectives for Swainson's hawk populations and the habitats they use. Swainson's hawk monitoring surveys are designed to achieve the following:

- Document the numbers, distribution, density, and reproductive success of the Swainson's hawk population in the Basin.
- Conduct surveys in a systematic and repeatable manner that will ensure detection of all active Swainson's hawk nests in the Basin from year to year.
- Document changes in land use and availability of foraging habitats throughout the Basin over time.

4.1.3 Life History

4.1.3.1 Status and Range

Swainson's hawk (Figure 4-1) inhabits grassland plains and agricultural regions of western North America during the breeding season and grassland and agricultural regions from Central Mexico to southern South America during the non-breeding season (Bechard et al. 2010; Airola et al. 2019). Early accounts described Swainson's hawk as one of the most common raptors in the state, occurring throughout much of lowland California (Sharp 1902). Since the mid-1800s, the native habitats that supported the species have undergone a gradual conversion to agricultural uses. Today, native grassland habitats are virtually nonexistent in the state, and only remnants of the once-vast riparian forests and oak woodlands still exist (Katibah 1983). This habitat loss contributed to a substantial reduction in the breeding range of the species and has reduced the estimated size of the breeding population by more than 90% in California (Bloom 1980; Bechard et al. 2010).

More recent surveys indicate a larger and possibly expanding breeding population in the Central Valley, which supports approximately 94% of the statewide population (Anderson et al. 2007). The results of the 2005–2006 statewide survey conducted by the California Department of Fish and Wildlife (CDFW) and the Swainson's Hawk Technical Advisory Committee indicated the Central Valley supported an estimated 3,218 (± 947) breeding pairs (Battistone et al. 2019), or between 19% and 80% of the historical population (Bloom 1980). The most recent effort to estimate the statewide population was conducted in 2018 (Furnas et al. 2022) with results suggesting a more substantial recovery of the species in California and an estimated population of 18,810 (95% CI: 11,353–37,228), exceeding the range of the estimated historical population. However, the results are inconsistent with the continuing reduction of suitable foraging habitat in the Central Valley and the results of regional surveys and monitoring efforts, issues which are acknowledged in the Furnas et al. (2022) report. This report also identified potential survey and modeling issues that may have resulted in an overestimation of the size of the population, which led the authors to recommend changes to the protocol for subsequent survey efforts and to caution readers regarding the use of the results to address management implications.

The Central Valley population extends from Tehama County south to Kern County. Yolo, Sacramento, and San Joaquin Counties support the bulk of the Central Valley population (Estep 1989; Battistone et al. 2019) (Figure 4-2). The Central Valley population is geographically isolated from the rest of the breeding population, which extends northward into western and central Canada and eastward to northwestern Illinois (England et al. 1997). Unpublished data from banding studies conducted by R. Anderson, P. Bloom, J. Estep, and B. Woodbridge suggest that no movement occurs between the Central Valley breeding population and other populations. However, results of satellite radio telemetry studies of migratory patterns indicate that birds outside of the Central Valley may occasionally travel through portions of the Central Valley during migration (Kochert et al. 2011).

Despite the loss of native habitats in the Central Valley, Swainson's hawk appears to have adapted relatively well to certain types of agricultural patterns in areas where suitable nesting habitat remains. However, nesting and foraging habitat for Swainson's hawk continues to decline in the Central Valley primarily due to changing agricultural practices and urban expansion.

4.1.3.2 Habitat Use

Swainson's hawks usually nest in large native trees, such as valley oak (*Quercus lobata*), cottonwood (*Populus fremontii*), walnut (*Juglans* spp.), and willow (*Salix* spp.), and with increasing frequency in nonnative trees, such as eucalyptus (*Eucalyptus* spp.). Nests occur in riparian woodlands, roadside trees, trees along field borders, isolated trees, small groves, and on the edges of remnant oak woodlands. Strings of remnant riparian forest along drainages contain the majority of known nests in the Central Valley (Estep 1984; Schlorff and Bloom 1984; Kochert et al. 2011). Nests are usually constructed as high as possible in a tree, providing protection to the nest and increased visibility from the nest (Figure 4-3).

Nesting pairs are highly traditional in their use of nesting territories and nesting trees. Many nest territories in the Central Valley have been occupied annually since 1979, and banding studies conducted since 1986 confirm a high degree of nest site and mate fidelity (Estep unpublished data).

In the Central Valley, Swainson's hawk feeds primarily on small rodents, usually in large fields that support low vegetative cover (providing access to the ground) and high densities of prey (Bechard 1982; Estep 1989, 2009). These habitats are usually hay fields, grain crops, certain row crops, and lightly grazed pasturelands. Fields lacking adequate prey populations (e.g., flooded rice fields) or those that are inaccessible to foraging birds (e.g., vineyards, orchards) are rarely used (Estep 1989, 2009; Babcock 1995; Nur et al. 2019). Urban expansion and conversion of agricultural lands to unsuitable crop types are responsible for a continuing reduction of available Swainson's hawk foraging habitat in the Central Valley.

4.1.3.3 Breeding Season Phenology

Swainson's hawks arrive at the breeding grounds from mid-March to early April (Figure 4-4). Breeding pairs immediately begin constructing new nests or repairing old ones. Eggs are usually laid in mid- to late April, and incubation continues until mid-May when young begin to hatch. The brooding period typically continues through early to mid-July when young begin to fledge (Bechard et al. 2010). Studies conducted in the Sacramento Valley indicate that one or two—and occasionally three—young typically fledge from successful nests (Estep 2007; Estep and Dinsdale 2012; ICF 2019) (Figure 4-5). After fledging, young remain near the nest and are dependent on the adults for approximately 4 weeks, after which they permanently leave the breeding territory (Anderson and

Estep unpublished telemetry data). By mid-August, breeding territories are no longer defended, and Swainson's hawks begin to form communal groups. These groups begin their fall migration from late August to mid-September. Unlike most other Swainson's hawk populations, which migrate to southern Argentina for the winter, the Central Valley population winters from Central Mexico to central South America (Airola et al. 2019).

4.2 Methods

4.2.1 Population Assessment

Surveys were conducted by systematically driving all available roads within the Basin, including both sides of all peripheral drainages. Where roads could not be used, surveys were conducted on foot. All potential nesting trees were searched with binoculars and/or a spotting scope for nests and adult Swainson's hawks.

Surveys were conducted in three phases. Phase 1 surveys were conducted early in the breeding season (late March to mid-April) to (1) detect Swainson's hawk activity at previously known nest sites as well as in all other suitable nesting habitats, and (2) to detect early nest failures that might otherwise be missed. All suitable nesting habitats were checked for the presence of adult Swainson's hawks and to note nesting activity and behavior (e.g., nest construction, courtship flights, defensive behavior). Activity was noted and mapped, and nest locations were documented using a global positioning system receiver.

Phase 2 surveys were conducted from mid-May through June to (1) determine whether potentially breeding pairs detected during Phase 1 surveys were nesting, and (2) resurvey all previously unoccupied potential nesting habitat for late-nesting pairs and for active nests that may have gone undetected during Phase 1 surveys.

Phase 3 surveys were conducted during July to determine nest success and record the number of young fledged per nest. Incidental observations, such as foraging, roosting, and other sightings of adult Swainson's hawks, were also noted.

An *occupied territory* is defined as a nest site that was occupied by a pair of Swainson's hawks, regardless of the reproductive outcome. An *active nest* is defined as a nest in which eggs are laid. A *successful nest* is defined as a nest from which young fledged. A *failed nest* is defined as a nest in which eggs were laid but from which no young were fledged.

4.2.2 Habitat Assessment

The distribution and abundance of land cover/crop types throughout the Basin, both on and off reserve lands, are documented annually (see Chapter 2, *Land Cover Tracking)*. These data are used to document any changes in the distribution and abundance of suitable Swainson's hawk foraging habitat throughout the Basin.

4.3 Results

4.3.1 Population Assessment

Swainson's hawks continued to nest primarily in the southern portion and along the far western and northern edges of the Basin in 2023. The nest sites are predominantly located along the Sacramento River and within approximately 1 mile of the river (Appendix D). These areas support suitable habitat for both nesting and foraging. Potential nest trees are distributed along roadsides, in remnant riparian and oak woodlands, and as isolated trees; foraging habitat is present in the upland row crops that dominate this part of the Basin. Conversely, most of the Basin north of Elkhorn Boulevard and east of Powerline Road is less suitable for nesting or foraging by Swainson's hawks because it is dominated by rice production, which provides limited foraging value, and there are relatively few potential nest trees in this area.

A total of 151 current and historical Swainson's hawk nesting territories were monitored during 2023 (Table 4-1). However, many of these territories are assumed to represent alternative nesting locations for the same breeding pairs. In instances where individual birds are marked (i.e., color banded) and can be identified, or where a new nest site occurs in proximity to a known and unoccupied nest with no other known territories in the immediate vicinity, the site is considered an alternate nest of a known territory. In the absence of either of these conditions, the site is considered a new territory. Therefore, although the number of territories may increase each year, this increase does not necessarily reflect new breeding pairs within the study area.

Changes in the number of occupied Swainson's hawk nesting territories, the number of successful nests, and the total number of young fledged from 2001 through 2023 are listed in Table 4-2 and depicted in Figure 4-6. Although the number of occupied territories decreased by 7 from 69 in 2022 to 62 in 2023, the number of occupied territories in 2023 remained well above the average of 57 over the study period and the statistically significant upward trend in the number of occupied territories over the study period is still evident ($R^2 = 0.614$, $P < 0.001$, Figure 4-7).

The high annual variation in reproductive success that has characterized the breeding population since 2011 continued in 2023. There have been five precipitous drops in most measures of reproductive success, including the total number of successful nests, total number of young fledged, the number of young per occupied territory, and the number of young per active nest. In all cases, reproductive metrics have rebounded the following year, often dramatically (Figures 4-6 and 4-8). Since the first precipitous drop in 2011, reproductive metrics have exhibited a high degree of annual variation, suggesting instability in the population. The number of young produced per occupied territory, per active nest, and per successful nest all now exhibit a significant downward trend over the monitoring period ($R^2 = 0.217$, $P = 0.025$; $R^2 = 0.197$, $P = 0.034$; and $R^2 = 0.548$, $P < 0.001$, respectively).

Following a modest rebound in 2022, most measures of reproductive success dropped substantially in 2023 to the lowest values since monitoring began. A similar reproductive crash occurred in 2019 when only five pairs nested successfully. Two pairs fledging a total of two young in 2023 indicates a near total loss of the 2023 reproductive cohort for the Basin breeding population. The reproductive rate (young produced per occupied territory) is significantly negatively correlated with the number of pairs (i.e., occupied territories) that fail to nest at all ($R^2 = 0.683$, $P < 0.001$). Both the 2019 and 2023 crashes in the reproductive rate are consistent with results from other areas of the Central

Valley, particularly the Sacramento Valley (Estep 2020, Estep pers obs.) and not unique to—or based on conditions within—the Basin.

Although a failure to nest is the most significant factor contributing to low reproductive rates, particularly in 2019 and 2023, there is also a significant decline in the number of young produced per successful nest (a measure of brood size) over the monitoring period (R^2 = 0.548, P < 0.001, Figure 4-9). While the cause(s) of this decline are unknown, the number of young fledged per successful nest is also negatively correlated with the number of occupied territories each year (R^2 = 0.352, P = 0.003), which is consistent with the hypothesis of a density-dependent response in this metric.

In 2023, there were 26 active nesting territories along the Sacramento River, a decrease of 9 from 2022, and slightly less than the average of 28 since 2001 (Table 4-3, Figure 4-10). Although the total number of nesting pairs along the Sacramento River fluctuates substantially from year to year ($\bar{x}$ = 28.8; SD = 3.9), there is no discernible trend over time. This relative constancy in the mean number of pairs has persisted despite continuing home construction, ongoing tree removal, and increasing human disturbances, including disturbance associated with implementation of the SAFCA NLIP along the east side of the river. Many pairs have alternate nest sites on both sides of the river, allowing for changes in nest site location in response to local disturbances.

Swainson's hawks often use alternate nest sites within the breeding territory. Of the 62 active territories in 2023, 47 (76%) have one or more alternate nest sites. Of the 23 pairs that nested in 2023, all used alternative nest trees that had been previously documented. No new nest trees were documented in 2023. All the alternate nest trees were in the immediate vicinity of previously used nest trees.

Historical activity within the 62 active territories is variable but indicates the extent of territory fidelity and the tendency toward long-term occupancy. Twenty-four (39%) of the territories were first reported active during or before the first year of monitoring under the current protocols in 2001 and, although some have been inactive in some of the intervening years, most have been mostly consistently active throughout the entire 23-year monitoring period. Forty-three (70%) of the 62 active territories were first reported active prior to 2010.

No Swainson's hawk nest trees were removed in 2023; however, several were damaged during spring storm events and one (NB-74) was trimmed to reduce interference with overhead distribution lines, severely reducing its suitability as a nest tree. Although many potential nest trees were removed during levee construction activities associated with the SAFCA NLIP, restoration actions have established new potential replacement trees near the toe of the new levee. These trees are expected to provide new potential nesting habitat when they reach maturity. Although no Swainson's hawk nest trees were removed within the NLIP in 2023, a total of nine have been removed since implementation of the NBHCP, seven of which resulted in the apparent abandonment of the nesting territory (Table 4-1). Levee construction activities on the next phase of the NLIP began in 2019 and continued through the 2023 breeding season. Numerous mature valley oak and other native trees were removed from the land side of the existing levee south of Powerline Road. Additional tree removal is planned as the project moves southward. There are no reported nests within the project right-of-way; however, substantial suitable nesting habitat is present and will be removed to expand the levee. Construction disturbance from levee construction activities is also likely to affect nesting activity and reproductive output of active nests that occur on the water side of the levee.

Competition with other nesting raptors also influences the distribution and abundance of nesting Swainson's hawks. For example, in 2022, 19 previously documented Swainson's hawk territories were occupied by nesting red-tailed hawks and great-horned owls.

Sources of adult or nestling mortality are usually difficult to confirm but presumably include predation by great-horned owls and direct disturbances to nests from construction or recreational activities that result in nest abandonment. Collisions with airplanes have also been documented but are difficult to quantify. In 2014, Sacramento County Airport System (SCAS) reported four adult Swainson's hawk fatalities resulting from collisions with aircraft, including the banded (i.e., identifiable) adult female from territory NB-107, immediately west of the airport perimeter fence. SCAS staff reported two Swainson's hawk fatalities from collision with aircraft in 2017, two in 2018, one in 2020, and one in 2021. Data were not available for 2023.

4.3.2 Habitat Assessment

The distribution of suitable Swainson's hawk foraging habitat in 2023 is shown on Figure 4-11, while changes in the total acres of three general categories of Swainson's hawk foraging habitat (upland agriculture, fallow lands, and grasslands) are listed in Table 4-4 and depicted on Figure 4-12. The biggest driver of the total number of acres of suitable Swainson's hawk foraging habitat is the number of acres of fallow lands, which itself is driven primarily by the total acres of fallow rice lands. Although fallow upland agricultural fields can provide valuable Swainson's hawk foraging habitat, fallow rice fields likely provide the lowest value habitat of any other land cover type considered suitable for foraging by Swainson's hawks.

Basin-wide foraging habitat increased 42% from 2021 to 2022 due primarily to the increase in fallow rice fields caused by the extensive drought in California. In 2023, the was a concomitant decrease in total foraging habitat resulting from the resumption of rice agriculture following one of the wettest winters ever recorded in California.

Suitable habitat on reserve lands increased substantially due primarily to the acquisition of new reserve tracts with an upland agriculture component. Most of the new land acquisitions with an upland agricultural component were in alfalfa or grass hay when acquired, and these two habitats have the highest value for Swainson's hawk foraging.

The total amount of alfalfa and the total amount of grasslands Basin-wide has decreased significantly over time (R^2 = 0.342, P = 0.008 and R^2 = 0.337, P = 0.007, respectively), despite the creation of new grasslands by the SAFCA NLIP project. Conversely, there has been no significant increase or decrease over the monitoring period in total acres of upland agriculture, fallow lands, or total Swainson's hawk foraging habitat.

There is no correlation between the number of occupied territories each year and the total acreage of suitable forging habitat in the Basin (R^2 = 0.098, P = 0.178), the acreage of upland row and field crops (R^2 = 0.075, P = 0.242), or the total acreage of alfalfa each year (R^2 = 0.085, P = 0.226). However, the total number of occupied territories is negatively correlated with the total acres of grassland habitat in the Basin (R^2 = 0.273, P = 0.018). This counterintuitive result is likely due to the fact that the majority of grasslands converted to other land cover types were probably of lower habitat value in areas seldom used by Swainson's hawks (e.g., ruderal habitats within or adjacent to developed areas).

No measures of reproductive success were significantly correlated with the total acreage of any of the categories of Swainson's hawk suitable foraging habitat in the Basin, with one exception. The number of young produced per successful nest is positively correlated with the Basin-wide total acres of alfalfa (R^2 = 0.214, P = 0.046).

The reserve system currently accounts for approximately 9% of the suitable Swainson's hawk foraging habitat in the Basin. Consequently, the extent to which TNBC-managed land will be able to influence the trajectory of the Swainson's hawk population in the Basin is currently limited.

4.4 Discussion

Trends over time in the number of occupied territories indicate a stable but slightly increasing breeding population of Swainson's hawks in the Basin. However, the pattern of relatively high territory occupancy and low reproductive metrics, which began in 2011, continued through 2023. The dramatic declines in reproductive metrics that began in 2011 have always been followed by a significant rebound the following year. However, declines have been more substantial than the subsequent rebounds and most reproductive metrics now exhibit a statistically significant decline over the monitoring period. The declines in 2019 and 2023 were part of a broader condition throughout the Central Valley.

Although it remains speculative, in any given year the likely causes for this widespread lack of production among Swainson's hawk and other raptor species nesting in the Central Valley include drought, late-spring storms, changes in agricultural patterns or practices, or more subtle climate-change phenomena — which may affect prey (i.e., rodent) populations — or possibly a natural cyclical decline in microtine rodents, or a combination of these factors. The arrival dates of Swainson's hawks on the breeding grounds and the pattern of territory establishment were typical from 2019 to 2022, and territory occupancy was relatively high, suggesting that the decline in reproductive performance is related to food resources. However, data from the Basin and elsewhere in the Central Valley showed later arrival dates on the breeding grounds in 2023, with most areas reporting arrival at least 2 weeks later than is typical, suggesting the possible contribution of weather or climate effects on nest establishment and reproductive output. The significant decline over the monitoring period in the number of young per successful nest, which is a reproductive metric influenced by clutch size and brood size, is unusual because of the intrinsic invariability in the metric (i.e., it is derived from a series of mostly 1s and 2s), but not unprecedented. The breeding population of Swainson's hawk in Saskatchewan Province, Canada, experienced a similar long-term decline in the number of young fledged per successful nest that coincided with a decline in Richardson's ground squirrel (*Urocitellus richardsonii*), the principal prey species (Houston and Schmutz 1995). Annual variation in clutch or brood size is common among some raptor species (including Swainson's hawk) that rely to a large extent on a single prey species, particularly if that species is subject to its own reproductive cycles, such as the California vole (*Microtus californicus*). However, a gradual and long-term decrease in average clutch or brood size may suggest a change in habitat conditions, such as the continuing conversion of row and field crop habitats to orchards or other crop types that could influence the availability of Swainson's hawk food resources (Bechard 1983). The increase in the number of occupied territories in conjunction with a decrease in the number of young per successful nest is also consistent with a density-dependent response in the reproductive rate to an increase in the size of the breeding population. Other potential (but less likely) contributing factors include pesticide contamination that reduces eggshell thickness or

disease. Given the correlation between the Basin-wide acres of alfalfa and the number of young produced per successful nest, it is possible that alfalfa provides food resources at a critical time (egg laying or incubation period) for brood development.

The lack of any positive correlation between the number of occupied territories and any metric of Swainson's hawk foraging habitat may indicate that the Basin provides only a portion of the foraging habitat required for this population, which is consistent with recent radio telemetry studies that demonstrated substantial use of out-of-Basin foraging habitats by Swainson's hawks nesting in the Basin (Fleishman et al. 2016).

The 2023 distribution of nest sites remained similar to past years, with the bulk of the nests occurring in trees along the perimeter drainages, primarily the Sacramento River and the Natomas Cross Canal. Most of the remaining nest sites are in the south Basin (i.e., south of Elkhorn Boulevard) and along the western edge of the Basin.

Nest tree removal and conversion of agricultural foraging habitat, mostly because of urbanization, have historically resulted in the removal of some nesting territories in the south Basin. The 2008 moratorium on planned and proposed urbanization because of levee-related restrictions was lifted in 2017, and development has resumed, primarily in the south Basin. As a result, suitable nesting and foraging habitat is expected to decline more rapidly within the Basin in the near future, which could result in nesting pairs being displaced. Recent urbanization in the Basin south of Elkhorn Boulevard and east of Powerline Road has - and continues to - remove suitable foraging habitats. Nesting territories in this area, such as NB-27 and NB-140, that are becoming increasingly surrounded by urbanization, are expected to eventually be abandoned. Others, such as NB-98 and NB-63, are subject to increasing risk due to recent urbanization within the territory. However, despite this loss, which was anticipated in the NBHCP, the management of reserve lands and other suitable nesting and foraging habitats in the Basin have contributed to maintaining a stable and even increasing Swainson's hawk nesting population.

The ongoing loss of trees could limit future nesting opportunities and the ability of the Swainson's hawk population to respond to habitat changes throughout the Basin. The County of Sacramento continues to allow residential development on the water side of the Sacramento River levee, which accelerates tree loss as riparian vegetation is cleared for home sites. These projects, along with tree and brush clearing for vegetation management and a fire on the east side of the river just north of Powerline Road in 2010, have cumulatively contributed to additional riparian tree loss. This loss of potential nesting trees and the increase in human disturbance along the river could potentially result in territory abandonment and limit opportunities for relocation of displaced nesting pairs and the establishment of new nesting sites.

In addition, SCAS, citing Federal Aviation Administration regulations, has removed trees on airport lands that are considered potential hazard trees due to bird use (County of Sacramento 2006). Although these actions may have been warranted to meet federal safety regulations, they have resulted in the removal of a substantial number of mature trees, including sites known to be used by Swainson's hawks as nest sites. No active nest trees were removed by SCAS in 2023.

SCAS also implements a wildlife hazard management plan to minimize the potential for bird strikes with planes on airport lands (Sacramento County Airport System 2007). This program involves the removal of a variety of bird species, including raptors. The loss of individual Swainson's hawks through this program is inconsistent with the goals of the NBHCP with respect to the maintenance of existing Swainson's hawk population levels in the Basin. Despite implementation of the wildlife

hazard management plan, airplane collision with birds at Sacramento International Airport (SMF) is a cause of mortality that could adversely affect the Natomas Basin Swainson's hawk population. Much of the land within the SMF perimeter fence is managed as a short grassland, which is attractive to foraging Swainson's hawks and other raptors, putting them at risk of collision with planes landing or taking off. Collision mortality during the breeding season can result in the abandonment of active nests and loss of productivity and increase adult turnover in the breeding population.

Implementation of the SAFCA NLIP has resulted in impacts on the Swainson's hawk population, but effects have generally been short term and appear to be mitigated. Despite the changes in habitat value resulting from levee and canal construction activities, tree removal, restoration activities, and related disturbances that may have been responsible for some nest failures in the last several years, the distribution of nesting pairs in the area affected by levee construction remains relatively stable. In addition, the restored grassland habitats in the area of the SAFCA NLIP provide moderate- to high-value foraging habitat and may also provide refugia for voles and other prey populations on adjacent agricultural lands, while the restored woodland habitats are expected to provide future nesting opportunities.

The majority of major levee construction activities from the Natomas Cross Canal to Powerline Road—coordinated by SAFCA—have been completed; however, the next phase of the project, from Powerline Road southward, which began in 2019 and continued through 2023, is largely completed south to San Juan Road and is nearing completion south to Interstate 80. Levee work will continue south of San Juan Road through at least 2024. The landside levee construction is coordinated by USACE, including the removal of trees along the remaining portion of the Sacramento River and along Steelhead Creek, and could adversely affect nesting activity in those areas.

4.5 Effectiveness

Biological effectiveness as it pertains to Swainson's hawk is measured on the basis of acquisition of reserve lands and management activities that meet the goals for Swainson's hawk habitat, as well as the population's response to these actions. Effectiveness is also measured through successful implementation of management recommendations designed to further benefit Swainson's hawk through targeted land acquisition or specific land management activities.

As discussed above, the status of the Swainson's hawk population in the Basin remains stable to slightly increasing, as measured by the number of occupied territories (Table 4-2). Evidence to date thus indicates that implementation of the NBHCP and Metro Airpark HCP has been effective in conserving the nesting population of Swainson's hawks in the Basin. However, additional population effects could become evident as urbanization of the Basin continues post-release of the building moratorium and actions unforeseen by the NBHCP continue, such as the continuation of the SAFCA NLIP south of Powerline Road, bird control actions by SCAS, bird-aircraft collision mortality, continued disturbance and habitat removal along the east side of the Sacramento River, or possibly factors affecting hawks outside the breeding season (i.e., on wintering habitats).

Swainson's hawk habitat goals continue to be met through establishment and management of suitable upland habitat, including the planting of potential future nesting trees, on reserve lands. The first documented active nest on an NBHCP Reserve tract was a nest on the BKS tract in 2005. 2019 marked the second year that Swainson's hawks occupied a nest on an NBHCP Reserve tract. A nesting pair established a new nest in a small group of trees planted in 2007 between the Huffman

East and Huffman West tracts in the North Basin Reserve. In 2020, a third Swainson's hawk nest site was found on the Atkinson tract of the North Basin Reserve. The nest was near the southern end of the cottonwood grove, where the nesting pair successfully fledged two young.

Swainson's hawk habitat has been a key consideration in reserve land acquisition. Acquisitions have generally been consistent with recommendations in the *Biological Effectiveness Monitoring Report* for the last several years.

4.6 Recommendations

The following management recommendations are provided to ensure that the biological goals and objectives identified in the NBHCP and MAPHCP are met or exceeded for this species. These recommendations are based on the data presented in this chapter, observations in the field, and the expertise of the chapter authors.

- Maximize acreage planted in alfalfa or similar grass hay or lightly grazed irrigated pasture habitats that minimize the annual removal of cover for small mammal prey species.
- Leave agricultural lands unplowed for as long as possible post-harvest so that vegetative cover supporting small mammal populations continues to provide foraging habitat for Swainson's hawk.
- Provide uncultivated field borders next to upland agricultural fields composed of native grasses, forbs, pollinator species, or other forms of permanent herbaceous cover to provide refugia for populations of small mammal prey species in areas where such refugia do not already exist.
- Work with the County of Sacramento to raise awareness of the importance of native trees along the Sacramento River to provide current and future nesting habitat for Swainson's hawk.
- Manage fallow lands with cover crops or other techniques to increase prey production for Swainson's hawk.

4.7 References

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Table 4-1. Results of 2023 Swainson's Hawk Surveys, NBHCP Area.

Territory Number	Status[a]	Number of Young	Nesting Habitat	Nest Tree Species[b]
NB-1	A-X	0	Urban	Valley oak
NB-2	I		Urban	Cottonwood
NB-3	NLE		Isolated tree—removed in 2003	Valley oak
NB-4	I		Riparian	Cottonwood
NB-5	I		Riparian	Willow
NB-6	I		Ornamental grove	Eucalyptus
NB-7	NLE		Isolated trees—removed in 2002	Willow
NB-8	A-X	0	Roadside tree row—ornamental	Cottonwood
NB-9	I		Channelized riparian	Cottonwood
NB-10	I		Isolated tree – removed in 2021	Cottonwood
NB-11	I		Riparian	Valley oak
NB-12	A-X	0	Riparian	Cottonwood
NB-13	A-F	0	Riparian	Oregon ash
NB-14	A-U		Tree row—ornamental	Eucalyptus
NB-15	NLE		Isolated tree—removed in 2002	Valley oak
NB-16	A-F	0	Oak grove	Cottonwood
NB-17	NLE		Isolated tree—removed in 1998	Valley oak
NB-18	I		Isolated tree	Cottonwood
NB-19	A-F	0	Tree along irrigation canal	Cottonwood
NB-20	NLE		Isolated tree—removed in 2002	Cottonwood
NB-21	A-X	0	Riparian	Cottonwood
NB-22	A-X	0	Isolated tree	Willow
NB-23	I		Riparian	Willow
NB-24	A-U		Riparian	Valley oak
NB-25	I		Riparian	Walnut
NB-26	NLE		Roadside tree—removed in 2002	Valley oak
NB-27	I		Riparian	Cottonwood
NB-28	I		Riparian	Cottonwood
NB-29	A-X	0	Riparian	Willow
NB-30	I		Riparian	Cottonwood
NB-31	I		Riparian	Willow
NB-32	A-F	0	Riparian	Cottonwood
NB-33	I		Riparian	Cottonwood
NB-34	I		Riparian	Cottonwood
NB-35	I		Riparian	Cottonwood
NB-36	I		Riparian	Cottonwood
NB-37	A-X	0	Riparian	Cottonwood
NB-38	A-X	0	Riparian	Cottonwood
NB-39	A-X	0	Riparian	Willow
NB-40	I		Riparian	Cottonwood
NB-41	I		Riparian	Willow
NB-42	I		Riparian	Cottonwood
NB-43	A-X	0	Riparian	Cottonwood
NB-44	A-F	0	Riparian	Cottonwood

Table 4-1 Continued

Territory Number	Status[a]	Number of Young	Nesting Habitat	Nest Tree Species[b]
NB-45	I		Riparian	Cottonwood
NB-46	I		Riparian	Cottonwood
NB-47	A-F	0	Riparian	Cottonwood
NB-48	I		Riparian	Cottonwood
NB-49	I		Riparian	Cottonwood
NB-50	I		Riparian	Sycamore
NB-51	I		Riparian	Cottonwood
NB-52	A-X	0	Riparian	Cottonwood
NB-53	A-X	0	Riparian	Cottonwood
NB-54	I		Riparian	Cottonwood
NB-55	A-X	0	Riparian	Cottonwood
NB-56	I		Riparian	Cottonwood
NB-57	A-X	0	Riparian	Cottonwood
NB-58	I		Riparian	Cottonwood
NB-59	A-F	0	Riparian	Cottonwood
NB-60	A-F	0	Riparian	Cottonwood
NB-61	I		Riparian	Cottonwood
NB-62	I		Riparian	Cottonwood
NB-63	I		Isolated tree	Willow
NB-64	A-F	0	Riparian	Valley oak
NB-65	A-F	0	Cottonwood grove	Cottonwood
NB-66	I		Riparian	Cottonwood
NB-67	I		Riparian	Cottonwood
NB-68	A-X	0	Riparian	Sycamore
NB-69	I		Urban ornamental	Willow
NB-70	I		Riparian	Valley oak
NB-71	A-X	0	Riparian	Willow
NB-72	I		Riparian	Cottonwood
NB-73	NLE		Tree row – removed in 2019	Ornamental conifer
NB-74	A-F	0	Roadside tree	Willow
NB-75	A-U		Riparian	Cottonwood
NB-76	NLE		Tree row—removed in 2004	Cottonwood
NB-77	A-X	0	Riparian	Cottonwood
NB-78	I		Riparian	Cottonwood
NB-79	I		Riparian	Sycamore
NB-80	I		Riparian	Cottonwood
NB-81	I		Isolated tree	Cottonwood
NB-82	I		Riparian	Willow
NB-83	A-X	0	Riparian	Willow
NB-84	I		Riparian	Cottonwood
NB-85	I		Riparian	Cottonwood
NB-86	A-U		Riparian	Cottonwood
NB-87	A-X	0	Riparian	Cottonwood
NB-88	I		Riparian	Cottonwood

Table 4-1 Continued

Territory Number	Status[a]	Number of Young	Nesting Habitat	Nest Tree Species[b]
NB-89	I		Riparian	Valley oak
NB-90	I		Riparian	Willow
NB-91	A-F	0	Riparian	Cottonwood
NB-92	I		Riparian	Cottonwood
NB-93	I		Riparian	Cottonwood
NB-94	A-X	0	Riparian	Cottonwood
NB-95	A-U		Riparian	Valley oak
NB-96	A-F	0	Riparian	Cottonwood
NB-97	I		Tree row	Eucalyptus
NB-98	I		Tree row	Eucalyptus
NB-99	I		Urban	Ornamental pine
NB-100	I		Riparian	Walnut
NB-101	A-F	0	Riparian	Cottonwood
NB-102	I		Riparian	Cottonwood
NB-103	I		Riparian	Cottonwood
NB-104	I		Riparian	Black locust
NB-105	A-F	0	Riparian	Cottonwood
NB-106	I		Roadside	Cottonwood
NB-107	A-X	0	Riparian	Cottonwood
NB-108	I		Ornamental (freeway rest stop)	Cottonwood
NB-109	I		Tree row	Valley oak
NB-110	A-X	0	Riparian	Cottonwood
NB-111	I		Tree Row	Cottonwood
NB-112	I		Riparian	Valley oak
NB-113	I		Riparian	Cottonwood
NB-114	A-X	0	Channelized riparian/tree row	Valley oak
NB-115	I		Riparian	Willow
NB-116	A-X	0	Cottonwood grove	Cottonwood
NB-117	I		Riparian	Cottonwood
NB-118	A-X	0	Tree row	Valley oak
NB-119	A-F	0	Channelized riparian/tree row	Cottonwood
NB-120	A-X	0	Channelized riparian/tree row	Valley oak
NB-121	A-X	0	Rural residential	Walnut
NB-122	A-X	0	Tree row	Valley oak
NB-123	I		Isolated tree	Cottonwood
NB-124	A-X	0	Riparian	Valley oak
NB-125	I		Riparian	Cottonwood
NB-126	A-X	0	Riparian	Cottonwood
NB-127	A-X	0	Riparian	Oregon ash
NB-128	I		Riparian	Alder
NB-129	A-F	0	Roadside tree row	Willow
NB-130	I		Isolated tree	Locust
NB-131	I		Riparian	Cottonwood
NB-132	A-F	0	Cottonwood grove	Cottonwood

Table 4-1 Continued

Territory Number	Status[a]	Number of Young	Nesting Habitat	Nest Tree Species[b]
NB-133	I		Isolated roadside tree	Valley oak
NB-134	I		Channelized riparian/tree row	Valley oak
NB-135	I		Isolated roadside tree	Sycamore
NB-136	A-X	0	Cottonwood grove	Cottonwood
NB-137	I		Riparian	Valley oak
NB-138	A-S	1	Tree row	Valley oak
NB-139	I		Isolated roadside tree	Eucalyptus
NB-140	I		Roadside tree row	Redwood
NB-141	A-F	0	Riparian	Cottonwood
NB-142	I		Riparian	Valley oak
NB-143	I		Tree row	Willow
NB-144	I		Tree row	Ornamental conifer
NB-145	A-F	0	Grove	Cottonwood
NB-146	I		Rural residential	Eucalyptus
NB-147	I		Riparian	Willow
NB-148	A-X	0	Isolated roadside tree	Willow
NB-149	A-X	0	Riparian	Oregon ash
NB-150	A-F	0	Grove	Valley oak
NB-151	A-S	1	Rural residential	Walnut

[a] A = active; I = inactive; NLE = no longer extant; S = successful; F = failed; X = did not nest; U = undetermined.

[b] For territories designated as I or X, tree species shown reflects last active nest tree.

Table 4-2. Reproductive Data for Active Swainson's Hawk Territories in the NBHCP Area, 1999–2023

Year	Occupied Territories[b]	Successful Nests	Unsuccessful Nests	Occupied but Not Nesting	Un-confirmed Nesting Status	Number Young Reared to Fledging	Number Young per Occupied Territory[c]	Number Young per Active Nest[c, d]	Number Young per Successful Nest[c]
1999[a]	15	14	1	0	0	25	1.67	1.67	1.79
2000[a]	18	10	4	4	0	20	1.11	1.43	2.00
2001	46	24	15	7	0	40	0.87	1.03	1.67
2002	43	24	11	7	1	38	0.90	1.09	1.58
2003	54	34	15	4	1	53	1.00	1.08	1.56
2004	59	39	12	4	4	54	0.98	1.06	1.38
2005	45	31	11	1	2	48	1.12	1.14	1.55
2006	45	32	9	4	0	48	1.07	1.17	1.50
2007	44	34	9	1	0	48	1.09	1.12	1.41
2008	51	42	8	1	0	64	1.25	1.28	1.52
2009	59	51	2	1	5	83	1.54	1.57	1.63
2010	52	42	4	3	3	70	1.43	1.52	1.67
2011	62	23	27	6	6	30	0.54	0.60	1.30
2012	65	42	14	3	6	59	1.00	1.05	1.40
2013	56	11	26	16	3	12	0.23	0.32	1.09
2014	59	34	11	7	7	39	0.75	0.87	1.15
2015	61	44	6	4	7	69	1.28	1.38	1.57
2016	56	43	3	6	4	63	1.21	1.37	1.47
2017	58	49	4	3	2	68	1.21	1.28	1.39
2018	69	48	9	5	7	70	1.13	1.23	1.46
2019	71	5	33	26	7	5	0.08	0.13	1.00
2020	70	50	8	3	9	54	0.89	0.93	1.08
2021	59	24	25	7	3	24	0.43	0.49	1.00
2022	69	35	14	8	12	40	0.70	0.81	1.14
2023	62	2	21	34	5	2	0.03	0.09	1.00

[a] Years 1999 and 2000 do not include the Sacramento River territories.

[b] An occupied territory is a nesting area that was occupied by a breeding pair of raptors throughout all or a significant portion of the breeding season. Includes successful nests, unsuccessful nests, pairs with unconfirmed nesting status, and pairs not nesting.

[c] Does not include pairs with unconfirmed nesting status.

[d] Active nest = number of successful nests + number of unsuccessful nests.

Table 4-3. Number of Active Territories on the Sacramento River, 2001–2023.

	River Side		
Year	West	East	**Total**
2001	14	13	**27**
2002	12	12	**24**
2003	12	20	**32**
2004	20	18	**38**
2005	11	13	**24**
2006	14	15	**29**
2007	8	12	**20**
2008	8	21	**29**
2009	8	23	**31**
2010	12	15	**27**
2011	11	17	**28**
2012	11	20	**31**
2013	11	14	**25**
2014	10	19	**29**
2015	12	17	**29**
2016	13	13	**26**
2017	15	14	**29**
2018	20	13	**33**
2019	19	13	**32**
2020	18	13	**31**
2021	11	16	**27**
2022	16	19	**35**
2023	11	15	**26**

Table 4-4. Swainson's Hawk Foraging Habitat in the NBHCP Area (acres), 2004–2023.

	Habitat Type			
Year	Upland Agriculture	Fallow Lands	Grasslands[a]	**Total**
2004	8,251	823	7,847	**16,921**
2005	7,566	1,625	7,766	**16,957**
2006	6,462	10,101	7,263	**23,826**
2007	7,919	10,033	5,669	**23,621**
2008	8,293	10,076	5,461	**23,830**
2009	11,692	5,869	5,794	**23,355**
2010	13,863	2,912	4,853	**21,628**
2011	15,100	2,323	4,608	**22,031**
2012	14,019	2,282	4,491	**20,792**
2013	12,096	2,160	4,832	**19,088**
2014	11,601	1,604	4,961	**18,166**
2015	11,771	1,893	4,344	**18,007**
2016	11,890	1,712	4,157	**17,759**
2017	11,089	6,442	4,359	**21,890**
2018	11,782	3,307	4,252	**19,341**
2019	10,488	4,667	4,193	**19,348**
2020	8,837	3,234	4,043	**16,114**
2021	8,784	3,414	4,041	**16,239**
2022	7,752	9,813	5,418	**22,039**
2023	6,835	1,404	6,836	**15,075**

[a] Grasslands include the grasslands (created), nonnative annual grassland, and ruderal land cover types.

FIGURE 4-1
Swainson's Hawk

NBC 104332 (2-27-2023)

FIGURE 4-2
Swainson's Hawk Range

Typical Swainson's hawk nesting and foraging habitat
in the Central Valley

Typical Swainson's hawk nest

FIGURE 4-3
Swainson's Hawk Nesting and Foraging Habitat

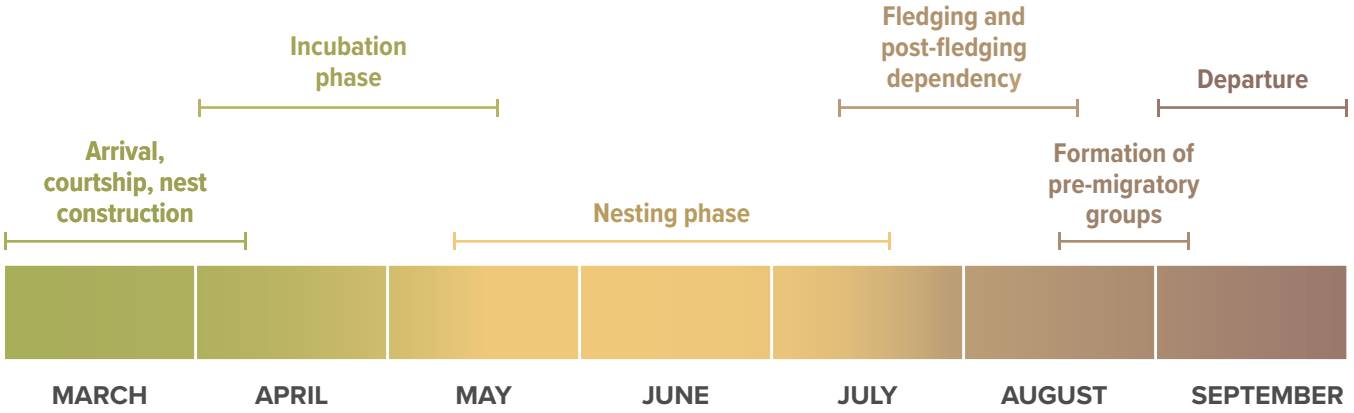


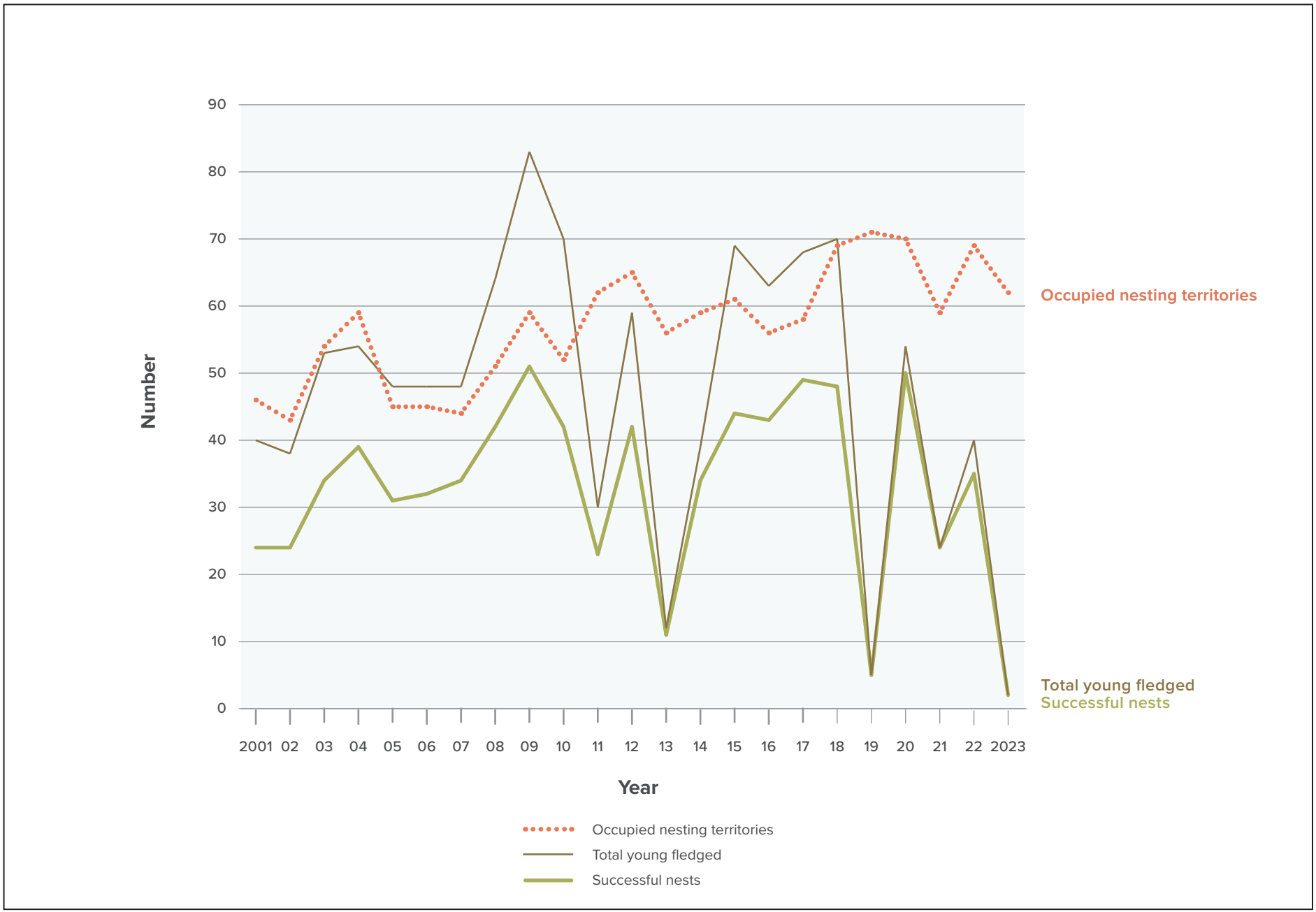
FIGURE 4-4
General Representation of Swainson's Hawk Breeding Cycle in the Central Valley

Swainson's hawk nest with eggs

Nestling Swainson's hawks

Nearly fledged Swainson's hawks

FIGURE 4-5
Swainson's Hawk in the Nest



NBC 104332 2023 AR (3-5-2024)

FIGURE 4-6

Number of Occupied Swainson's Hawk Nesting Territories, Successful Nests, and Total Young Fledged in the Natomas Basin, 2001–2023

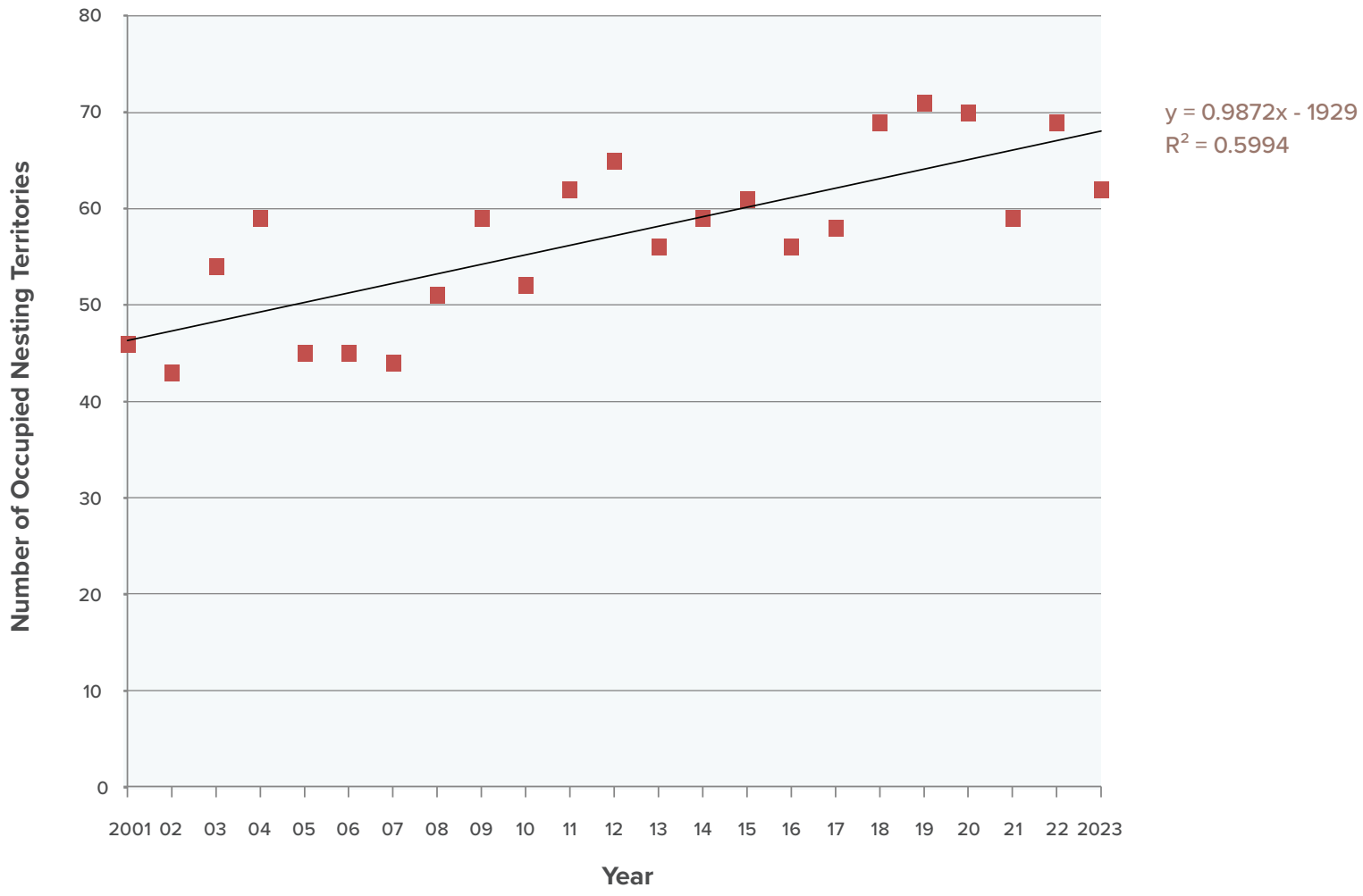
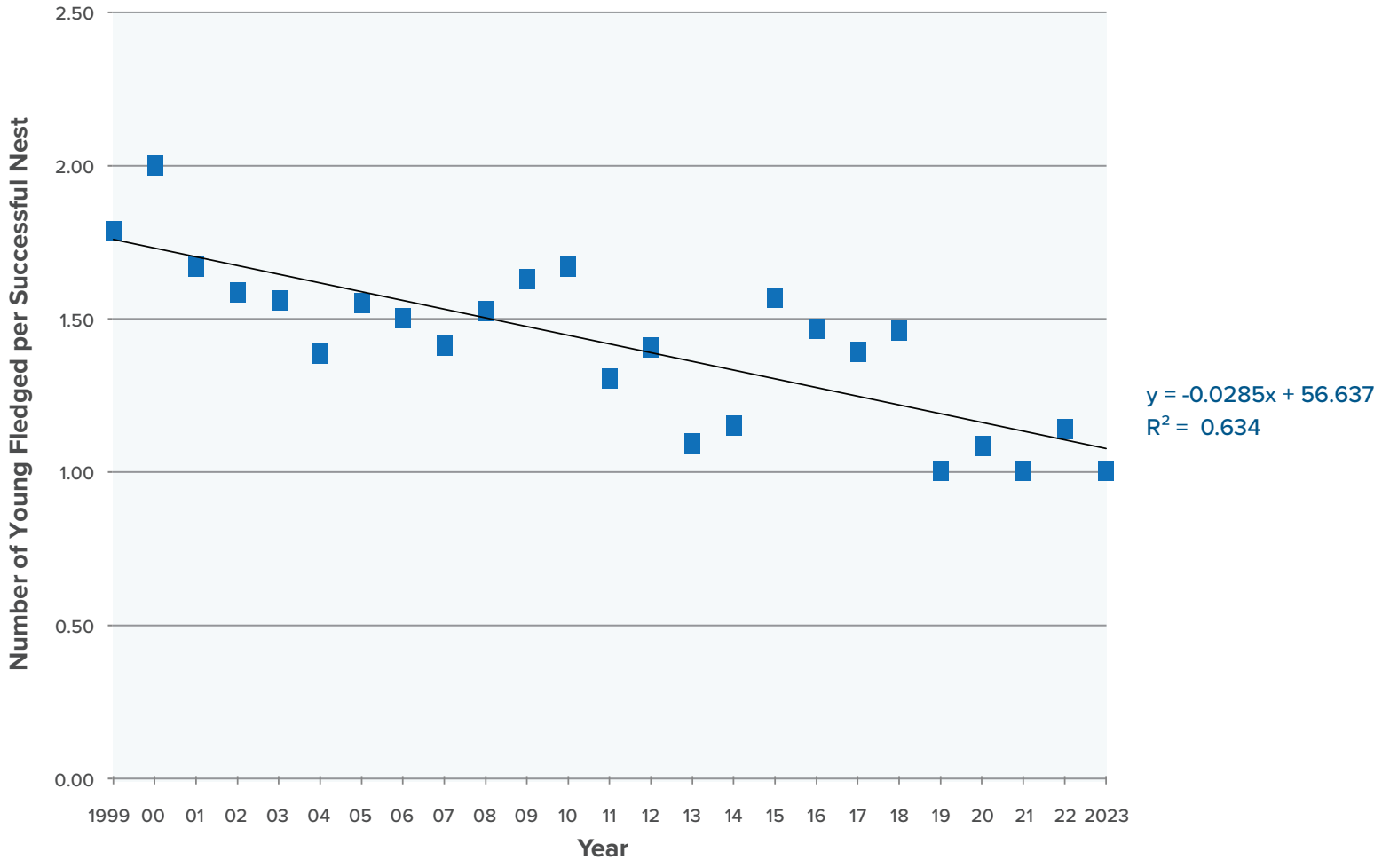


FIGURE 4-7
Trends in the Number of Occupied Territories in the Natomas Basin Nesting Population, 2001–2023

FIGURE 4-8
Various Measures of Swainson's Hawk Reproductive Success in the Natomas Basin, 1999–2023



NBC 104332 2023 AR (3-5-2024)

FIGURE 4-9

Trends in the Number of Young Fledged per Successful Nest in the Breeding Population of Swainson's Hawk in the Natomas Basin, 1999–2023

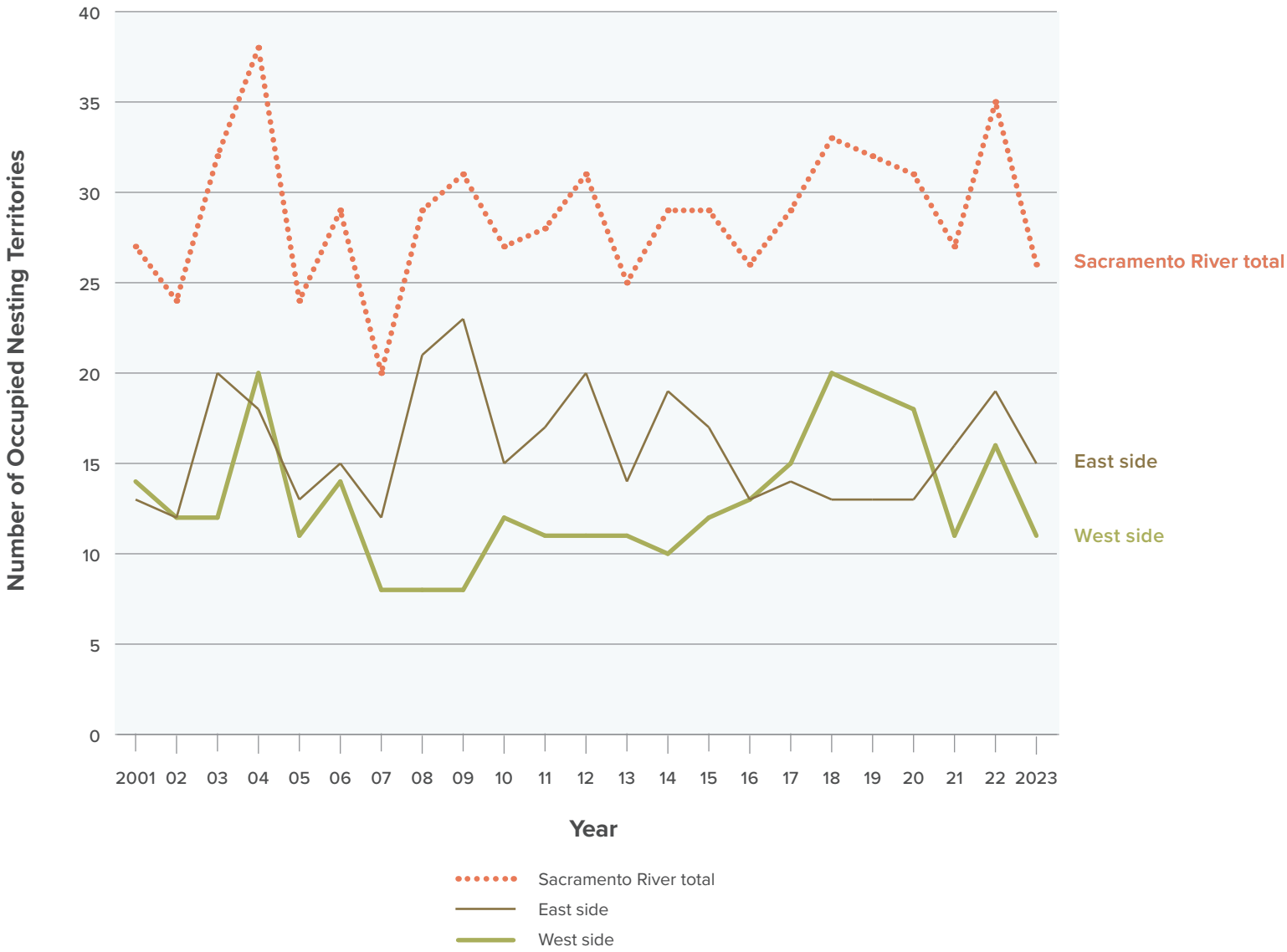
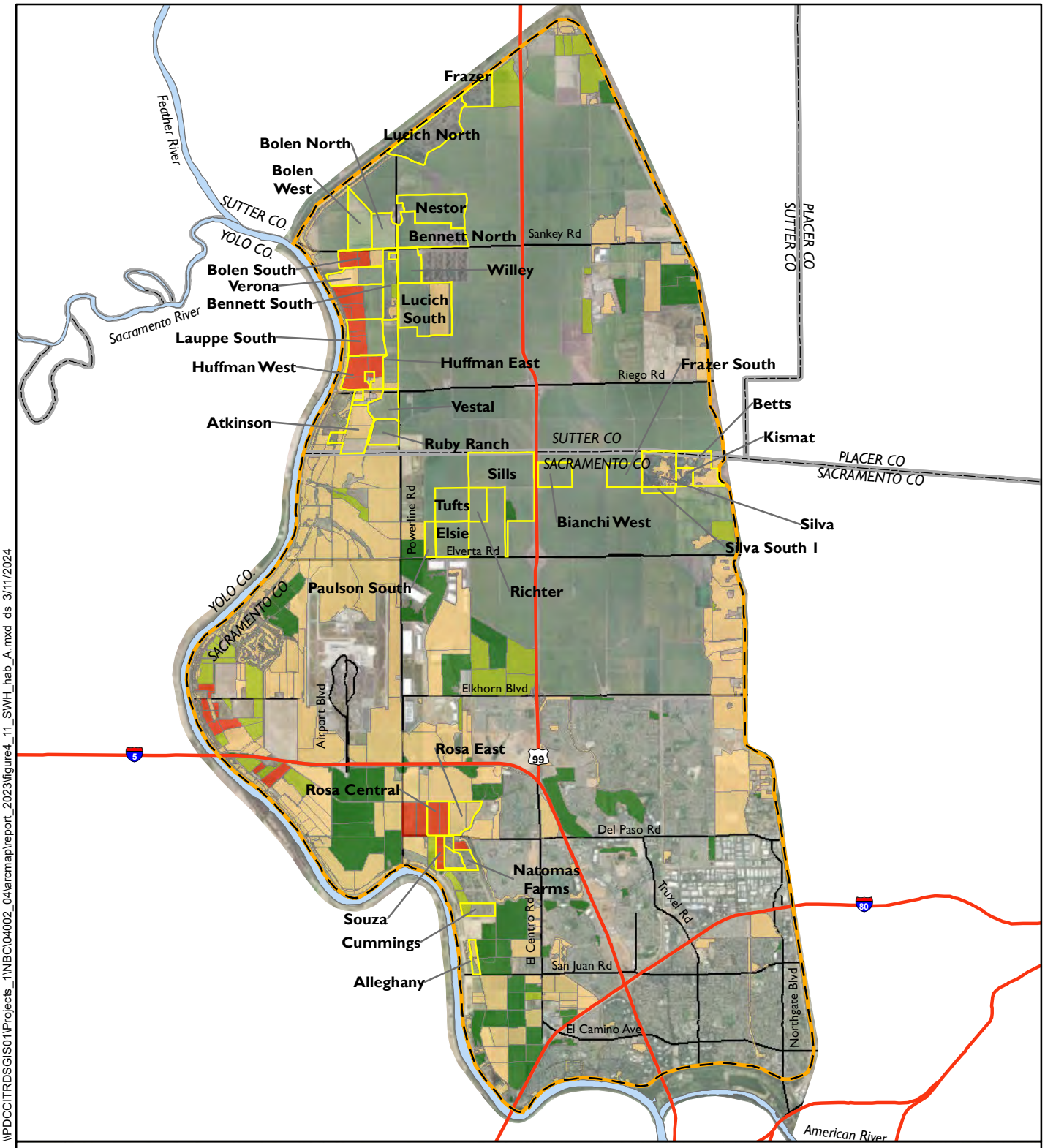


FIGURE 4-10
Number of Occupied Swainson's Hawk Nesting Territories
along the Sacramento River in the Natomas Basin, 2001–2023



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Legend

Swainson's Hawk Foraging Habitat

- High Value
- Moderate Value
- Moderate/Low Value
- Low Value

- Reserve Lands
- NBHCP Area Boundary
- Major Roads

- Roads
- County Boundaries
- Rivers

N

0 1 2 Miles

Figure 4-11
Distribution of Suitable Swainson's Hawk Foraging Habitat, 2023

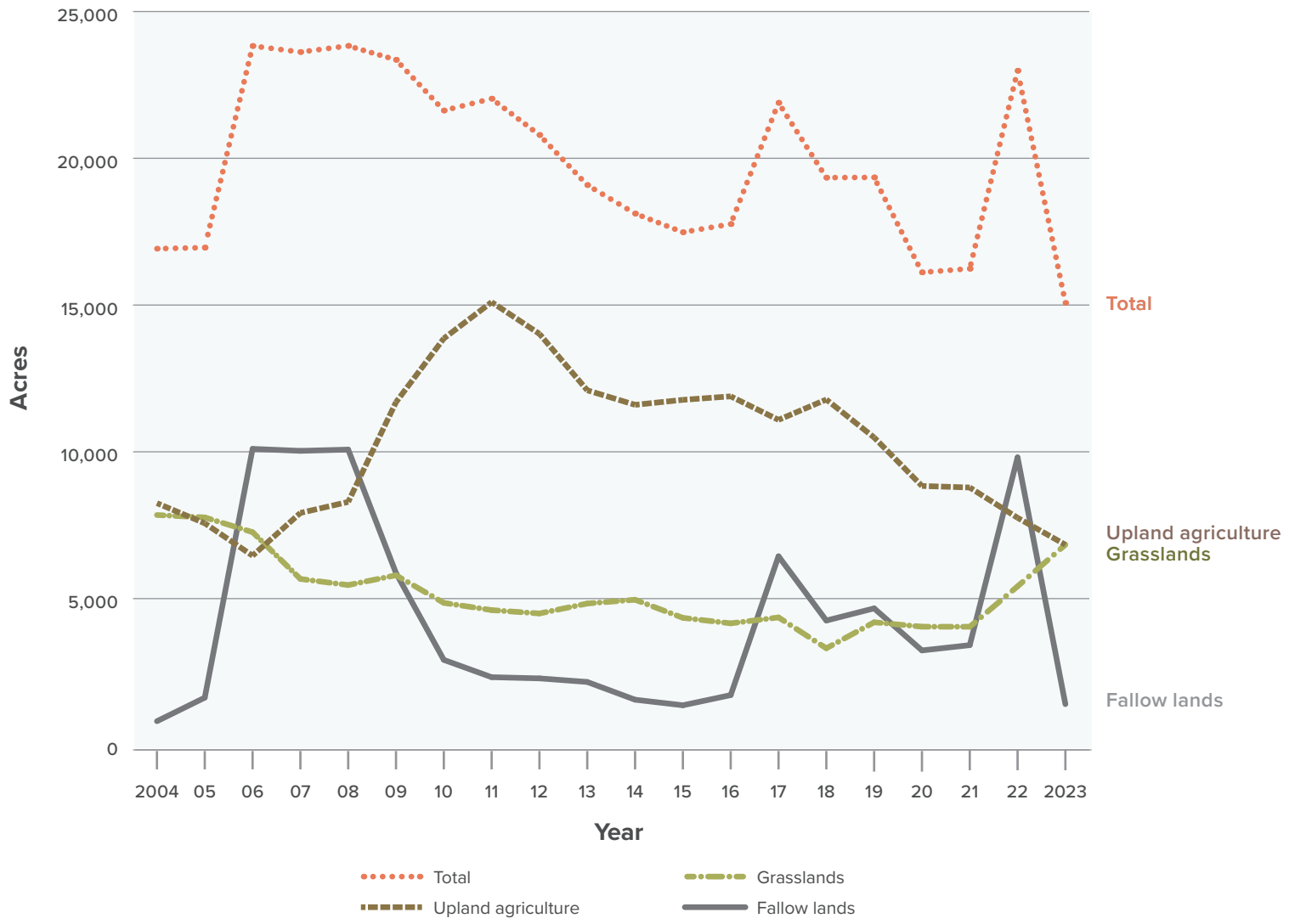

FIGURE 4-12

Changes in the Abundance of Three Categories of Swainson's Hawk Foraging Habitat in the Natomas Basin, 2004–2023

Chapter 5
Other Covered Wildlife Species

CHAPTER HIGHLIGHTS

- Reserve lands continue to provide important habitats for a wide variety of species, including shorebirds, neotropical migrants, raptors, and waterfowl.
- Northwestern pond turtle now occurs on most if not all reserve lands that host a wetland component.
- White-faced ibis and tricolored blackbird have not nested on reserve lands since 2010. These two species nest intermittently on the nearby SCAS Willey Wetlands Preserve and a patch of Armenian blackberry (*Rubus armeniacus*) in an irrigated pasture on private lands. Wetland habitats on reserve lands would need to be enhanced to support nesting by these two species on reserve lands again.
- Burrowing owl and loggerhead shrike detections have significantly declined on both reserve and non-reserve lands. Adaptive management action is required if these species are to be conserved in the Basin.

5.1 Introduction

5.1.1 Background

Other Covered Species include 20 plant and animal species other than giant garter snake and Swainson's hawk that are addressed in the NBHCP and covered by its associated permits (Table 1-2). Monitoring efforts for Other Covered Species, like those for Swainson's hawk and giant garter snake, are designed to evaluate progress in meeting the Plan's biological goals and objectives for Covered Species and their habitats.

Five Other Covered Species have been detected in the Basin: white-faced ibis, loggerhead shrike, tricolored blackbird, burrowing owl, and northwestern pond turtle. Although suitable foraging habitat for Aleutian cackling goose (formerly Aleutian Canada goose) is present, this species has not been detected in the Basin since comprehensive monitoring began in 2004. Suitable nesting habitat for bank swallow (*Riparia riparia*), another Covered Species, is not present in the Basin. Suitable habitat for vernal pool species—vernal pool fairy shrimp (*Branchinecta lynchi*), mid-valley fairy shrimp (*B. mesovallensis*), vernal pool tadpole shrimp (*Lepidurus packardi*), California tiger salamander (*Ambystoma californiense*), and western spadefoot (*Spea hammondii*) — has not been reported in the Basin except for the 11 vernal pools (1 acre) created on the BKS tract and a few potentially suitable wetlands on private property along the extreme eastern edge of the Basin. Created vernal pools on the BKS tract were not inoculated with soil occupied by vernal pool species and to date, there has been no evidence of occupancy of the 11 pools at BKS by any Covered Species. Several blue elderberry (*Sambucus cerulea*) shrubs, the host plant for valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), have been documented in the Basin, but the beetle has

not been found there although no surveys have been conducted. None of the five covered plant species have been detected in the Basin despite intensive monitoring efforts for many years. Several Sanford's arrowhead (*Sagittaria sanfordii*) plants were transplanted to the BKS tract in 2022 but did not survive.

Monitoring populations of Other Covered Species known to occur in the Basin is accomplished using a variety of techniques, including a generalized avian survey on reserves. Two general types of monitoring were conducted to meet the Plan's goals and objectives: monitoring on reserve lands and Basin-wide monitoring on non-reserve lands.

5.1.2 Goals and Objectives

The objectives of monitoring efforts on reserve lands for Other Covered Species are listed below.

- Document the presence/absence and use of reserves by all wildlife species in general and Other Covered Species in particular.
- Compare the relative success of Other Covered Species on and off reserves.
- Evaluate the extent to which the Plan is meeting its objectives to provide open space to benefit all native wildlife species.

Secondary objectives of monitoring on reserve lands include providing information on the effects of management actions and monitoring populations of indicator species that may be useful in assessing the health of managed habitats.

Monitoring on non-reserve lands is limited to surveys for Other Covered Species. The objectives of this monitoring effort are listed below.

- Document the presence/absence of Other Covered Species within the Basin.
- Compare the relative success of Other Covered Species on and off TNBC reserve lands.

5.2 Methods

5.2.1 Surveys on Reserves

Surveys for Other Covered Species include surveys for covered avian species and northwestern pond turtle. These surveys are conducted using a generalized avian monitoring protocol that is a modified area search (Ralph et al. 1993). The survey technique consists of slowly driving roads or walking trails and recording the numbers of each species (both Covered and non-Covered Species) seen or heard on each reserve tract. Areas of dense vegetation, linear tree rows, and areas inaccessible by vehicle are surveyed on foot using the area search technique to ensure complete coverage. The exact route and the time allotted for the survey is specific to each tract and is constrained to ensure consistency in effort and technique through time. The numbers of each avian species seen or heard during the search are recorded. Species observed outside each tract are not counted unless they are clearly associated with the tract in some way (e.g., swallows flying overhead hawking insects, or a raptor perched outside the tract and scanning the ground inside the tract, would be counted). The specific routes taken, and time allotted for each tract, are described in the

Natomas Basin Habitat Conservation Plan Area Biological Effectiveness Monitoring Program (ICF Jones & Stokes 2009).

From 2005 through 2017, each tract was surveyed monthly. Beginning in 2018, the frequency of surveys was modified to incorporate two surveys per month from April through June with one monthly survey in July and August. Surveys were discontinued for September through November whereas surveys December through February were limited to reserves composed of rice fields and emergent wetland habitats (ICF 2017).

Tracts acquired in 2021 included the Willey, Verona, and Lauppe South tracts in the North Basin Reserve, and the Paulsen South, Elverta, and Richter tracts in the Central Basin Reserve. Surveys on the Willey, Paulsen South, and Richter tracts began in January 2021. Surveys on the Verona and Lauppe South tracts began in May 2021. Surveys on the Elverta tract began in January 2022. Surveys on the Lauppe North tract - acquired in January 2022 - also began in January 2022. Surveys on the Paulsen Central tract - acquired in January 2023 - began January 2023. Surveys on the Ann Rudin tract - acquired in February 2023 - began in April 2023.

Observations of Covered Species on non-reserve lands or outside of formal survey periods were recorded separately as incidental observations. Northwestern pond turtle detections were recorded during avian surveys, particularly along marsh shorelines with suitable basking habitat and other areas where turtles congregate to bask.

5.2.2 Surveys on Non-Reserve Land

Surveys for Other Covered Species throughout the Basin on non-reserve lands are specifically designed to obtain maximum geographic coverage of the Basin and to ensure repeatability and consistency. These surveys were conducted monthly from 2005–2017. Since 2018, the survey effort has consisted of one monthly survey from April to July. Surveys in the South Basin region were discontinued at the end of 2017.

The Basin is divided into three regions for the surveys (Figure 5-1) as follows. The North Basin is the area between the Natomas Cross Canal and Elverta Road, the Central Basin is the area between Elverta Road and Del Paso Road, and the South Basin is the area between Del Paso Road and Garden Highway. A road transect has been established in each region. Each road transect covers 48–51 kilometers (30–32 miles) and is surveyed in approximately 1.5 hours. Survey times were assigned to road segments in each transect to minimize variation in effort. A single observer drives slowly (when possible) and scans the area for Other Covered Species, occasionally stopping at pullouts or backtracking where appropriate. Stops occur frequently to scan large fields for Other Covered Species, but the duration and number of stops are constrained by the time allotted for each segment and transect. Each survey route is depicted in Figure 5-1.

5.2.3 Analytical Methods

The average number of detections per survey (i.e., total number of individuals counted divided by the number of surveys) and the proportion of surveys in which at least one individual was counted are the two metrics or indices used to assess relative use of reserve and non-reserve lands between years, seasons, tracts, and reserves. Trends over time in these metrics were evaluated using simple linear regression.

5.3 Results

A complete list of all wildlife species detected on reserves since comprehensive monitoring began is provided in Appendix E-1. The numbers of each bird species detected by tract and reserve during surveys for Other Covered Species in 2023 are provided in Appendix E-2.

5.3.1 Generalized Avian Surveys

In 2023, 117 avian species were detected on reserves, compared to 116 in 2022, and 122 in 2021. The number of species observed each monitoring year has ranged from a low of 114 in 2019 to a high of 139 in 2009. No new species were detected on reserves in 2023. Table 5-1 summarizes the total number of individuals and number of avian species recorded from 2021 through 2023 on each tract (by reserve) for selected taxonomic groups (raptors, waterfowl, neotropical migrants, and shorebirds) and all birds.

5.3.1.1 Raptors

The raptor group consists of hawks and owls, a category of predatory birds that predominantly occupy the top of the food web and are generally less abundant than other groups, making them good indicators of ecosystem health. Although Swainson's hawk and burrowing owl are the only two Covered Species that are raptors, 17 other raptor species have been recorded during avian surveys in the Basin since 2004.

Many raptors are migratory, changing the composition of the raptor community across seasons. For example, Swainson's hawk only occurs in the Basin during the breeding season, spending the winter in Central and South America, while large numbers of red-tailed hawks and other species move into the Basin from other areas during winter.

Across all years and all seasons, red-tailed hawk (*Buteo jamaicensis*) continues to be the most abundant raptor on reserve lands, followed by northern harrier (*Circus hudsonius*), American kestrel (*Falco tinnunculus*), red-shouldered hawk (*Buteo lineatus*), and white-tailed kite (*Elanus leucurus*). The annual average number of raptors detected per survey on reserve lands was 0.094 in 2023, the lowest value ever recorded over the monitoring period (Figure 5-2). There has been a significant decline in raptor detections over the monitoring period (R^2=0.531, P<0.001), driven primarily by declines in the number of detections of northern harrier (R^2=0.652, P<0.001) and American kestrel (R^2=0.655, P<0.001).

Raptors are most abundant on the BKS tracts in the Central Basin Reserve (0.320 raptor detections per survey) and Atkinson tract in the North Basin Reserve (0.223 raptor detections per survey), followed by Lucich South (0.133 raptor per survey) and Lucich North (0.127 raptor per survey). Raptors are most abundant on reserves from September through March when large numbers of migratory raptors come into the Central Valley to spend the winter.

5.3.1.2 Waterfowl

The waterfowl group—comprising geese, swans, and ducks—is an important aesthetic and sporting resource in the Basin. Approximately 60% of the ducks and geese that migrate along the Pacific Flyway use the wetlands, flooded agricultural fields, and wildlife refuges in the Central Valley during winter. The waterfowl population wintering in the Central Valley comprises 20% of all waterfowl in

North America (Heitmeyer et al. 1989). Because less than 10% of the wetlands that historically covered the Central Valley still exist today, this group is of high management concern in the region.

Greater white-fronted goose (*Anser albifrons*) is the most abundant species of waterfowl on reserve lands, followed by snow goose (*Anser caerulescens*), mallard (*Anas platyrhynchos*), northern shoveler (*Spatula clypeata*), and pintail (*Anas acuta*). The average number of waterfowl detected per survey on reserve lands exhibits a great deal of variation over the monitoring period, as would be expected for migratory species that occur in very large flocks (Figure 5-3). However, there is no evidence of a significant increase or decrease in waterfowl numbers as a group over the monitoring period (R^2=0.165, P=0.085). Of the four most abundant species, only mallard has exhibited a significant decline over the monitoring period (R^2=0.734, P<0.001) (Figure 5-3).

The BKS tracts support the largest number of waterfowl followed by the Lucich South, Lucich North, and Bennett North tracts. BKS and Lucich North are composed almost entirely of wetlands; the other tracts with high numbers of waterfowl are composed of rice fields. Waterfowl numbers are highest from December through February when large numbers of geese and other waterfowl begin to arrive in the Central Valley to spend the winter.

5.3.1.3 Neotropical Migrants

Neotropical migrants are defined here as passerine (perching) birds (e.g., flycatchers, swallows, warblers) that breed in North America in the summer and migrate in fall to the Neotropics (southern United States, Mexico, Central America, and South America) to spend the winter. Populations of neotropical migrants are generally declining, due in part to loss of habitats such as riparian woodlands in both their breeding and wintering ranges, as well as habitat loss along migration routes. The riparian woodlands on the western and northern edges of the Natomas Basin are an important resource for breeding and migrating neotropical migrants. This habitat type has recently increased substantially in the Basin because of mitigation associated with the NLIP. Many species such as kingbirds (*Tyrannus* spp.) and swallows also make extensive use of the wetlands, grasslands, and agricultural habitats on reserve lands for foraging.

Cliff swallow (*Petrochelidon pyrrhonota*) is the most abundant neotropical migrant on reserve lands, followed by barn swallow (*Hirundo rustica*), tree swallow (*Tachycineta bicolor*), and western kingbird (*Tyrannus verticalis*) (Figure 5-4). There has been no significant increase or decrease in the numbers of neotropical migrant detections over the monitoring period (R^2=0.046, P=0.377), although there have been significant declines in the numbers of detections of barn swallows and tree swallows over the monitoring period (R^2=0.424, P<0.003 and R^2=0.289, P=0.018, respectively) (Figure 5-4).

Detections of neotropical migrants have been driven primarily by cliff swallow, which began nesting in large numbers under the carport on the BKS tracts in the Central Basin Reserve in 2012. In 2015, cliff swallows arrived on the BKS tract in April and May, but the colony collapsed, and no young were fledged. The cliff swallow nesting colony did not return in 2016 or 2017, although large numbers of birds continue to congregate on the BKS tracts, possibly nesting in smaller groups throughout the tracts. In 2018, cliff swallows nested on both the BKS tracts and under the drainage canal between the AKT and Sharma SAFCA tracts. A similar pattern was repeated in 2019. In 2020, cliff swallows again nested in the culvert draining the SAFCA marshes into Fisherman's Lake, but in small numbers, and were not detected nesting anywhere else on reserve lands. No cliff swallow nesting colonies have been detected since 2019.

5.3.1.4 Shorebirds

Shorebirds are a diverse taxonomic group that includes sandpipers, plovers, stilts, avocets, snipes, and phalaropes. The majority of species migrate long distances between breeding and wintering areas. The shallow wetlands and flooded agricultural fields of the Central Valley constitute one of the most important foraging areas in western North America for migrating and wintering shorebirds (Shuford et al. 1998). The post-harvest rice fields and marsh complexes of TNBC's reserve system provide important habitats for shorebirds during spring and fall migration. Management of these habitats can have a strong influence on the number of shorebirds stopping over in the Basin. Like waterfowl, shorebirds are a group of high management concern in the region.

Some shorebird species have been documented breeding on reserve lands, including American avocet (*Recurvirostra americana*), black-necked stilt (*Himantopus mexicanus*), and killdeer (*Charadrius vociferus*). These species tend to be most abundant during June through August, the period after young have fledged. Conversely, the non-resident shorebirds tend to be most abundant from November through January. The largest numbers of shorebirds by far are found on the BKS tract, followed by the Lucich South, Lucich North, and Nestor tracts. Long-billed dowitcher (*Limnodromus scolopaceus*), killdeer, dunlin (*Calidris alpina*), and least sandpiper (*Calidris minutilla*) are the most abundant shorebirds on reserve lands.

Shorebird detections have decreased significantly over the monitoring period (R^2=0.465, P=0.001). Long-billed dowitcher, killdeer, and dunlin all exhibit significant declines in the number of detections over the monitoring period (R^2=0.301, P=0.015, R^2=0.784, P<0.001, and R^2=0.266, P=0.024, respectively), while least and western sandpiper (*Calidris mauri*) numbers show no evidence of an increase or decrease over the monitoring period (Figure 5-5).

5.3.1.5 Other Species and Observations of Interest

Yellow-billed magpie (*Pica nuttalli*) is endemic to California, and its range is restricted to the Central Valley, southern Coast Ranges, and Sierra Nevada foothills. Numbers of this species have declined rapidly in the Central Valley in association with the introduction and spread of West Nile virus, first detected in this species in 2004 (Ernest et al. 2010). Yellow-billed magpie appears to be more susceptible to West Nile virus than most species (Wheeler et al. 2009), and the impacts of West Nile virus on avian populations is of increasing concern because populations of many species have not recovered after initial contact with the disease (George et al. 2015).

The mean number of detections per survey has declined drastically and significantly over the monitoring period (R^2=0.796, P<0.001) (Figure 5-6). Although yellow-billed magpie has been detected on most reserve tracts over the monitoring period, the species began to disappear from tracts that did not contain nesting habitat after 2008. This species is most common on tracts with significant woodlands such as Alleghany 50, Atkinson, BKS, and Huffman West; however, even on these tracts, there has been a significant decline in the number of detections per survey over the monitoring period (R^2=0.581, P<0.001).

The distribution and abundance of Canada goose (*Branta canadensis*) has been increasing in the United States for several decades. Populations in some areas have grown substantially, so much so that they are considered pests for their droppings, bacteria in their droppings, noise, and damage they do to some grasslands.

Although California is outside the historical breeding range of Canada goose, numerous resident populations have become established. Because they are herbivorous, they can present management problems in natural landscapes where the management goal is establishment of native grasses. Numbers of Canada goose detected on reserves have significantly increased during the monitoring period (R^2=0.740, P<0.001), although the numbers appear to have stabilized since 2019 (Figure 5-6). Canada goose now regularly nests on several reserve tracts, including the BKS, Lucich North, Lucich South, Frazer, Bennett North, and Bennet South tracts.

5.3.2 Other Covered Species

All five Other Covered Species known to occur in the Basin have been documented using reserve lands, and all have been documented or are suspected of breeding on reserves at some point since comprehensive monitoring began (Tables 5-2 and 5-3). Northwestern pond turtles of varying size are now routinely documented on reserves, and thus breeding on reserves is almost certain.

The average number of individuals detected per survey of avian Other Covered Species recorded during surveys on reserves is summarized in Table 5-3. The average numbers of avian Other Covered Species detected per survey during non-reserve land surveys are summarized in Table 5-4.

5.3.2.1 Loggerhead Shrike

Loggerhead shrike has been a year-round resident in the Basin and has been detected throughout the year (Figure 5-7). The mean number of detections per survey on reserve lands has been cyclic over the course of the monitoring period, peaking in 2009 and 2012, followed by a significant decline after 2013 (Table 5-3, Figure 5-7). Shrike detections have remained low since 2014 and declined to zero in 2022. In 2023 there were two detections on the southern edge of the Bennett North tract. In both cases the flushed bird flew south to the SCAS Willey Wetlands Preserve. The decline in shrike detections on reserve lands over the monitoring period is statistically significant (R^2=0.347, P=0.008).

The decline in the shrike population on non-reserve lands has also been statistically significant (R^2=0.816, P<0.001), with no detections since 2017 (Table 5-4; Figure 5-7).

The few shrikes detected on non-reserve lands over the last 4 years have all been associated with large contiguous patches of habitat with minimal human disturbance (e.g., the ruderal area of SCAS buffer lands north of the Atkinson tract, the SCAS buffer lands north of the Rosa tracts, and the SCAS Willey Wetland Preserve south of the Bennett North tract).

5.3.2.2 White-Faced Ibis

White-faced ibis typically occurs in very low numbers outside the breeding season and moves into the Basin in large numbers from May through September (Figure 5-8). The species was regularly detected foraging in small numbers on reserve lands when comprehensive monitoring began in 2005. From 2007 through 2010 white-faced ibis nested in large numbers on the BKS tracts in the Central Basin Reserve (Table 5-2). No nesting was detected in the Basin in 2011. In 2012, the nesting colony moved to the SCAS Willey Wetlands Preserve. The SCAS Willey Wetlands Preserve nesting colony was active again in 2013 and 2021, with 400 to 600 nesting pairs. White-faced ibis has not nested in the Basin since 2010.

On reserve lands, neither the mean number of white-faced ibis detected per survey nor the proportion of surveys in which the species was detected exhibits a significant increase or decrease over the monitoring period (Table 5-3, Figure 5-8).

On non-reserve lands, the proportion of surveys in which white-faced ibis was detected shows a statistically significant increase over the monitoring period (R^2=0.222, P=0.042) through 2022. White-faced ibis was not detected on non-reserve lands in 2023 (Figure 5-8).

5.3.2.3 Tricolored Blackbird

Tricolored blackbird is detected in the Basin year-round (Figure 5-9), although numbers are impossible to estimate outside the breeding season when the species primarily occurs in large, mixed-species flocks. During the breeding season, tricolored blackbird occurs in single-species flocks that are more detectable, even when they are not breeding.

Tricolored blackbird nested on the BKS tract in a small patch of Armenian blackberry in 2005 and 2007. A second colony was established in a patch of Armenian blackberry in 2007 in an irrigated pasture on private land. At the end of the 2007 breeding season, TNBC trimmed the patch of Armenian blackberry where tricolored blackbirds had nested on the BKS tract. In 2008, the BKS colony nested in the created emergent tule marsh on the tract, and TNBC removed the entire patch of Armenian blackberry that tricolored blackbird had previously nested in, and the colony on private lands moved to the marsh on the Frazier tract. Tricolored blackbird nested in the marshes on the BKS tracts in 2009 and 2010.

In 2011, a new colony was established on the SCAS Willey Wetlands Preserve. In 2012, no tricolored blackbirds nested in the Basin for the first time since 2006. In 2013, tricolored blackbird again nested on the SCAS Willey Wetlands Preserve although the nesting attempt was eventually abandoned. In 2020, tricolored blackbird again nested on the SCAS Willey Wetlands Preserve. In 2023 tricolored blackbirds nested in the large patch of Armenian blackberry on the northern edge of the Basin on private property.

Tricolored blackbird detections on reserve lands exhibit a significant decrease over the monitoring period, primarily due to the presence of nesting colonies on the BKS and Frazer tracts from 2005 through 2010 (R^2=0.313, P=0.013) and subsequent lack of nesting on reserve lands, while the proportion of surveys in which tricolored blackbird was detected on reserve lands does not exhibit any significant increase or decrease over time (R^2=0.017, P=0.593) (Figure 5-9).

Conversely, the proportion of surveys in which tricolored blackbird was detected on non-reserve lands has increased significantly over the monitoring period (R^2=0.430, P=0.002) (Figure 5-9), primarily due to the movement of the nesting colonies in the Basin to non-reserve lands, while the mean number of tricolored blackbirds detected per survey on non-reserve lands exhibits no significant increase or decrease over time (Figure 5-9).

5.3.2.4 Western Burrowing Owl

Burrowing owl is known to breed and winter in low densities in the Basin and can be regularly detected throughout the year (Figure 5-10).

On reserve lands a single pair resided at the BKS tract in 2004 and 2005 but disappeared after one member of the pair was apparently killed by a great horned owl in 2006. Burrowing owl

subsequently bred on the Elsie and Tufts tracts for several years, but the species has not bred on reserve lands since 2012 (Table 5-2). Burrowing owl continues to winter on the Elsie and Tufts tracts, with a scattering of winter sitings on other reserve tracts.

Neither the mean number of burrowing owls detected per survey nor the proportion of surveys in which owls were detected on reserve lands exhibit a statistically significant increase or decrease over the monitoring period (R^2=0.184, P=0.067 and R^2=0.194, P=0.059, respectively) (Table 5-3, Figure 5-10).

Breeding burrowing owls have likewise disappeared from most of the Basin, although Basin-wide surveys could easily miss owls on private lands and other areas not covered by survey routes.

Three burrowing owl nesting colonies were documented in the Basin on non-reserve lands over the monitoring period. One occurred in the Sleep Train Arena Parking lot, but the colony was abandoned when the parking lot was used as a temporary parking space for large commercial trucks.

The second colony occurred near the eastern edge of the Basin just north of Del Paso Boulevard near Aimwell Road along a dirt road bordering an agricultural field. The field road was eventually disked, removing the high ground and ground squirrel burrows required by the owls and the site was abandoned.

The third colony occurs just north of Elkhorn Boulevard near the eastern edge of the Basin in an elevated area between two agricultural fields that historically contained several buildings that have since been removed. Breeding owls at this site also occurred across the street to the south in a dry pasture field. Maintenance in the form of mowing and controlling vegetation decreased over time until the site became unsuitable and was abandoned by the owls. One to two pairs of owls continue to inhabit the dry pasture on the south side of the road. Breeding was last documented at this site in 2021.

Burrowing owl has been documented inhabiting several scattered locations within the Basin over the monitoring period, but never for more than a single year.

Neither the mean number of burrowing owls detected per survey nor the proportion of surveys on which owls were detected on non-reserve lands exhibit a statistically significant increase or decrease over the monitoring period (R^2=0.077, P=0.251 and R^2=0.010, P=0.679, respectively) (Table 5-4, Figure 5-10).

Burrowing owl is occupying fewer places in the Basin and is no longer resident in some areas where the species historically occurred, both on and off reserve lands.

5.3.2.5 Northwestern Pond Turtle

Northwestern pond turtle is known to have occured in several areas of the Basin prior to the onset of comprehensive monitoring in 2005, including Fisherman's Lake and near the Prichard Lake and Elkhorn pumping stations. Red-eared slider (*Trachemys scripta elegans*), a naturalized but nonnative species that superficially resembles northwestern pond turtle, can be difficult to distinguish from northwestern pond turtle before a turtle slips into the water and disappears from sight. Since 2013, large, adult northwestern pond turtles have been observed regularly in Fisherman's Lake adjacent to the Rosa and Natomas Farms tracts during the summer months. Northwestern pond turtle has also been documented on the Cummings, Natomas Farms, and Rosa Central tracts of the Fisherman's

Lake Reserve, the BKS and Sills tracts of the Central Basin Reserve, and the Lucich North, Lucich South, Bennet North, Bennet South, and Frazer tracts of the North Basin Reserve (Table 5-3, Figure 5-11).

Due to the difficulty in determining species when turtles of all species dive at the first sign of disturbance, it is impossible to tell if the increase in turtle sightings is due to an increasing number of northwestern pond turtles or if the increase is due to increased numbers of nonnative turtles. Monitoring data indicate that the creation of marsh and wetland habitats has benefitted the population of northwestern pond turtles in the Basin.

5.4 Discussion

Monitoring results over the last 19 years indicate that TNBC reserves meet the NBHCP objective of providing open space to benefit wildlife species (i.e., covered and non-covered species). On average, 125 species of birds are documented annually on reserves — most of which are typical of the Central Valley and associated with agricultural habitats, but also includes some rarely seen species and species that depend on specialized habitats such as wetlands, riparian forest, and grasslands.

The data collected indicate that the creation of emergent tule marsh and other aquatic wetlands on reserve lands have benefitted some Covered Species. Northwestern pond turtle detections on reserve lands demonstrate that the species has successfully colonized most, if not all, of the TNBC tracts with created emergent tule marsh habitats. However, tricolored blackbird and white-faced ibis have not nested in created emergent tule marsh habitats on TNBC reserves since 2010 and data show that other species' (e.g., loggerhead shrike) detections and nesting have declined significantly. Tricolored blackbird populations have experienced significant declines throughout their range and were listed as threatened under the California ESA. Tricolored blackbird is an itinerant breeder (Beedy et al. 2023) that still intermittently nest in relatively small colonies in the Basin and use reserve lands to roost and forage. However, the species has not nested on reserve lands since 2010, nesting instead in the created emergent tule marsh non-reserve habitat on the SCAS Willey Wetlands Preserve and in a large patch of Armenian blackberry in an irrigated pasture on private lands.

Larger contiguous patch size of tules and Armenian blackberry, more extensive emergent tule benches, stable water levels that are maintained throughout the nesting season, and less human disturbance appear to be the characteristics that distinguish the SCAS Willey Wetland Preserve from the TNBC created and managed wetlands. TNBC lands do not contain either irrigated pasture nor patches of Armenian blackberry which are known and often preferred nesting and foraging habitats for tricolored blackbird (Beedy et al. 2023). Water levels must be maintained at levels to support the preferred nesting vegetation which would provide the basic habitat requirements to support nesting of tricolored blackbird or white-faced ibis.

The pattern of nesting by white-faced ibis (i.e., nesting on the BKS tract prior to 2010 and subsequent move to the SCAS Willey Wetlands Preserve) is very similar to that of tricolored blackbird indicating that larger patch size, more extensive emergent tule benches, stable water levels maintained throughout the nesting season, and less human disturbance are important for this species as well. There are adaptive management opportunities to enhance and improve reserve lands to ensure that habitat requirements for tricolored blackbird are met.

Loggerhead shrike and burrowing owl have all but disappeared from the Basin on both reserve and non-reserve lands. The factors influencing these declines are unknown. That these declines occur on both reserve and non-reserve lands suggest that factors beyond TNBC's control, such as climate change or widespread use of biocides, may be contributing to these declines. The decline in some raptors, shorebirds, and other species adds support to this hypothesis.

The creation of extensive grasslands adjacent to the stands of oak woodland along the western side of the Basin along with the establishment of additional riparian and wetland habitats in this area as mitigation for the NLIP has resulted in a substantial expansion of loggerhead shrike habitat. However, to date no increase in the shrike population has been documented.

Recent studies in Europe show dramatic declines in insect abundance even in wilderness areas (Hallmann et al. 2017), indicating that biocide use may be having dramatic effects well beyond the area of application. Use of biocides has been implicated in the decline of loggerhead shrikes across the species range (Yosef 2020) and in some burrowing owl populations (Poulin et al. 2020).

Habitats for Other Covered Species associated with vernal pools (e.g., vernal pool invertebrates, western spadefoot, and California tiger salamander) are generally lacking in the Basin, except for the created vernal pool habitats on the BKS tracts. No evidence of occupancy by any covered species has been observed in these pools.

5.5 Effectiveness

Biological effectiveness as it pertains to Other Covered Species is measured primarily based on land management activities that promote the development and enhancement of habitats for these species and the response of populations to these management actions.

Data obtained for tricolored blackbird, white-faced ibis, and northwestern pond turtle to the NBHCP and MAPHCP operating conservation program indicate mixed responses, with some positive results (northwestern pond turtle) while also indicating that reserve design and management need to be improved for tricolored blackbird and white-faced ibis. The data regarding burrowing owl and loggerhead shrike indicate that additional management actions are required if these species are to be conserved in the Basin.

5.6 Recommendations

The following list of recommendations to improve habitat design and management were developed based on data obtained from published and unpublished sources on natural history and management of select Covered Species, as well as data obtained from this monitoring program. Implementation of many of these recommendations will likely benefit the entire suite of Covered Species known to occur in the Basin.

5.6.1 Western Burrowing Owl

Burrowing owl nests in burrows in open grasslands away from trees and power poles. Burrows for escape from predators and for nesting are required. Nest boxes have been used successfully across the northern and western U.S. Protection of burrowing mammals, installation of nest boxes,

installation of perches to provide sites for hunting and predator observation, restriction of biocides, and vegetation management through fire or grazing have all been used to improve burrowing owl habitat (Poulin et al. 2020). We provide the following recommendations for this Covered Species:

- Limit the use of biocides to the maximum extent practicable on all reserve lands to allow insect prey populations to recover and to prevent direct adverse effects of biocides on this species.
- Promote the expansion of existing California ground squirrel populations on the BKS tract and the ruderal field on the Sills tract and/or consider translocation of ground squirrels to these or other suitable sites. California ground squirrels have persisted in the Central Basin Reserve rice fields west of SR 99 and appear to be compatible with rice production and water conveyance infrastructure.
- Create burrowing owl nesting habitat using recently designed above ground artificial burrows in grassland habitats that can be maintained in shorter grass through grazing where possible.
- Provide elevated perch sites in areas where burrowing owl habitat is to be improved or created and managed.
- Restore irrigated pasture near areas where burrowing owl habitat is to be managed or created to provide foraging habitat for burrowing owls and other covered species.
- Consider relocating owls being displaced by development or other projects onto TNBC reserves, using artificial burrows in appropriate places and techniques developed in other relocation efforts.
- Consider active translocation from healthy populations elsewhere and supplemental prey to encourage establishment following translocation, similar to what is being done for the Santa Clara Valley HCP and Natural Community Conservation Plan in Santa Clara County, CA.

5.6.2 Tricolored Blackbird

Tricolored blackbird is a colonial nester that nests in dense emergent marsh and in patches of Armenian blackberry in the northern central valley. Colony sites frequently change from year to year, indicating a need for several distinct patches of suitable nesting habitat. Patch sizes used typically exceed 15 meters wide and thus must be large. Tricolored blackbird will travel substantial distances to find suitable foraging habitat in rice fields, grasslands, wetlands, alfalfa fields and irrigated pastures. The species requires large amounts of insect prey to nest successfully. Recommendations for this covered species are as follows:

- Expand existing created emergent tule marsh habitats rather than creating new ones in separate locations to increase the patch size of marsh habitats.
- Expand tule benches in existing marsh habitats.
- Maintain water levels according to design specifications in approved land management plans to ensure that tule benches are continually submerged throughout the nesting season (May through August).
- Design native habitats to minimize disturbance by minimizing roads, maximizing emergent marsh patch size, and maximizing the distance between water control structures.
- Create new, lightly grazed irrigated pasture.

- Graze grasslands such as the Bennett South grassland and the ruderal field on the Sills tract to maximize the availability of insect prey and maintain appropriately low grass heights.
- Minimize or eliminate the use of biocides or—when absolutely necessary—use biocides that are the least toxic and most specific to the species being targeted.
- Conduct necessary management activities (i.e., mowing, weed spraying, etc.) outside the breeding season (May through August) to minimize disturbance and human presence and the potential for nest disturbance, destruction, or abandonment.
- If Armenian blackberry becomes reestablished in a suitable location (a location with little to no disturbance and proximity to foraging habitat), allow it to persist and expand.

5.6.3 Loggerhead Shrike

Loggerhead shrike inhabits ecotones, grasslands, and other open habitats and feeds on a variety of insects and vertebrates such as lizards and small birds and mammals. The species forages primarily in open habitats and often impales prey on thorny vegetation or barbed wire fences. Across its range, loggerhead shrike is often associated with active pasture lands with many perches and typically breeds in isolated trees or large shrubs (Yosef 2020). We provide the following recommendations for this covered species:

- Create new lightly grazed irrigated pasture.
- Maintain and lightly graze other grasslands such as the ruderal field on the Sills tract, the relatively large grassland on the Bennett South tract, or the grasslands on the eastern edge of the BKS tract.
- Minimize or eliminate the use of biocides or when absolutely necessary, use biocides that are the least toxic and most specific to the species being targeted.
- Design native habitats to minimize disturbance by minimizing roads, maximizing emergent marsh patch size, and maximizing the distance between water control structures.

5.7 References

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Table 5-1. Summary of Results of Monthly Avian Surveys by Reserve and Tract,[a] 2021–2023.

	Waterfowl			Raptors			Neotropical Migrants			Shorebirds			All Bird Species		
Reserve	**2021**	**2022**	**2023**	**2021**	**2022**	**2023**	**2021**	**2022**	**2023**	**2021**	**2022**	**2023**	**2021**	**2022**	**2023**
North Basin Reserve															
Atkinson	179 (4)	73 (3)	14 (`1)	41 (8)	42 (6)	21 (5)	116 (9)	136 (9)	81 (6)	6 (2)	8 (2)	4 (1)	2,405 (65)	1,609 (59)	1,153 (49)
Bennett North	3,414 (12)	748 (11)	1,131 (10)	29 (6)	8 (4)	3 (3)	15 (3)	47 (3)	44 (3)	8 (2)	20 (1)	29 (2)	5,087 (41)	1,550 (38)	2.060 (38)
Bennett South	627 (4)	33 (8)	48)2)	28 (7)	14 (6)	12 (4)	16 (5)	20 (4)	4 (2)	34 (4)	4 (1)	27 (2)	3,702 (42)	4,846 (35)	786 (24)
Bolen North	2,483 (3)	12 (1)	453 (2)	5 (2)	8 (3)	- (-)	2 (1)	1 (1)	- (-)	48 (3)	9 (2)	73 (2)	3,793 (24)	744 (23)	1,279 (17)
Bolen South[b]	- (-)	- (-)	- (-)	5 (2)	6 (2)	2 (1)	55 (4)	45 (5)	59 (3)	- (-)	- (-)	- (-)	1,911 (26)	408 (29)	243 (23)
Bolen West	676 (5)	- (-)	20 (3)	7 (4)	8 (4)	3 (2)	11 (3)	16 (2)	17 (2)	413 (4)	- (-)	112 (2)	5,092 (37)	348 (15)	546 (22)
Frazer North	1,078 (9)	548 (11)	477 (12)	9 (4)	9 (3)	4 (3)	8 (1)	22 (3)	53 (4)	15 (1)	20 (2)	44 (3)	2,669 (38)	1,865 (40)	2.050 (43)
Huffman East	173 (3)	16 (1)	141 (3)	13 (4)	5 (4)	5 (3)	4 (2)	3 (2)	5 (2)	8 (2)	14 (1)	4 (2)	2,341 (24)	1,737 (28)	607 (25)
Huffman West[b]	- (-)	- (-)	- (-)	25 (5)	12 (4)	7 (4)	32 (4)	25 (5)	38 (2)	13 (2)	8 (1)	- (-)	1,163 (28)	590 (24)	256 (17)
Lauppe North	n/a	- (-)	34 (3)	n/a	15 (5)	7 (3)	n/a	15 (2)	23 (2)	n/a	44 (3)	250 (4)	n/a	1,842 (29)	704 (31)
Lauppe South	2 (1)	128 (3)	95 (2)	1 (1)	3 (3)	3 (2)	12 (4)	17 (4)	9 (1)	61 (2)	156 (4)	25 (3)	399 (25)	1,195 (28)	391 (25)
Lucich North	2,608 (17)	1,338 (19)	1,545 915)	26 (5)	15 (5)	17 (4)	32 (3)	46 (4)	23 (2)	429 (4)	180 (5)	158 (4)	6,010 (55)	2,542 (52)	4,134 (51)
Lucich South	5,630 (13)	265 (6)	2,029 (7)	32 (7)	22 (4)	14 (6)	2 (1)	12 (2)	33 (4)	99 (7)	158 (4)	263 (5)	8,055 (49)	11,463 (41)	3,258 (45)
Nestor	30 (3)	2 (1)	80 (3)	9 (2)	13 (4)	5 (5)	3 (2)	- (-)	2 (2)	43 (5)	4 (1)	10 (1)	1,452 (28)	440 (19)	600 (23)
Ruby Ranch	28 (2)	60 (1)	3 (1)	7 (3)	10 (2)	2 (2)	18 (4)	14 (2)	36 (5)	20 (3)	9 (2)	26 (3)	3,525 (34)	413 (18)	626 (26)
Verona	2,507 (3)	- (-)	2 (1)	1 (1)	4 (4)	3 (3)	19 (4)	6 (2)	11 (3)	5 (1)	3 (1)	- (-)	2,780 (26)	276 (19)	596 (25)
Vestal	20 (2)	270 (1)	8 (2)	6 (5)	12 (3)	6 (2)	19 (4)	15 (3)	14 (4)	15 (1)	4 (1)	6 (1)	887 (32)	1,106 (28)	616 (37)
Willey	756 (5)	3 (1)	9 (1)	5 (3)	4 (2)	- (-)	3 (2)	2 (2)	2 (1)	- (-)	81 (2)	6 (1)	1,088 (21)	1,411(19)	422 (13)
Central Basin Reserve															
BKS	8,342 (19)	2,386 (21)	3,153 (17)	58 (8)	70 (8)	33 (9)	143 (5)	283 (5)	78 (4)	105 (5)	78 (4)	25 (2)	15,771 (72)	7,632 (74)	5,822 (67)
Bianchi West	676 (5)	363 (5)	876 (8)	4 (2)	6 (1)	- (-)	3 (1)	2 (1)	- (-)	57 (4)	65 (6)	121 (4)	1,167 (26)	1,084 (25)	1,216 (23)
Elsie	108 (3)	90 (1)	2 (1)	25 (4)	9 (4)	6 (2)	2 (1)	7 (1)	5 (1)	18 (2)	9 (1)	8 (1)	1,932 (26)	1,813 (19)	176 (20)
Elverta/ Silva S.	n/a	979 (2)	239 (3)	n/a	20 (4)	8 (3)	n/a	20 (2)	3 (1)	n/a	5 (1)	35 (2)	n/a	1,693 (27)	1,443 (30)
Frazer South	603 (10)	122 (3)	224 (3)	8 (3)	14 (3)	6 (4)	6 (3)	13 (2)	- (-)	102 (4)	48 (4)	28 (4)	1,308 (37)	666 (26)	888 (29)
Paulsen South	196 (6)	196 (5)	404 (6)	1 (1)	1 (1)	- (-)	6 (1)	- (-)	1 (1)	9 (2)	26 (4)	76 (5)	374 (20)	454 (21)	548 (21)
Richter	2 (1)	15 (1)	4 (1)	7 (3)	4 (2)	2 (2)	1 (1)	2 (2)	1 (1)	10 (2)	- (-)	1 (1)	236 (15)	85 (12)	118 (12)
Sills	54 (5)	356 (4)	194 (2)	29 (4)	18 (3)	5 (4)	8 (2)	29 (4)	24 (3)	76 (5)	10 (2)	55 (3)	2,048 (33)	1,615 (31)	982 (27)
Tufts	20 (3)	79 (2)	5 (1)	18 (3)	8 (2)	8 (4)	2 (1)	4 (1)	- (-)	14 (2)	2 (1)	3 (1)	759 (22)	667 (20)	155 (16)
Fisherman's Lake Reserve															
Allegheny[b]	- (-)	- (-)	- (-)	- (-)	3 (1)	3 (1)	9 (2)	5 (2)	17 (3)	- (-)	1 (1)	- (-)	107 (11)	101 (15)	191 (21)

	Waterfowl			Raptors			Neotropical Migrants			Shorebirds			All Bird Species		
Reserve	**2021**	**2022**	**2023**	**2021**	**2022**	**2023**	**2021**	**2022**	**2023**	**2021**	**2022**	**2023**	**2021**	**2022**	**2023**
Ann Rudin	- (-)	- (-)	153 (6)			7 (4)			36 (4)			- (-)	626 (34)	593 (35)	392 (34)
Cummings	162 (5)	56 (7)	110 (6)	11 (4)	4 (3)	6 (4)	33 (4)	26 (3)	46 (4)	5 (1)	3 (1)	3 (2)	1,038 (43)	636 (45)	640 (45)
Natomas Farms	323 (5)	201 (11)	168 (8)	17 (8)	6 (2)	11 (5)	8 (3)	54 (3)	28 (7)	7 (1)	5 (1)	4 (1)	405 (31)	280 (29)	247 (24)
Rosas[b]	24 (4)	6 (1)	6 (2)	11 (2)	8 (3)	3 (3)	32 (4)	41 (5)	23 (2)	2 (1)	9 (1)	- (-)	164 (20)	185 (19)	163 (18)
Souza[b]	5 (1)	79 (2)	- (-)	6 (3)	1 (1)	2 (1)	29 (2)	3 (1)	24 (3)	1 (1)	1 (1)	- (-)	107 (11)	101 (15)	191 (21)

[a] Numbers in this table reflect the total number of individuals of each group observed followed by the number of species observed (in parentheses).
[b] These reserves were surveyed only from May through August and therefore would be expected to have a lower number of observations and species.

Table 5-2. Number of Pairs of Other Covered Species on TNBC Mitigation Lands, 2004–2023.

Species	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Burrowing owl	1 (BKS)	1 (BKS)	1 (BKS, pair failed)	0	1 (Elsie)	3 (2 Tufts, 1 Elsie)	4 (1 Tufts, 1 Elsie, 1 Sills, 1 BKS)	3 (2 Elsie, 1 Tufts)	1 (Elsie)	2 (Elsie)	1 (Tufts)	0	0	0	0	0	0	0	0	0
Loggerhead shrike	4 (3 BKS, 1 Brennan)	3 (2 BKS, 1 Brennan)	3 (1 BKS, 1 Alleghany, 1 Brennan)	3 (1 BKS, 1 Alleghany, 1 Huffman West)	1 (Alleghany)	1 (Atkinson)	1 (Atkinson)	1 (Atkinson)	3[a]	3[a] (1 Lucich North, 1 Rosa, 1 Souza)	4[a] (Lucich North, Bennett North, Atkinson, Rosa)	1[a] (Rosa)	0	1 (Rosa)	1 (Rosa)	0	0	0	0	0
Tricolored blackbird	0	~900 (BKS)	0	~1,200 (BKS)	~4,900 (~900 BKS, ~4,000 Frazer)	~1,500 (BKS)	~700 (BKS)	0	0	0	0	0	0	0	0	0	0	0	0	0
White-faced ibis	0	0	0	~750 (BKS)	~1,500 (BKS)	~2,500 (BKS)	~2,500 (BKS)	0	0	0	0	0	0	0	0	0	0	0	0	0

[a] Presumed nesting on/or immediately adjacent to reserve lands.

Table 5-3. Average Number of Observations per Survey of Other Covered Species Recorded during Monthly Avian Surveys on Reserves, 2005–2023.

Species	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
White-faced ibis[a]	0.042	0.050	0.062	0.241	0.222	0.160	0.129	0.124	0.187	0.156	0.160	0.102	0.018	0.111	0.051	0.146	0.266	0.095	0.039
Burrowing owl	0.028	0.039	0.000	0.098	0.196	0.175	0.138	0.058	0.022	0.036	0.004	0.009	0.004	0.020	0.043	0.029	0.018	0.006	0.016
Loggerhead shrike	0.085	0.033	0.067	0.223	0.253	0.047	0.116	0.164	0.164	0.054	0.044	0.036	0.013	0.051	0.020	0.007	0.003	0.000	0.007
Tricolored blackbird	24.169	2.039	26.836	50.031	15.760	2.401	3.763	1.604	6.236	5.000	4.071	0.982	0.391	3.336	0.602	5.211	3.405	3.006	1.305
Pacific pond turtle and Unidentified Turtle	0.000	0.000	0.000	0.004	0.000	0.000	0.004	0.027	0.033	0.065	0.047	0.044	0.018	0.099	0.082	0.082	0.071	0.142	0.155

[a] To account for variation in effort in documenting total numbers during Basin-wide surveys and to account for numbers inflated by large counts at nesting colonies, this metric is the proportion of surveys on which the species was detected.

Table 5-4. Average Number of Observations per Survey of Other Covered Species Recorded during Monthly Basin-Wide Surveys, 2005–2023.

Species	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
White-faced ibis[a]	0.154	0.077	0.269	0.261	0.259	0.167	0.074	0.208	0.227	0.273	0.231	0.471	0.136	0.444	0.250	0.429	0.750	0.600	0.000
Burrowing owl	0.385	0.385	0.038	1.826	3.519	4.000	4.852	7.292	5.682	4.364	1.855	1.471	1.136	1.222	0.125	0.857	0.625	0.200	0.000
Loggerhead shrike	3.269	2.769	2.346	1.565	3.519	2.167	2.111	2.042	1.273	0.545	0.500	0.059	0.045	0.000	0.000	0.000	0.000	0.000	0.000
Tricolored blackbird	6.385	1.154	1.885	261.739	287.222	0.000	18.519	5.000	7.364	37.773	56.154	5.294	12.364	28.333	25.625	53.857	13.75	80.000	367.000

[a] To account for variation in effort in documenting total numbers during Basin-wide surveys and to account for numbers inflated by large counts at nesting colonies, this metric is the proportion of surveys on which the species was detected.

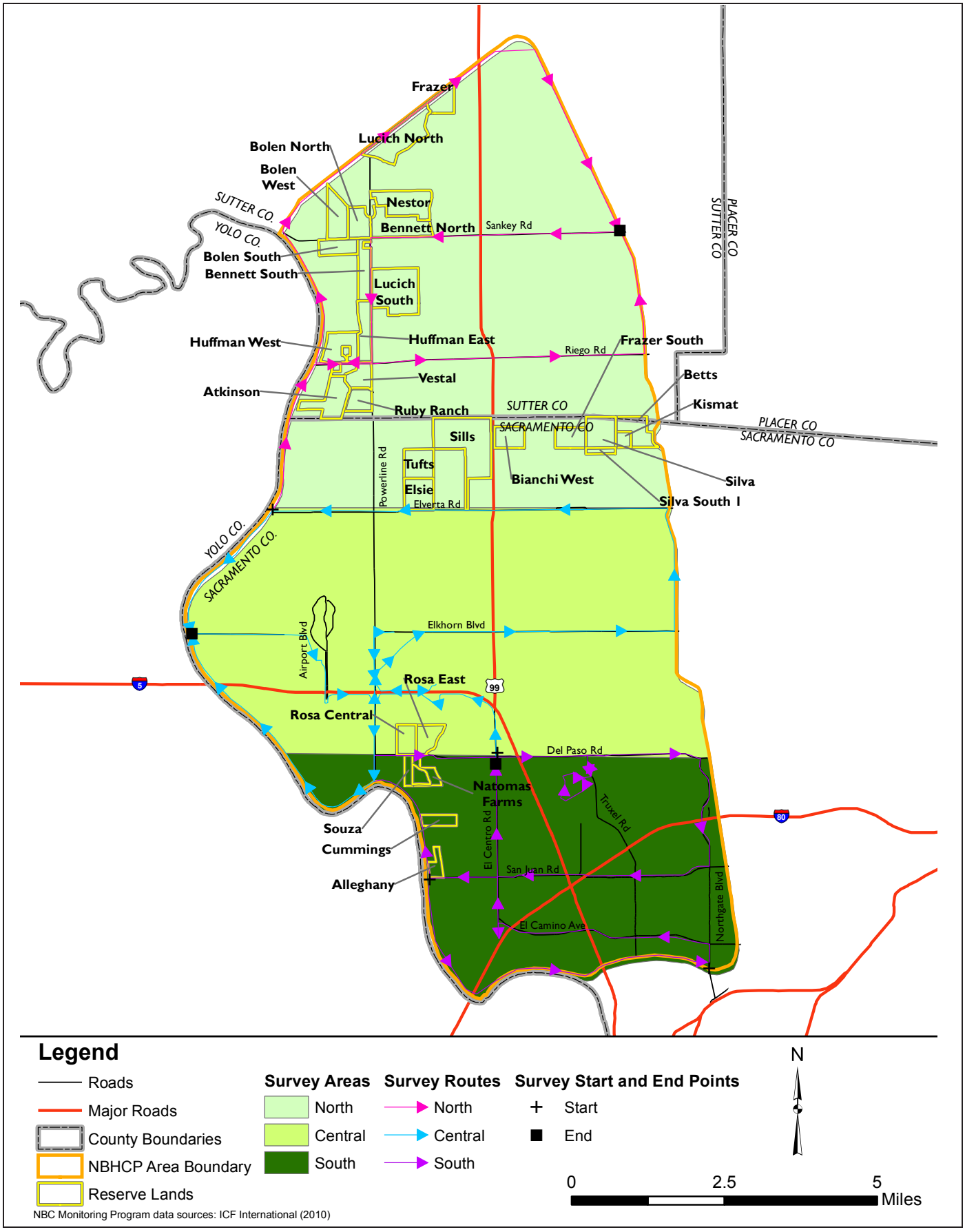

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FIGURE 5-1
Monthly Basin-Wide Survey Routes

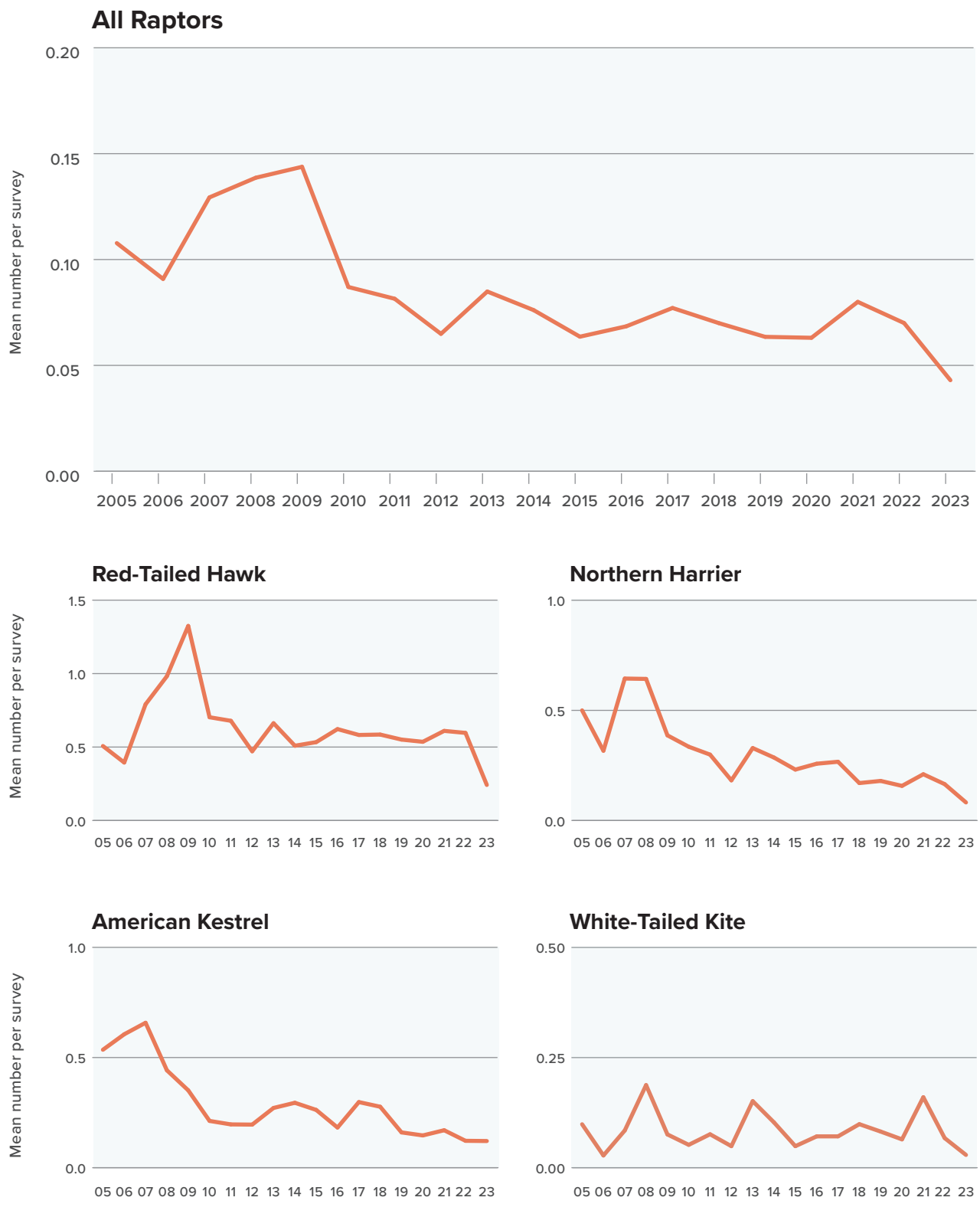

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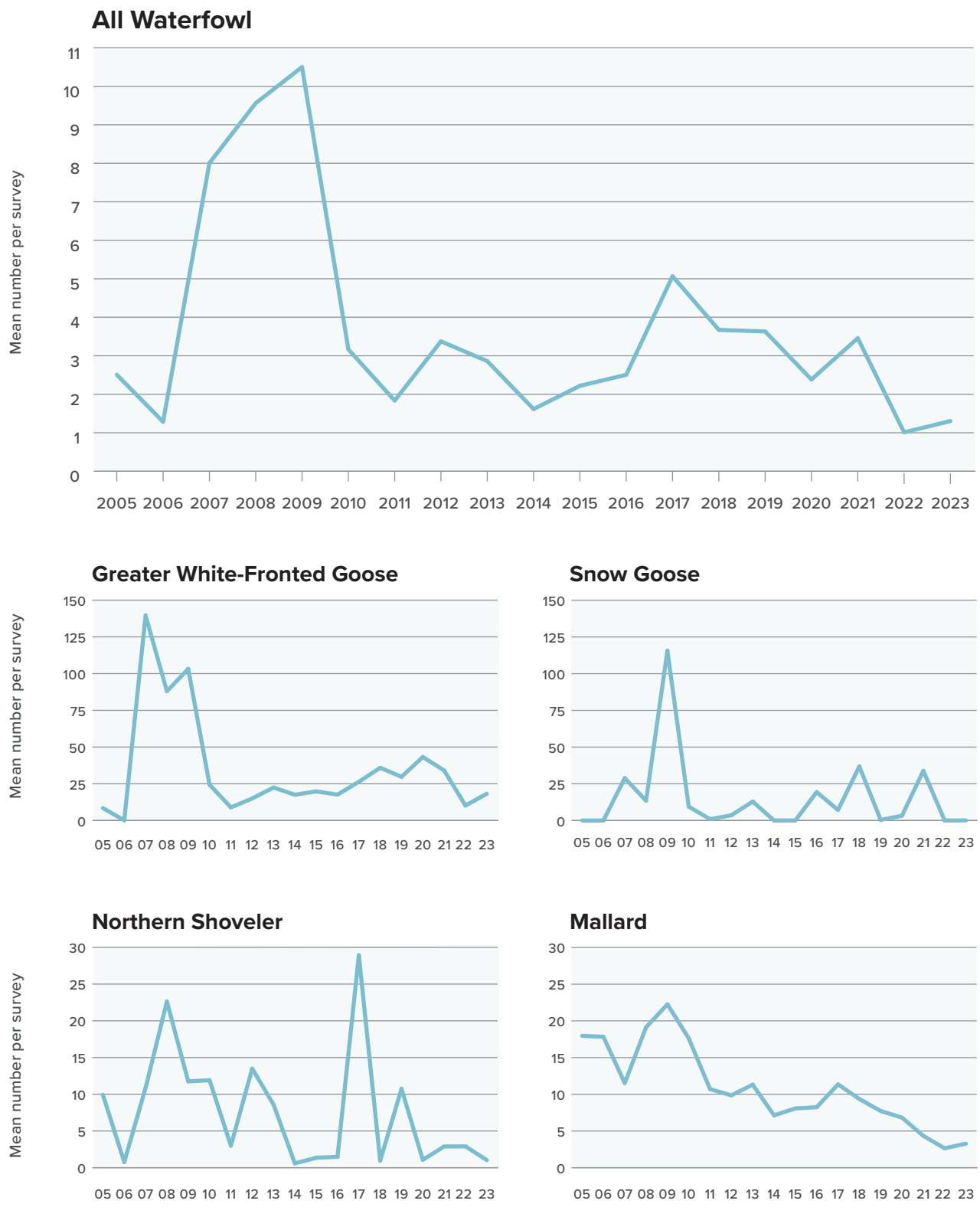
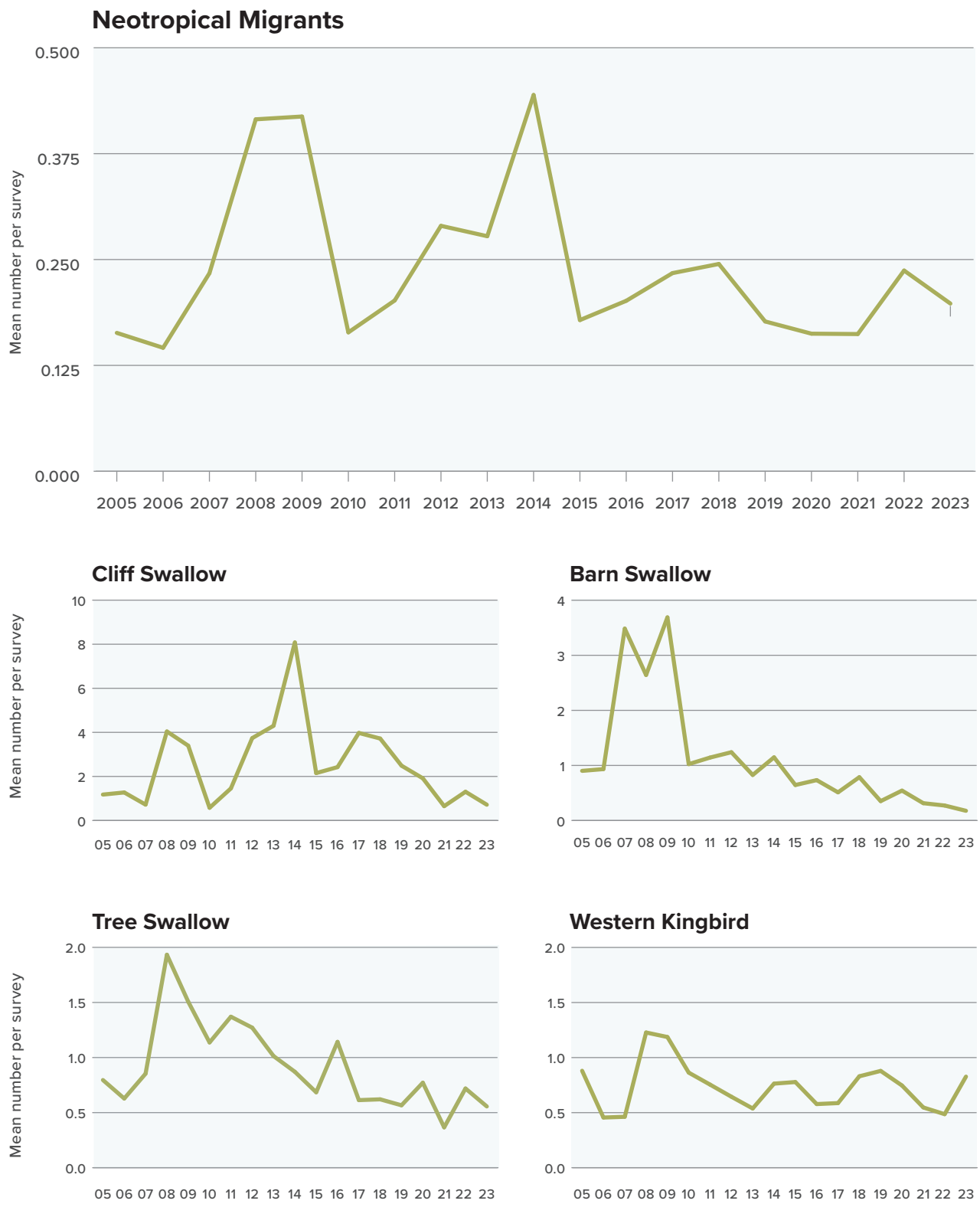
FIGURE 5-2
Mean Number of Raptors Detected per Survey on TNBC Reserves in the Natomas Basin, 2005–2023



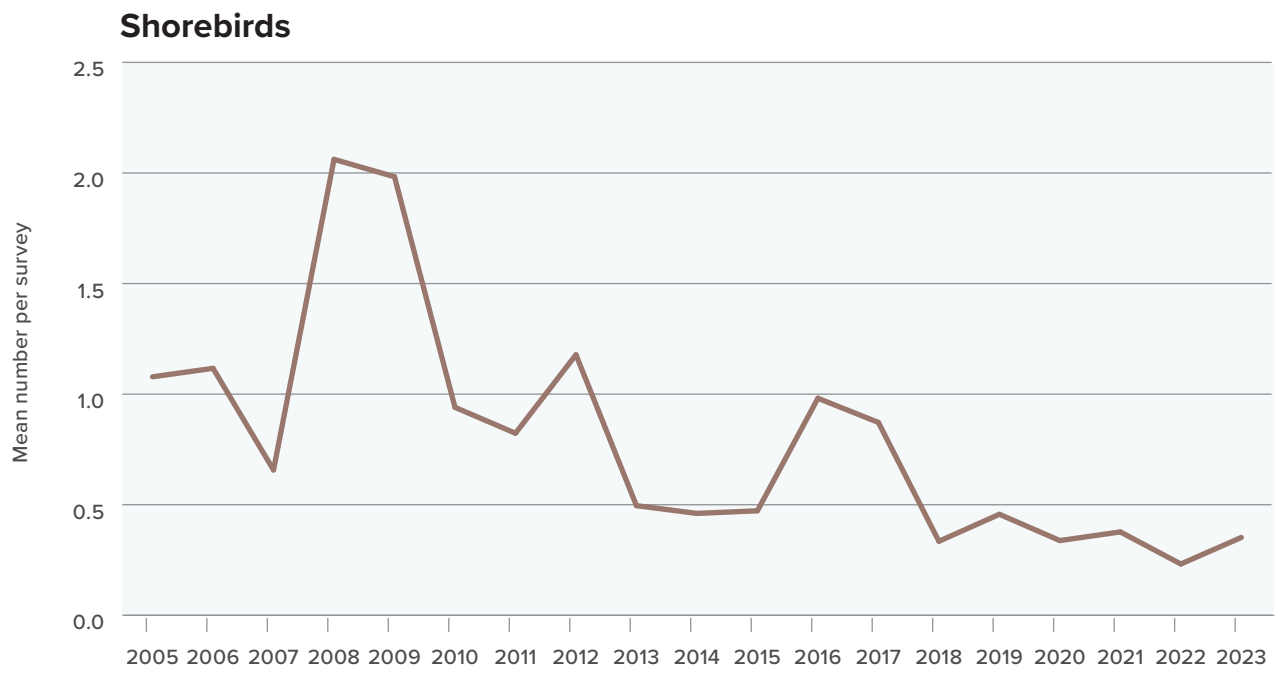
NBC 104332 2023 (3-6-2024)

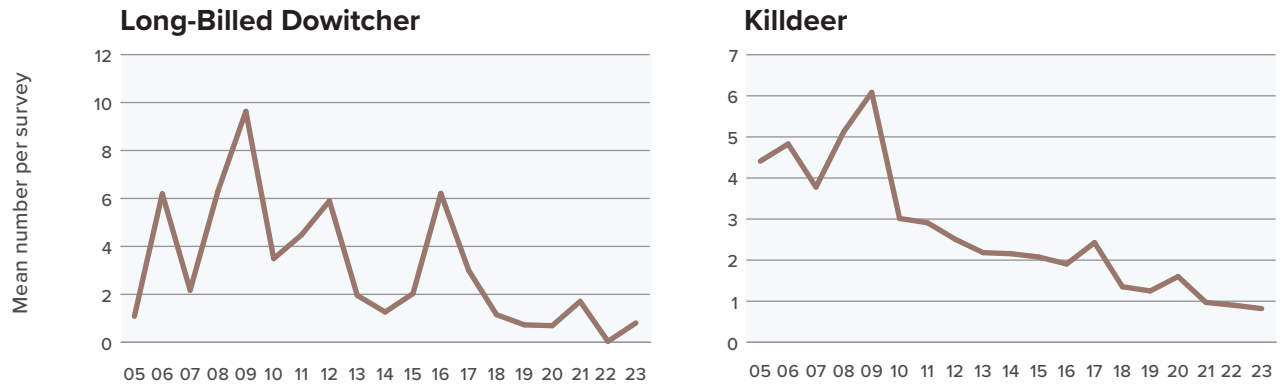
FIGURE 5-3
Mean Number of Waterfowl Detected per Survey on TNBC Reserves in the Natomas Basin, 2005–2023

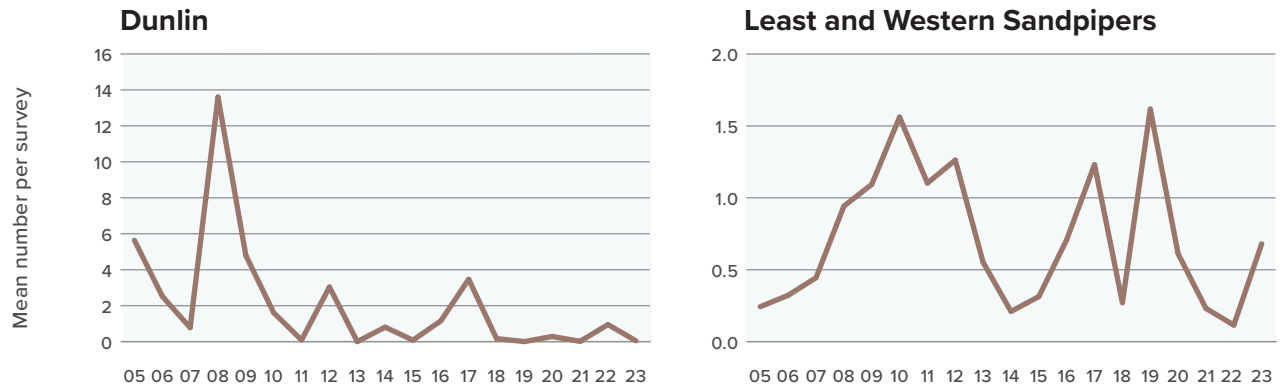


NBC 104332 2023 (3-6-2024)

FIGURE 5-4
Mean Number of Neotropical Migrants Detected per Survey on TNBC Reserves in the Natomas Basin, 2005–2023

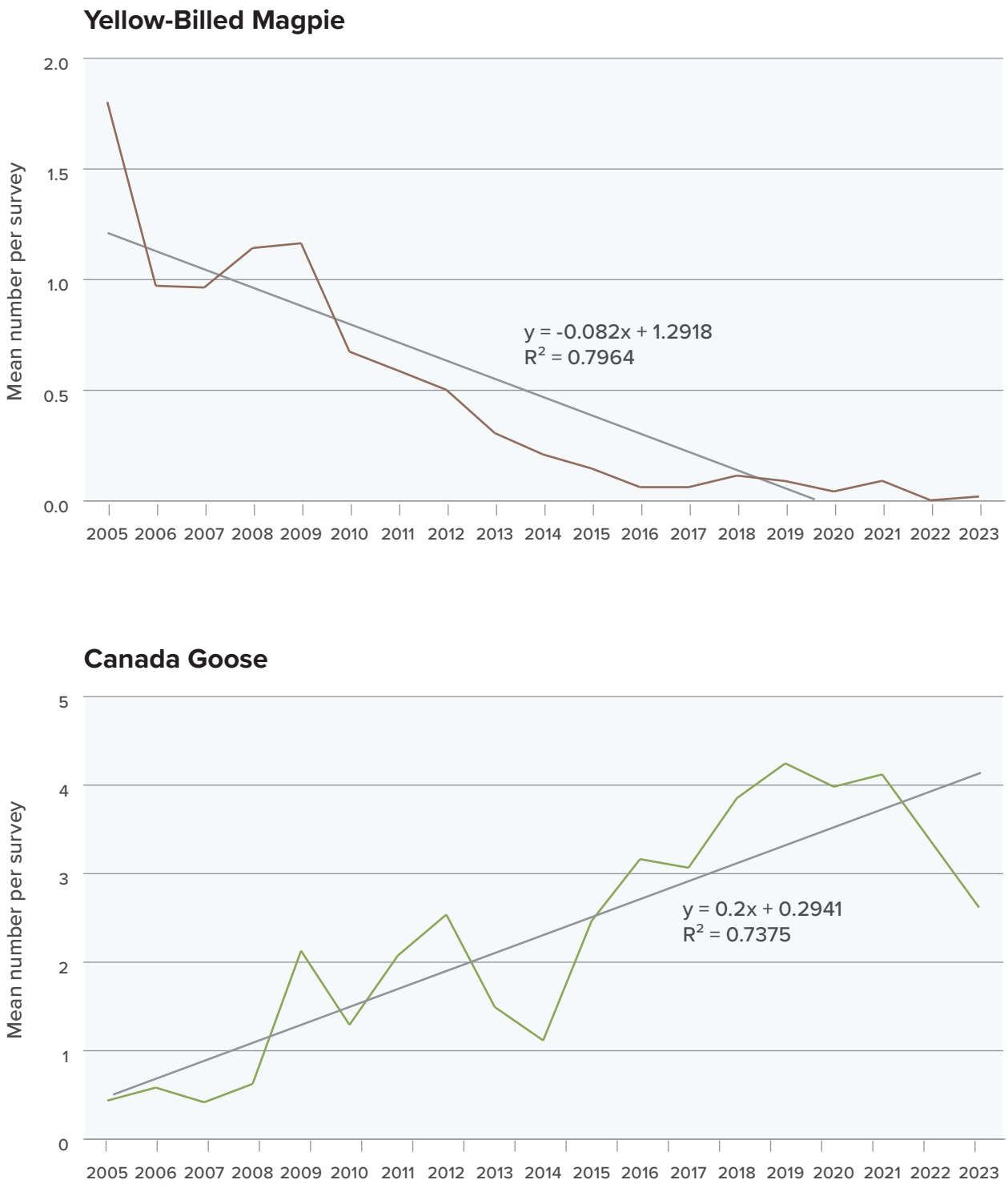






NBC 104332 2023 (3-6-2024)

FIGURE 5-5
Mean Number of Shorebirds Detected per Survey on TNBC Reserves in the Natomas Basin, 2005–2023



NBC 104332 2023 (3-6-2024)

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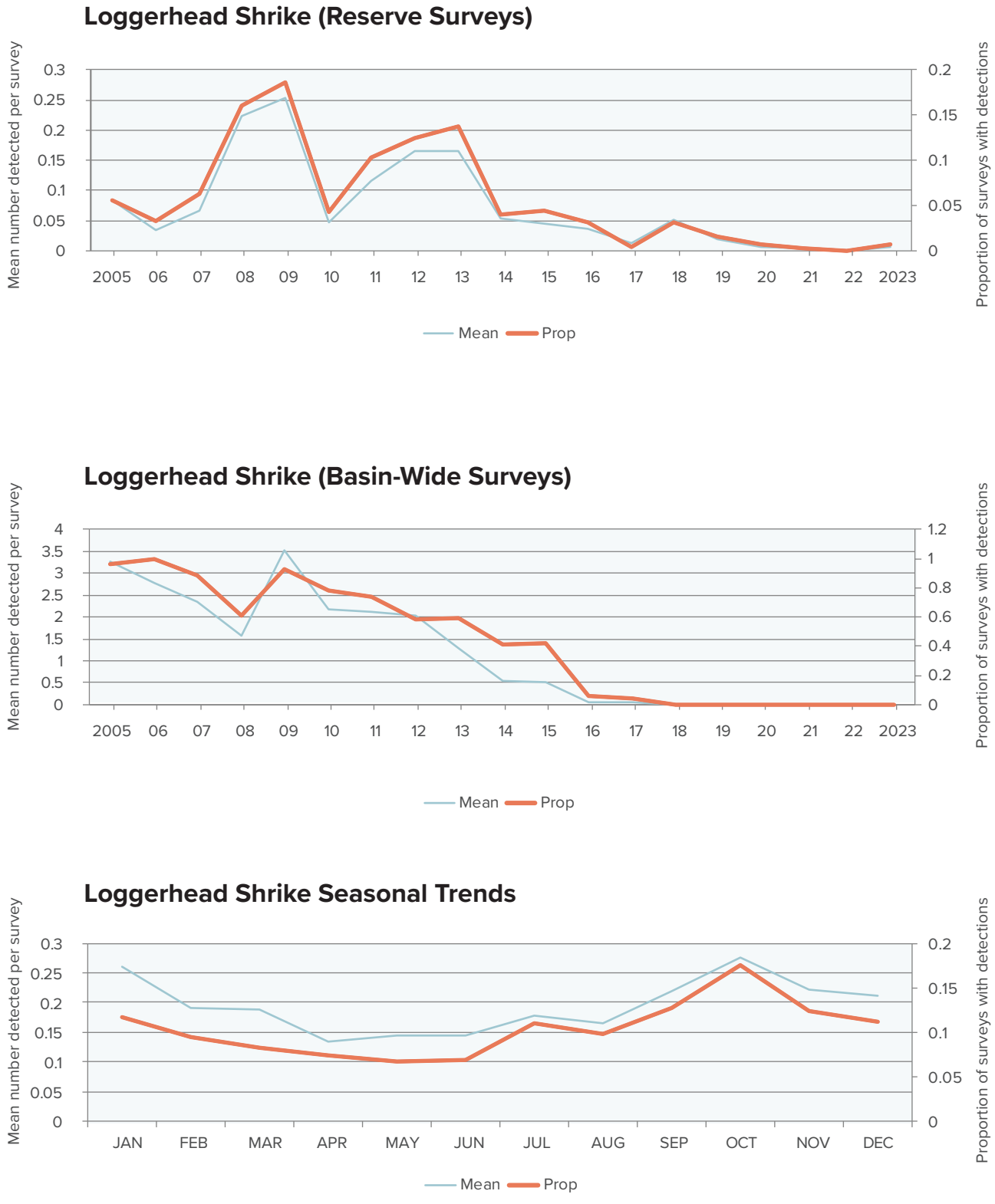
FIGURE 5-6

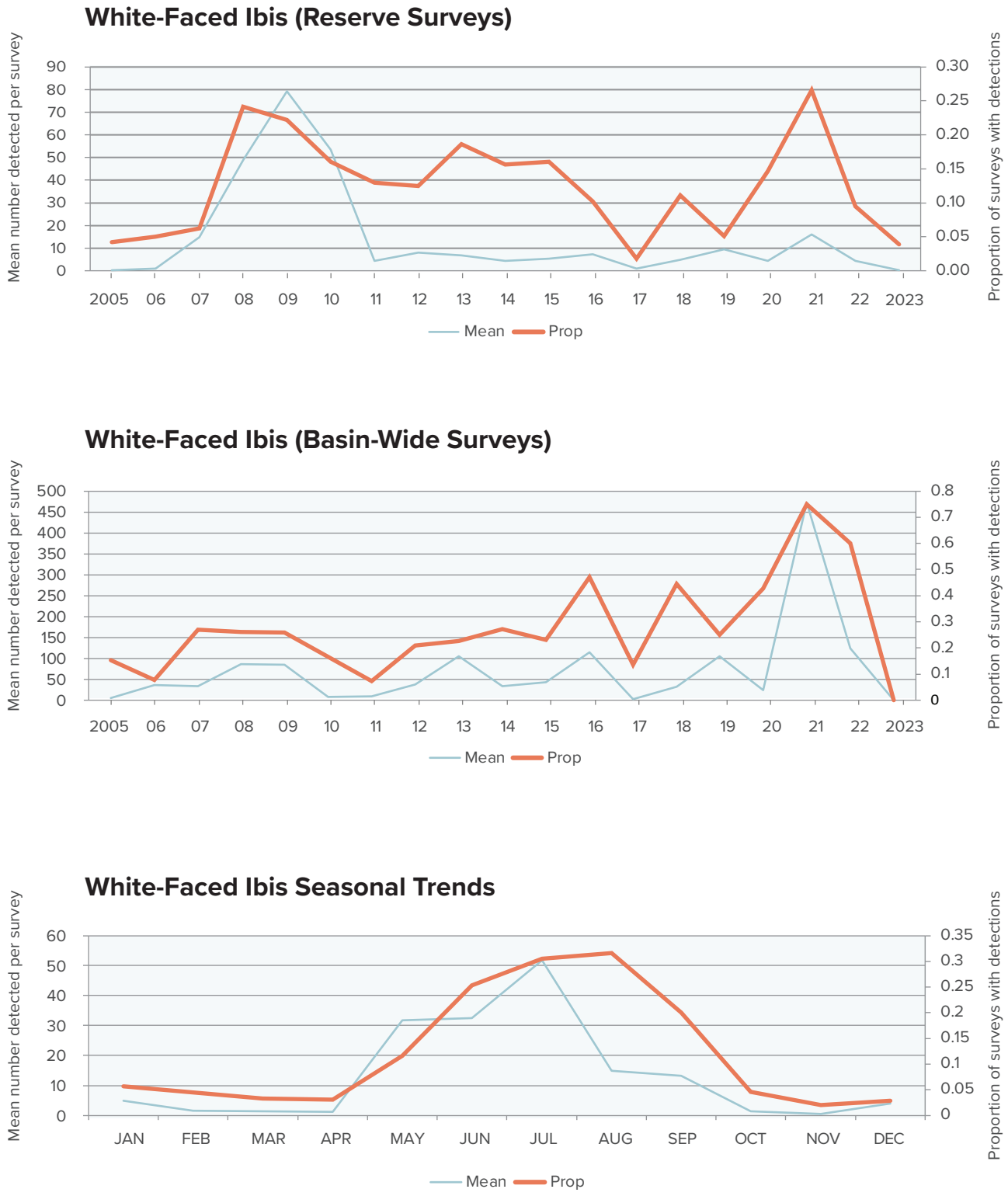
Mean Number of Yellow-Billed Magpies and Canada Geese Detected per Survey on TNBC Reserves in the Natomas Basin, 2005–2023



NBC 104332 2023 (3-6-2024)

FIGURE 5-7

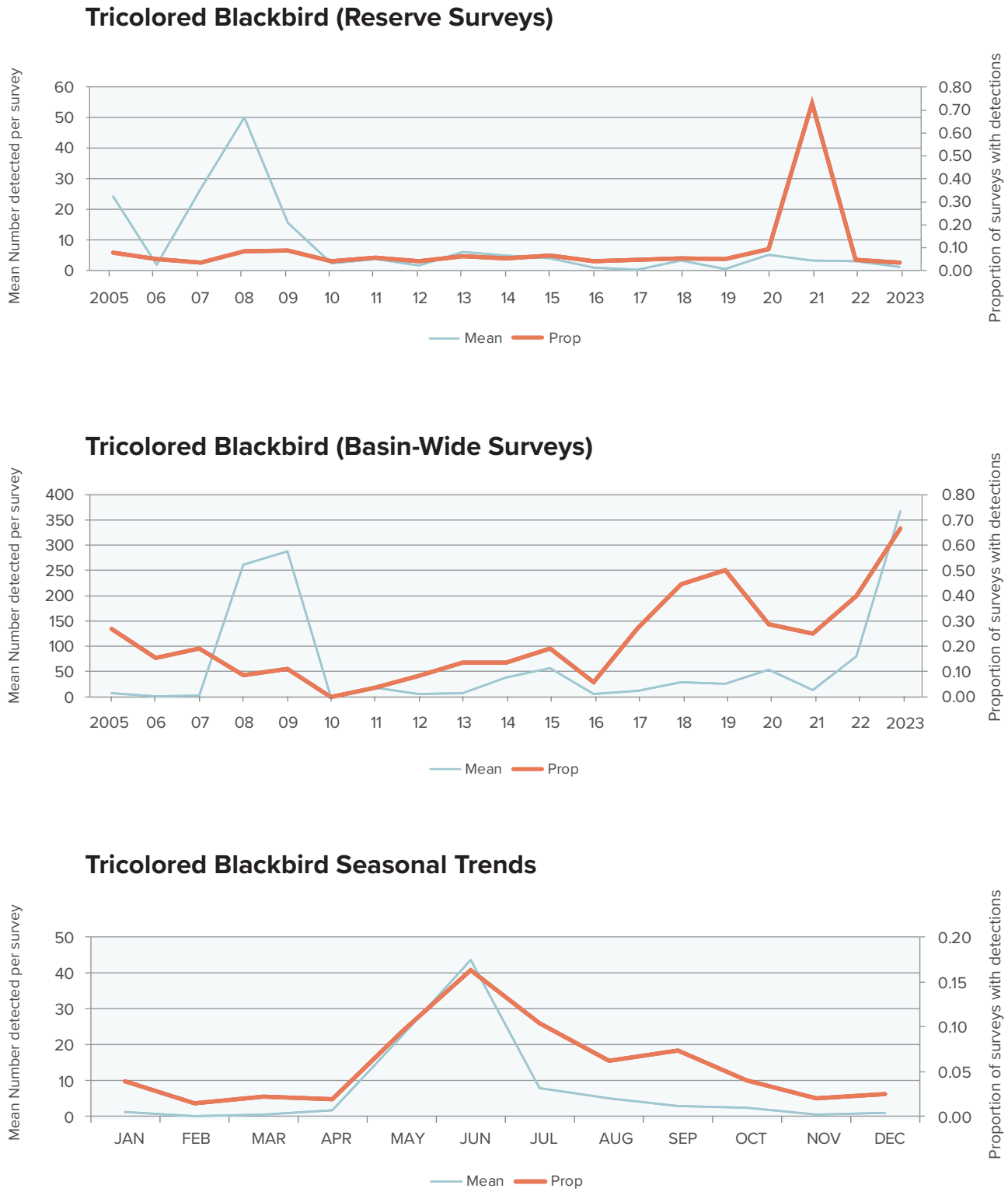
Mean Number of Loggerhead Shrikes Detected and the Proportion of Surveys on which Shrikes were Detected on TNBC Reserves in the Natomas Basin, 2005–2023



NBC 104332 2023 (3-6-2024)

FIGURE 5-8

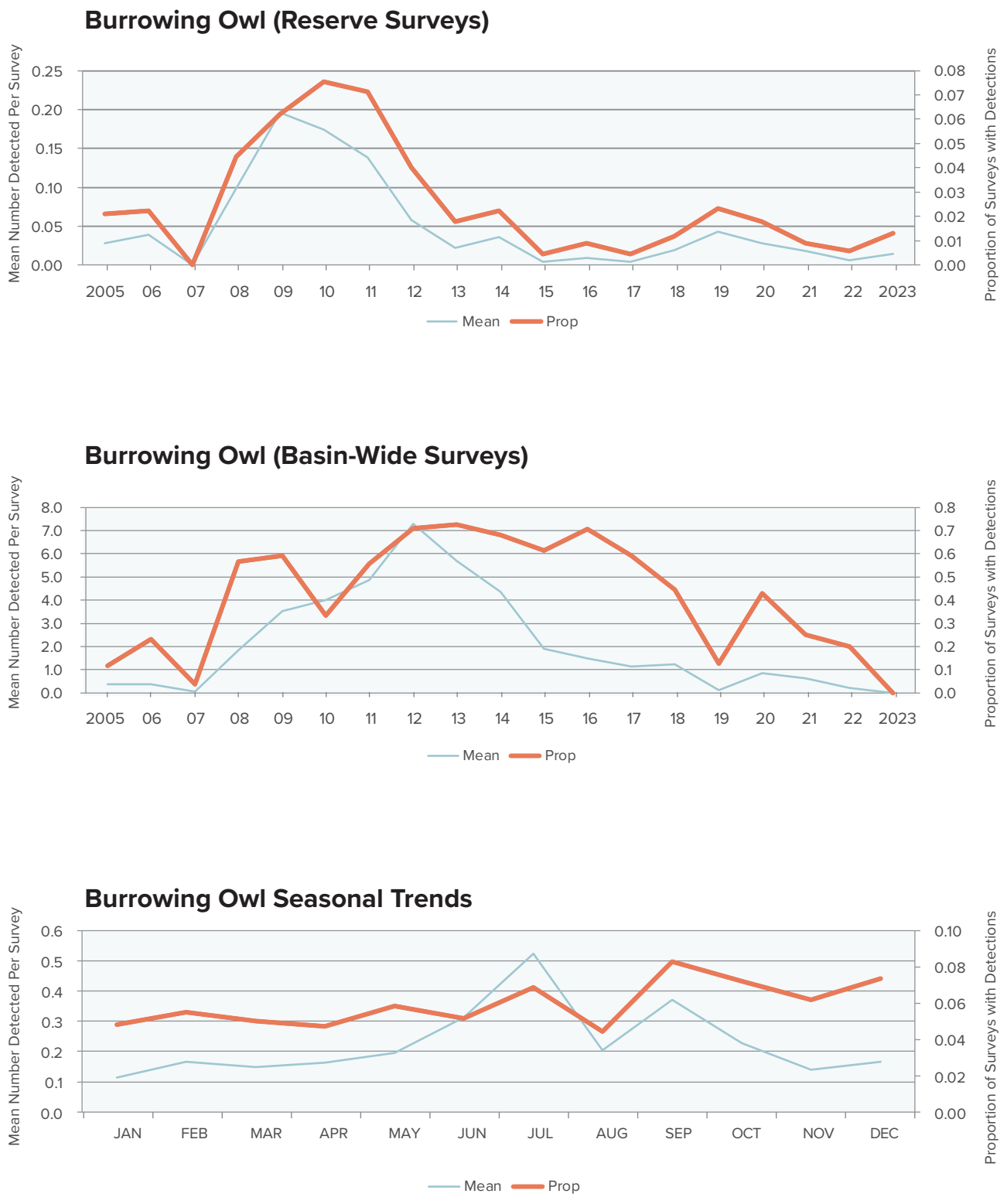
Mean Number of White-Faced Ibis Detected and the Proportion of Surveys on which Ibis Were Detected on TNBC Reserves in the Natomas Basin, 2005–2023



NBC 104332 2023 (3-6-2024)

FIGURE 5-9

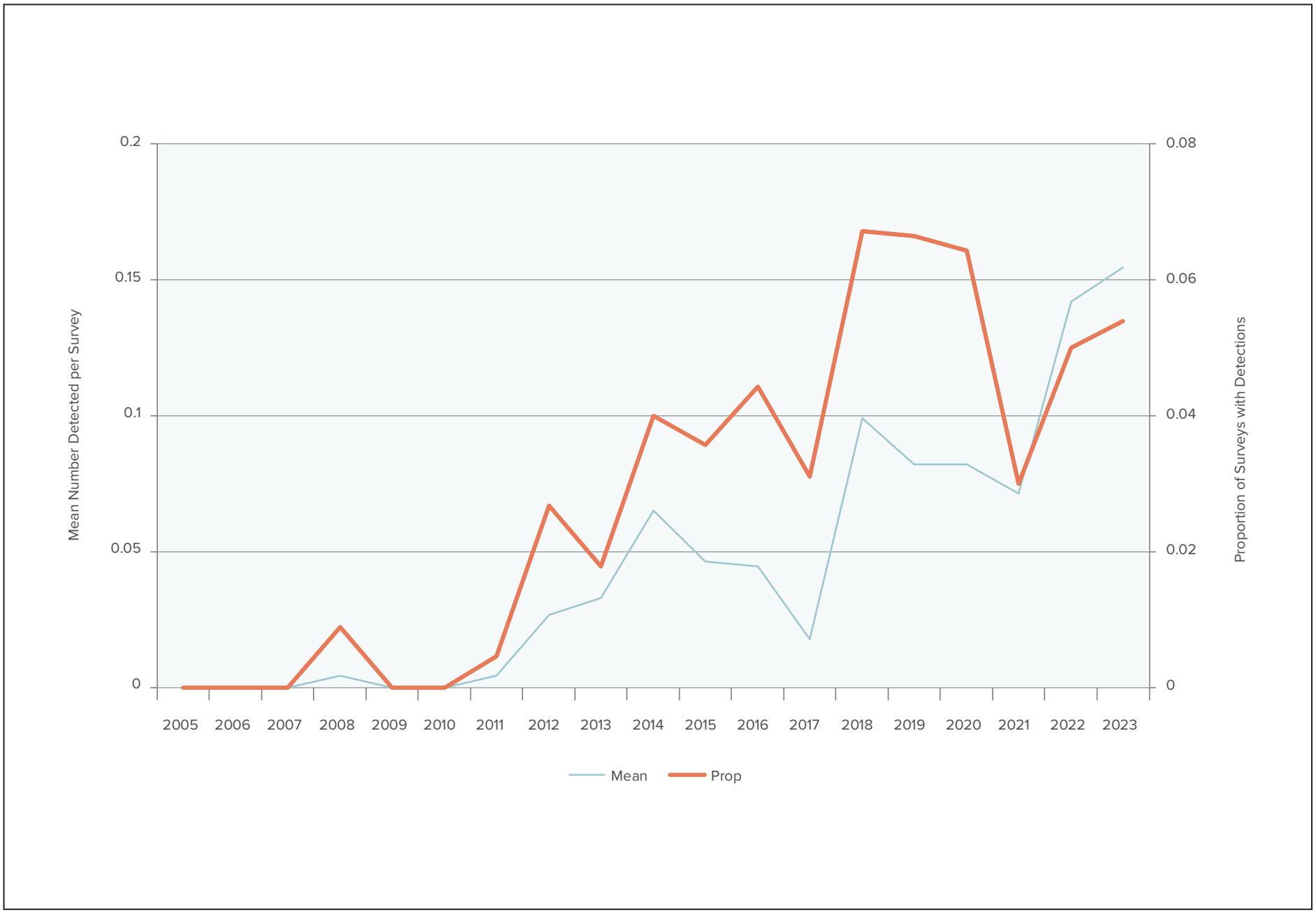
Mean Number of Tricolored Blackbird Detected and the Proportion of Surveys on which Blackbirds Were Detected on TNBC Reserves in the Natomas Basin, 2005–2023



NBC 104332 2023 (3-7-2024)

FIGURE 5-10

Mean Number of Burrowing Owl Detected and the Proportion of Surveys on which Owls were Detected on TNBC Reserves in the Natomas Basin, 2005–2023



NBC 104332 2023 (3-7-2024)

FIGURE 5-11

Mean Number of Northwestern Pond Turtles and Unidentified Turtles and the Proportion of Surveys on which Turtles were Detected on TNBC Reserves in the Natomas Basin, 2005–2023

Appendix A

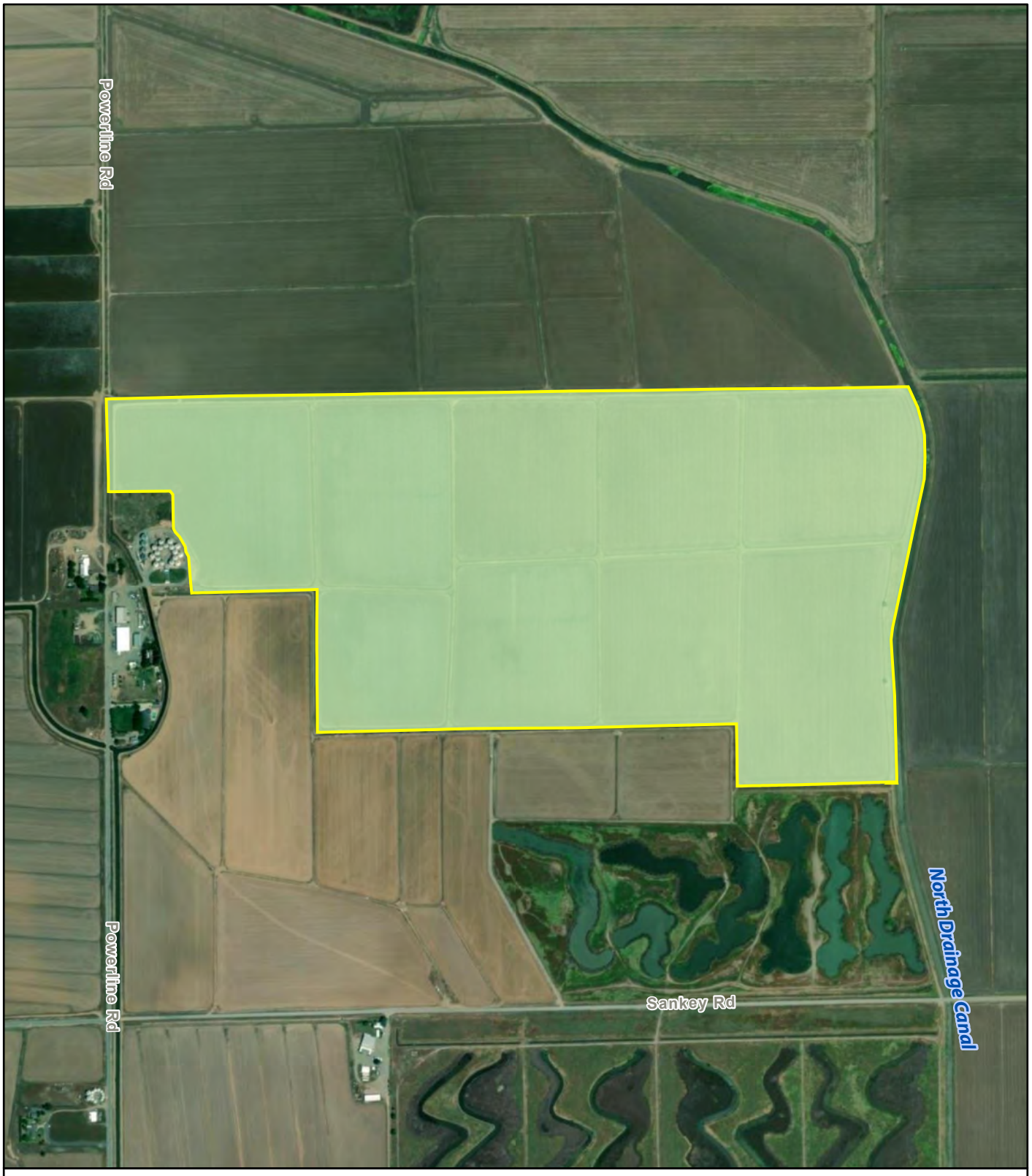
NBHCP Reserve Land Cover Data

Figure A - 1
North Basin Reserve — Frazer North Tract

Figure A - 2
North Basin Reserve — Lucich North Tract

Figure A - 3
North Basin Reserve — Bolen West Tract

Figure A - 4
North Basin Reserve — Bolen North Tract



Reserve Lands
NBHCP Area Boundary

Land Cover
Rice

N

200 0 200
Meters

Path:\\PDCCITRDSGIS01\Projects_1\NBC\04002_04\arcmap\report_2023\AppendixA\Appendix_A.aprx

Figure A - 5
North Basin Reserve — Nestor Tract

Reserve Lands
NBHCP Area Boundary

Land Cover
Fresh Emergent Marsh (Created)
Grassland (Created)
Rice
Riparian Scrub
Ruderal

N

200 0 200
Meters

Path:\\PDCCITRDSGIS01\Projects_1\NBC\04002_04\arcmap\report_2023\AppendixA\AppendixA_A.aprx

Figure A - 6
North Basin Reserve — Bennett North Tract

Figure A - 7
North Basin Reserve — Bolen South Tract

Figure A - 8
North Basin Reserve — Verona Tract

Figure A - 9
North Basin Reserve — Bennett South Tract

Figure A - 10
North Basin Reserve — Willey Tract

Figure A - 11
North Basin Reserve — Lauppe North Tract

Figure A - 12
North Basin Reserve — Lucich South Tract

Figure A - 13
North Basin Reserve — Lauppe South Tract

Figure A - 14
North Basin Reserve — Huffman East Tract

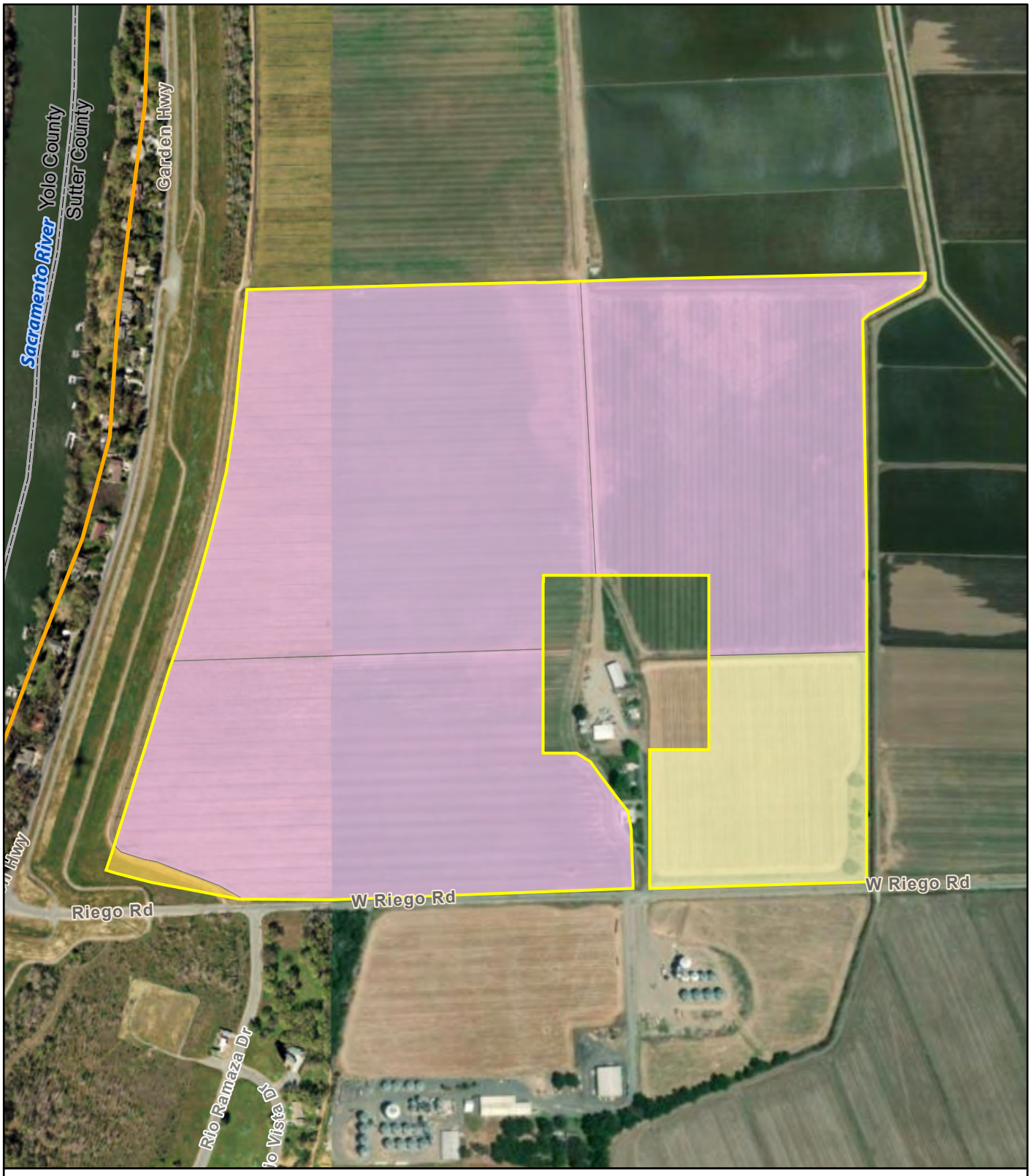


Figure A - 15
North Basin Reserve — Huffman West Tract

Figure A - 16
North Basin Reserve — Atkinson Tract

Reserve Lands
NBHCP Area Boundary

Land Cover
Rice
Valley Oak Woodland

N

200 0 200
Meters

Figure A - 17
North Basin Reserve — Vestal Tract

Figure A - 18
North Basin Reserve — Ruby Ranch Tract

Figure A - 19
Central Basin Reserve — Paulsen Central Tract

Figure A - 20
Central Basin Reserve — Paulsen South Tract

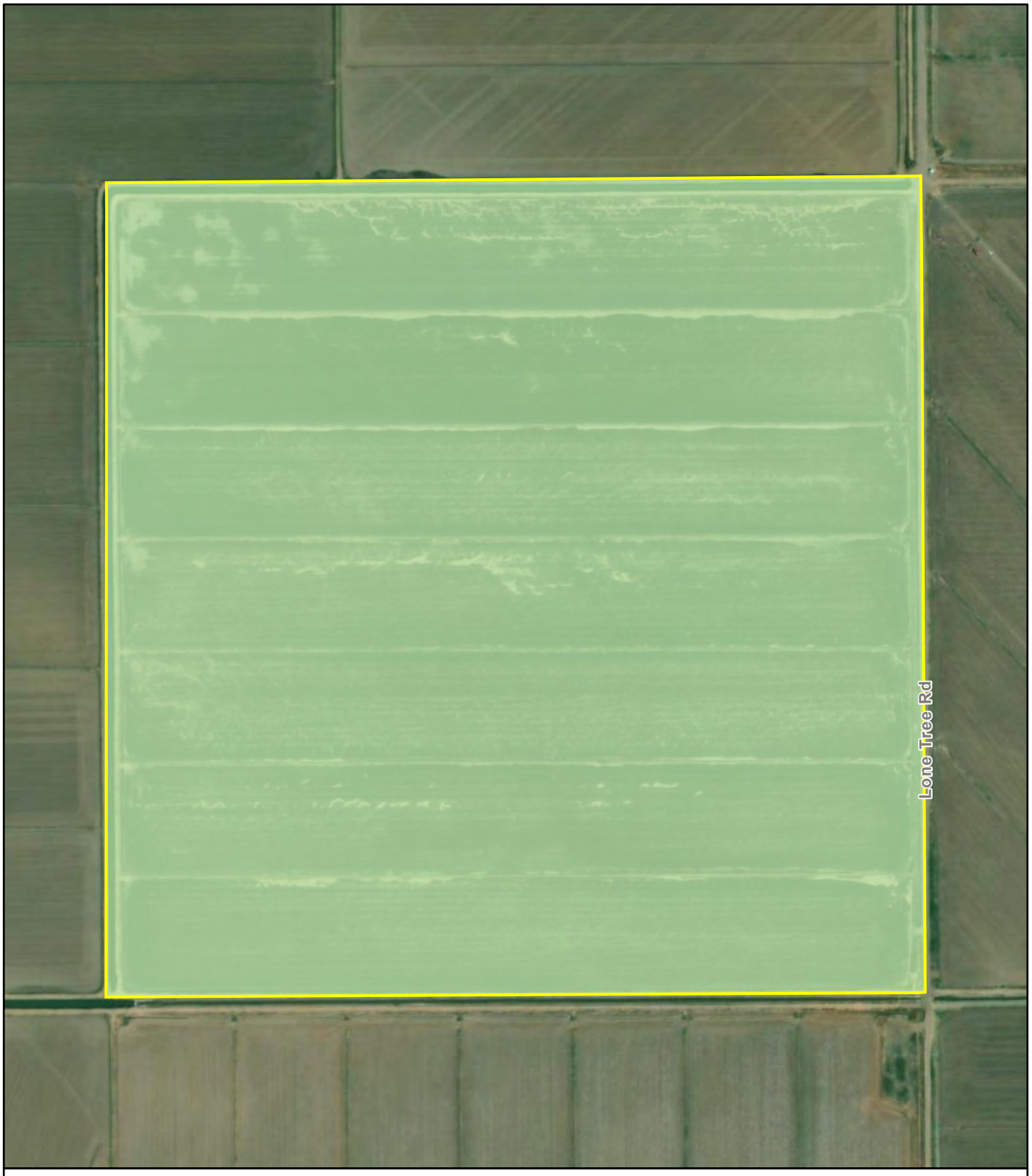


Figure A - 21
Central Basin Reserve — Tufts Tract

Figure A - 22
Central Basin Reserve — Elsie Tract

Figure A - 23
Central Basin Reserve — Richter Tract

Figure A - 24
Central Basin Reserve — Sills Tract

Reserve Lands
NBHCP Area Boundary

Land Cover
Rice

N

200 0 200
Meters

Path:\\PDCCITRDSGIS01\Projects_1\NBC\04002_04\arcmap\report_2023\AppendixA\Appendix_A.aprx

Figure A - 25
Central Basin Reserve — Bianchi West Tract

Figure A - 26
Central Basin Reserve — Frazer South Tract

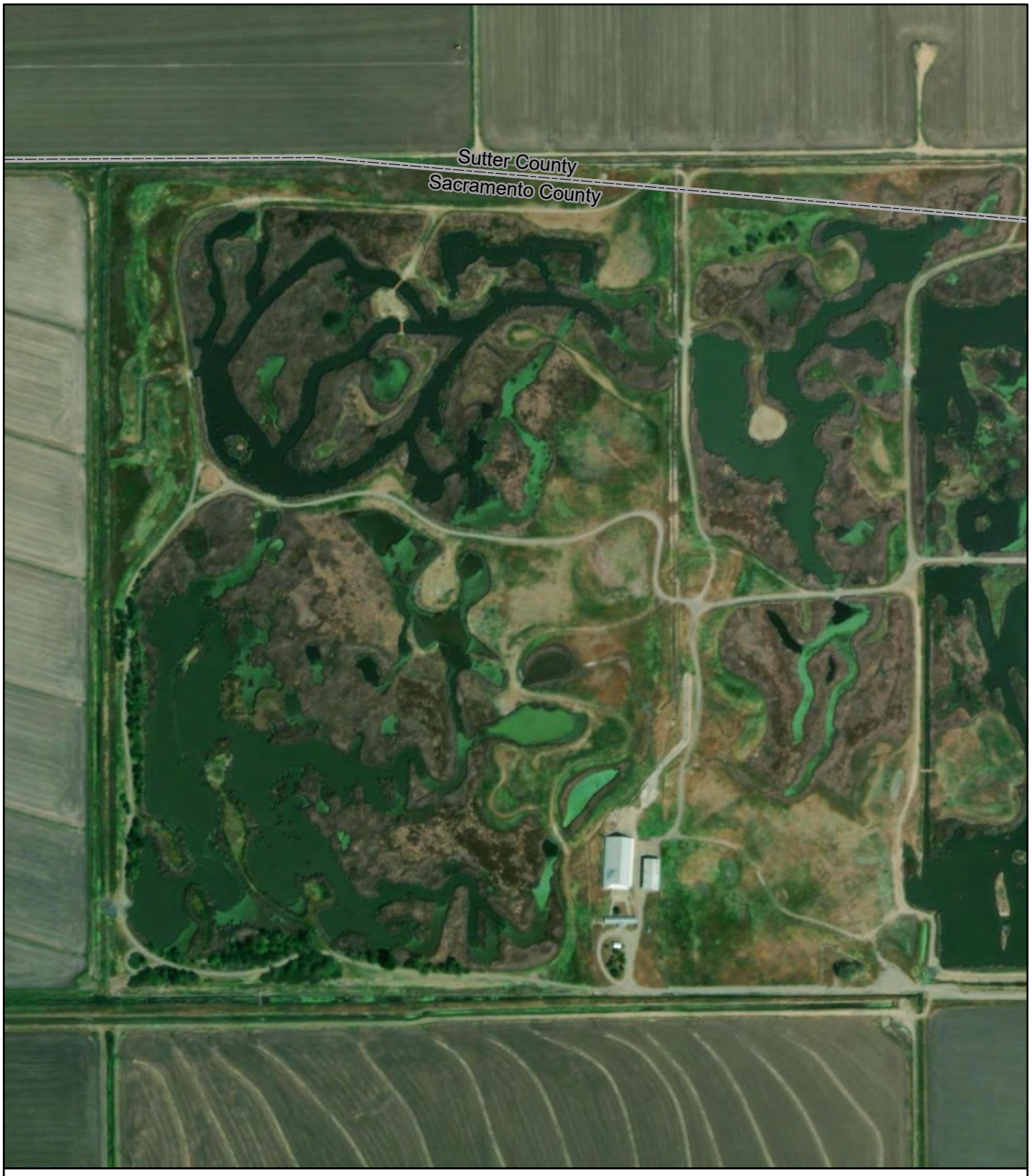


Figure A - 27
Central Basin Reserve — BKS Tract

Figure A - 28
Central Basin Reserve — BKS Tract

Figure A - 29
Central Basin Reserve — BKS Tract

Figure A - 30
Central Basin Reserve — Silva South Tract

Figure A - 31
Central Basin Reserve — Elverta Tract

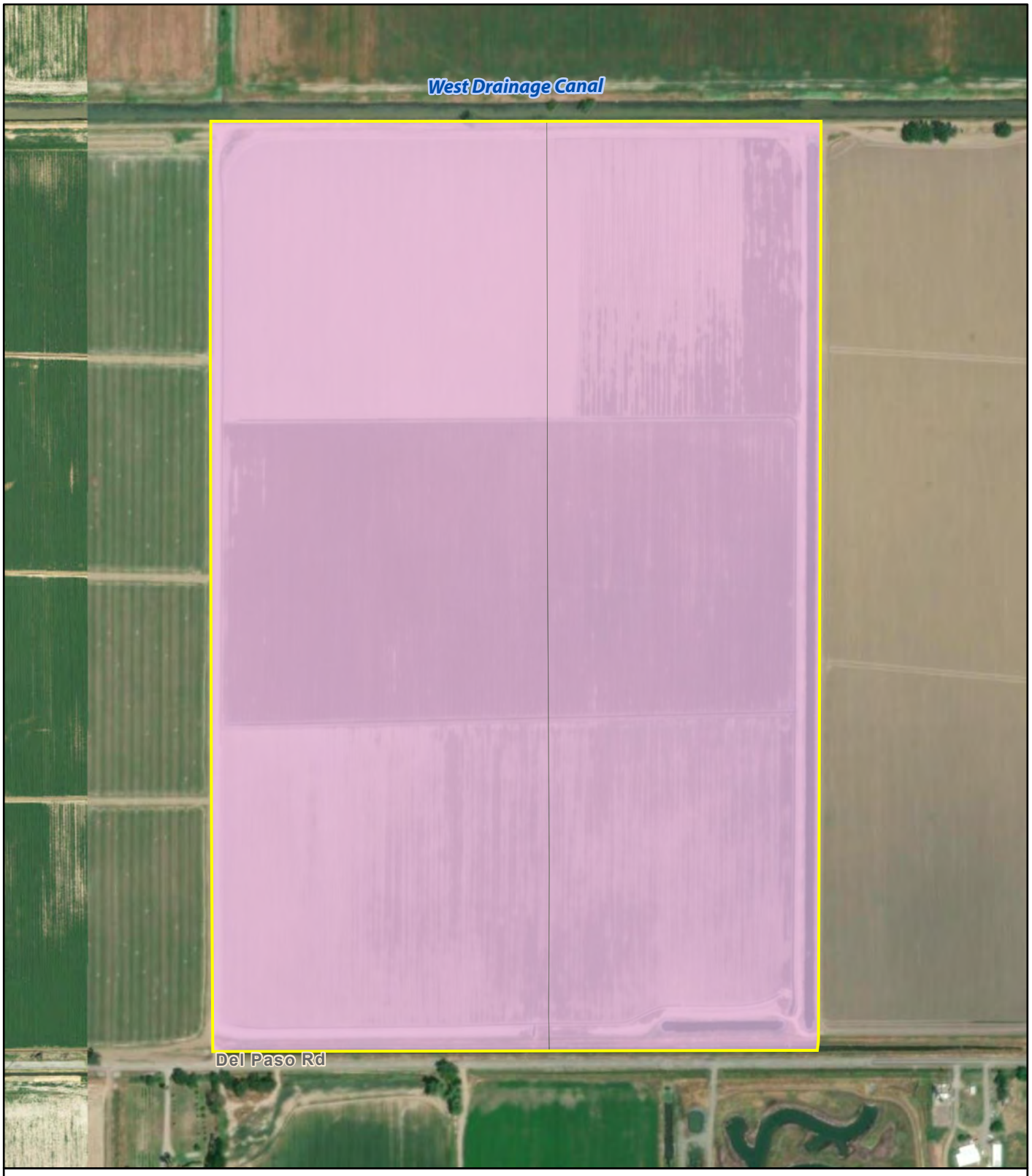


Figure A - 32
Fisherman's Lake Basin Reserve — Rosa Central Tract

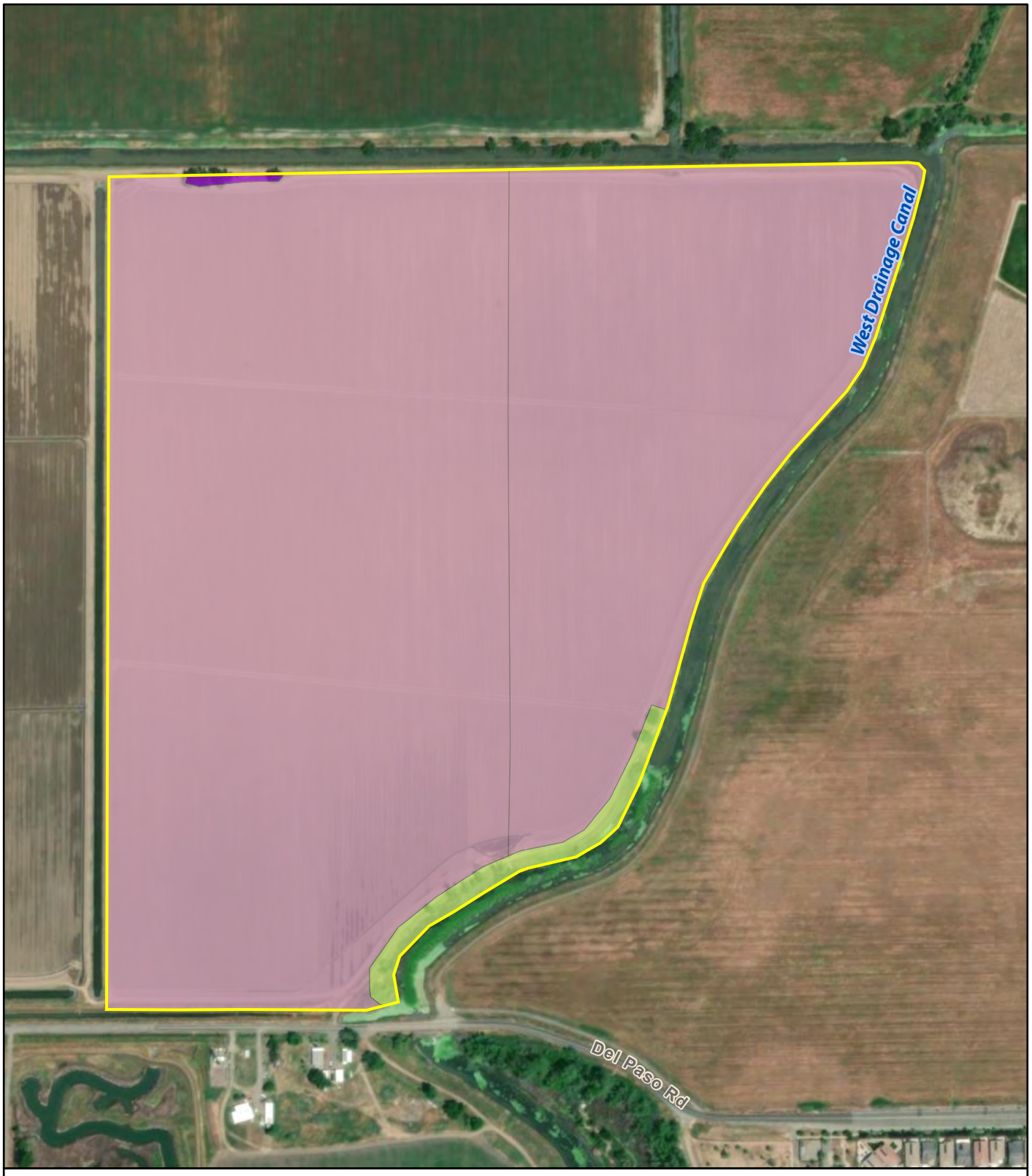


Figure A - 33
Fisherman's Lake Basin Reserve — Rosa East Tract

Figure A - 34
Fisherman's Lake Basin Reserve — Souza Tract

Figure A - 35
Fisherman's Lake Basin Reserve — Natomas Farms Tract

Figure A - 36
Fisherman's Lake Basin Reserve — AKT Tract

Figure A - 37
Fisherman's Lake Basin Reserve — Cummings Tract

Path:\\PDCCITRDSGIS01\Projects_1\NBC\04002_04\arcmap\report_2023\AppendixA\AppendixA_A.aprx

Figure A - 38
Fisherman's Lake Basin Reserve — Alleghany Tract

Appendix B

Botanical Survey Results

Table B-1. Cumulative List of Plant Species Observed on the Natomas Basin Conservancy Reserves, 2005–2023.

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve							Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
Ferns and Fern Allies																										
Azollaceae	**Mosquito Fern Family**																									
Azolla filiculoides	Waterfern		X	X	X			X	X	X	X	X				X				X			X	X		
Equisetaceae	**Horsetail Family**																									
Equisetum telmateia ssp. *braunii*	Giant horsetail	X																				X				
Marsileaceae	**Marsilea Family**																									
Marsilea vestita ssp. *vestita*	Hairy waterclover			X							X													X		
Monocotyledons																										
Alismataceae	**Water-Plantain Family**																									
*Alisma lanceolatum**	Lance-leaved water-plantain	X	X	X	X		X	X	X	X	X	X	X		X		X	X	X	X	X		X	X		
Alisma trivial (Alisma plantago-aquatica)	Common water-plantain																							X		
Echinodorus berteroi	Burhead	X						X	X		X	X		X												
Sagittaria longiloba	Gregg arrowhead								X		X													X		
Sagittaria montevidensis ssp. *calycina*	California arrowhead	X	X	X	X		X	X	X		X	X		X									X	X		
Araceae (Lemnaceae)	**Arum Family (Duckweed Family)**																									
Lemna sp.	Duckweed	X	X	X				X	X	X	X	X				X							X	X		
Cyperaceae	**Sedge Family**																									
Bolboschoenus maritimus (Scirpus maritimus)	Prairie bulrush			X				X			X															
Cyperus esculentus	Nutsedge	X	X	X	X		X	X			X			X											X	

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
*Cyperus difformis**	Variable flatsedge			X				X			X	X		X		X								X	X	
Cyperus eragrostis	Umbrella sedge	X	X	X	X		X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Cyperus odoratus	Fragrant flatsedge							X			X															
Eleocharis acicularis	Needle spikerush	X																								
Eleocharis macrostachya	Creeping spikerush						X	X			X		X			X	X	X	X					X		
Eleocharis engelmannii (Eleocharis obtusa var. *engelmannii)*	Blunt spikerush/ Engelmann's spikerush			X				X			X													X		
Schoenoplectus acutus (Scirpus acutus var. *occidentalis)*	Common tule	X	X	X				X			X	X		X		X	X		X	X		X	X	X	X	
*Schoenoplectus mucronatus (Scirpus mucronatus)**	Ricefield bulrush			X	X			X	X		X	X				X								X		
Hydrocharitaceae	**Waterweed Family**																									
Elodea canadensis	Canadian pondweed								X																	
Juncaceae	**Rush Family**																									
Juncus balticus	Baltic rush			X												X						X				
Juncus bufonius	Toad rush	X		X		X		X			X	X		X	X	X	X		X	X				X	X	X
Juncus effusus	Soft rush	X		X	X		X									X										
Poaceae	**Grass Family**																									
*Agrostis avenacea**	Pacific bentgrass	X	X	X				X			X	X												X		
Alopecurus carolinianus	Tufted foxtail							X			X												X			
Alopecurus saccatus	Foxtail	X	X	X								X		X						X						
*Arundo donax**	Giant reed															X										
*Avena barbata**	Slender wild oats	X		X			X	X	X	X	X	X	X	X		X		X			X				X	X
*Avena fatua**	Common wild oats		X					X			X						X		X	X		X	X	X		X

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
*Briza minor**	Little quaking grass	X														X										
*Bromus catharticus**	Rescue brome	X	X		X						X												X			
*Bromus diandrus**	Ripgut brome	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
*Bromus hordeaceus**	Soft chess	X	X	X		X	X	X			X	X	X			X	X	X	X	X		X	X	X		
Bromus madritensis ssp. *rubens**	Foxtail chess					X		X																		
Cortaderia jubata	Pampas grass																						X			
*Crypsis schoenoides**	Swamp grass							X			X					X										
*Cynodon dactylon**	Bermuda grass	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	
Deschampsia danthonioides	Annual hairgrass	X	X					X			X	X				X								X		
*Digitaria sanguinalis**	Hairy crabgrass	X		X		X	X			X	X	X	X			X	X	X	X							
Distichlis spicata	Saltgrass					X		X			X				X	X		X			X	X	X			
*Echinochloa crus-galli**	Barnyardgrass	X	X	X	X	X		X	X		X	X		X		X							X	X	X	
*Eleusine tristachya**	Threespike goosegrass															X										
Elymus glaucus	Blue wildrye		X	X				X			X	X											X	X		
Elymus triticoides (Leymus triticoides)	Creeping wildrye					X		X			X															
Eragrostis pectinacea var. *pectinacea*	Tufted lovegrass															X										
Eragrostis sp.*	Lovegrass															X										
*Festuca arundinacea**	Reed fescue	X																						X		
*Festuca bromoides (Vulpia bromoides)**	Foxtail fescue			X					X							X							X			
Festuca microstachys (Vulpia microstachys)	Small fescue		X					X			X	X											X	X		
*Festuca myuros (Vulpia myuros)**	Rattail fescue		X					X								X										

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
*Festuca perennis (Lolium multiflorum)**	Italian ryegrass	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Glyceria occidentalis	Sweet flotegrass			X				X			X	X		X		X	X		X	X					X	
*Holcus lanatus**	Velvetgrass										X													X		
Hordeum brachyantherum	Meadow barley		X					X			X	X				X						X	X		
Hordeum marinum ssp. *gussoneanum**	Mediterranean barley							X			X						X		X	X				X		
*Hordeum murinum**	Foxtail barley	X	X	X			X	X		X	X	X	X	X		X	X	X	X	X		X	X	X	X	X
Leersia oryzoides	Rice cutgrass							X			X															
Leptochloa fusca subsp. *Fascicularis (Leptochloa fascicularis)*	Bearded sprangletop	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X							X	X	X	
Muhlenbergia rigens	Deergrass															X										
*Oryza sativa**	Rice	X	X	X	X		X		X			X	X	X			X	X	X	X	X				X	
*Paspalum dilatatum**	Dallisgrass	X	X	X	X		X	X	X		X	X	X	X		X	X	X	X		X	X			X	
Paspalum distichum	Knotgrass	X	X	X	X						X	X		X		X								X	X	
*Phalaris aquatica**	Harding grass							X									X					X				
*Phalaris minor**	Littleseed canarygrass	X	X					X	X	X	X									X			X	X	X	X
*Phalaris paradoxa**	Paradox canarygrass			X							X	X				X						X		X		
*Poa annua**	Annual bluegrass		X		X		X	X		X	X	X		X		X				X		X	X	X		
*Polypogon interruptus**	Ditch beard grass	X	X			X		X			X												X	X		
*Polypogon monspeliensis**	Rabbit's-foot grass	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X		X	X	X	X	
*Setaria pumila**	Yellow bristle grass		X							X		X				X								X		
*Sorghum bicolor**	Milo	X								X																
*Sorghum halepense**	Johnsongrass	X	X	X	X	X	X	X	X		X		X	X	X		X	X	X	X		X	X	X	X	

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
Sporobolus indicus	Small smutgrass															X										
Stipa pulchra (Nassella pulchra)	Purple needlegrass		X													X										
*Triticum aestivum**	Wheat					X																		X		X
Pontederiaceae	**Mud Plantain Family**																									
*Heteranthera limosa**	Ducksalad				X			X			X			X												
Typhaceae	**Cattail Family**																									
Typha angustifolia	Narrow-leaved cattail			X					X											X						
Typha domingensis	Southern cattail	X	X	X	X	X	X	X				X	X		X		X	X	X		X		X	X	X	X
Typha latifolia	Broadleaf cattail		X	X				X	X		X	X	X	X		X		X	X	X	X		X	X		
Dicotyledons																										
Aceraceae	**Maple Family**																									
Acer negundo	Box-elder					X																	X	X		
Adoxaceae	**Muskroot Family**																									
Sambucus nigra subsp. *canadensis (Sambucus mexicana)*	Blue elderberry	X																					X			
Amaranthaceae	**Amaranth Family**																									
Asclepias fascicularis	Narrow-leaf milkweed										X															
Amaranthaceae	**Amaranth Family**																									
*Amaranthus albus**	Pigweed amaranth															X										
Amaranthus sp.	Amaranth				X	X				X													X			
Anacardiaceae	**Sumac Family**																									
Toxicodendron diversilobum	Poison-oak	X				X																				
Apiaceae	**Carrot Family**																									

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
*Ammi visnaga**	Bisnaga		X			X		X			X															
*Conium maculatum**	Poison hemlock																								X	
*Daucus carota**	Wild carrot								X																	
*Foeniculum vulgare**	Sweet fennel									X												X	X	X	X	
*Torilis arvensis**	Hedge parsley	X																				X				
Araliaceae	**Ginseng Family**																									
*Hedera helix**	English ivy																									X
Asclepiadaceae	**Milkweed Family**																									
Asclepias fascicularis	Narrow-leaf milkweed															X								X		
Asteraceae	**Sunflower Family**																									
Achyrachaena mollis	Blow-wives			X								X				X				X				X		
Ambrosia sp.	Ragweed					X		X			X															
*Anthemis cotula**	Mayweed							X			X															
Baccharis pilularis	Coyote brush	X	X									X				X							X	X		
Baccharis salicifolia	Mulefat															X										
*Carduus pycnocephalus**	Italian thistle										X	X		X		X						X	X			
Centaurium pulchellum	Branched centaury										X	X														
*Centaurea solstitialis**	yellow star-thistle	X	X	X	X			X	X	X	X	X	X	X	X	X	X	X		X	X	X				
Centromadia fitchii	Fitch's spikeweed			X		X										X										
*Cichorium intybus**	Chicory			X					X	X		X				X						X		X		
*Cirsium vulgare**	Bull thistle	X	X	X	X	X	X	X	X		X	X	X		X	X						X	X	X	X	X
*Dittrichia graveolens**	Stinkwort	X						X			X					X			X				X			
Eclipta prostrata	False daisy				X			X			X	X													X	

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
*Erigeron canadensis (Conyza)**	Horseweed	X		X	X	X	X	X	X		X	X	X			X	X	X	X			X	X		X	
*Gnaphalium luteoalbum**	Cudweed everlasting	X	X	X	X	X		X	X	X	X	X	X	X		X					X			X		
Helianthus annuus	Annual sunflower	X																								
*Helminthotheca echioides (Picris echioides)**	Bristly ox-tongue	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Heterotheca grandiflora	Telegraphweed			X												X										
Holocarpha virgata ssp. *virgata*	Common tarweed	X														X										
*Hypochaeris glabra**	Soft cat's-ear															X										
*Lactuca saligna**	Willow lettuce										X													X		
*Lactuca serriola**	Prickly lettuce	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Lasthenia glaberrima	Smooth goldfields															X										
*Leontodon saxstilis (taraxacoides)**	Hairy hawkbit											X														
*Logfia gallica (Filago gallica)**	Narrow-leaved filago															X										
*Matricaria discoidea (Chamomila suaveolens)**	Pineapple weed		X									X				X										
Microseris elegans	Elegant microseris															X										
Psilocarphus brevissimus var. brevissimus	Woollyheads															X										
Psilocarphus tenellus	Slender woollyheads															X										
*Senecio vulgaris**	Common groundsel		X	X				X		X	X	X		X		X				X		X				X
*Silybum marianum**	Milk thistle	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X	X
*Soliva sessilis**	Lawn burweed															X										
Sonchus asper ssp. *asper**	Prickly sow thistle	X	X	X				X			X		X	X	X	X				X		X	X			
*Sonchus oleraceus**	Common sow-thistle	X		X	X	X	X	X	X		X	X	X			X	X	X	X	X		X	X	X	X	X

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
Symphyotrichum subulatum (Aster subulatus var. *ligulatus)*	Annual water-aster	X	X	X	X	X		X			X	X		X		X							X	X	X	
Taraxacum officinale	Dandelion															X								X		
*Tragopogon porrifolius**	Salsify	X																								
Xanthium spinosum	Spiny coccklebur															X										
Bignoniaceae	**Bignonia Family**																									
*Catalpa bignonioides**	Catalpa															X										
Boraginaceae	**Borage Family**																									
Amsinckia menziesii var. *intermedia*	Common fiddleneck	X		X				X	X	X	X	X		X		X						X				
Heliotropium curassavicum	Heliotrope	X								X	X													X	X	
Plagiobothrys stipitatus var. micranthus	Stipitate popcornflower															X										
Brassicaceae	**Mustard Family**																									
*Brassica nigra**	Black mustard	X	X					X		X	X	X	X									X	X	X		
*Brassica rapa**	Field mustard			X	X		X		X		X		X			X	X	X	X				X		X	
*Capsella bursa-pastoris**	Shepherd's-purse				X		X	X	X	X		X		X	X	X	X		X	X		X	X	X		X
Cardamine oligosperma	Idaho bittercress															X										
*Hirschfeldia incana**	Shortpod mustard		X							X	X	X														
Lepidium dictyotum	Alkali pepperweed																									
*Lepidium didymus (Cornopus didymus)**	Lesser swinecress	X	X					X		X	X	X				X							X	X		X
*Lepidium latifolium**	Perennial pepperweed	X		X	X	X					X					X							X		X	
Planodes virginicum (Sibara virginica)	Common rockcress															X							X			

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
*Raphanus sativus**	Wild radish	X	X	X		X			X		X	X	X			X						X	X	X	X	X
Rorippa curvisiliqua	Westwen yellowcress	X	X					X			X	X								X						
*Sinapis arvensis**	Charlock mustard		X			X					X									X				X		
*Sisymbrium officinale**	Hedge mustard				X	X																				
Callitrichaceae	**Water-Starwort Family**																									
Callitriche marginata	Water-starwort			X																						
Caryophyllaceae	**Pink Family**																									
*Cerastium glomeratum**	Mouse-ear chickweed			X																						
*Spergularia rubra**	Red sandspurry			X								X				X										
*Stellaria media**	Common chickweed							X						X		X				X			X	X		
Ceratophyllaceae	**Hornwort Family**																									
Ceratophyllum demersum	Hornwort								X		X	X											X			
Chenopodiaceae	**Goosefoot Family**																									
*Chenopodium album**	White goosefoot										X															
Chenopodium sp.	Goosefoot				X	X										X				X			X			X
*Salsola tragus** *(previous family – Asteraceae)*	Russian thistle, tumbleweed										X		X			X								X		
Convolvulaceae	**Morning Glory Family**																									
*Convolvulus arvensis**	Field bindweed	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Cressa truxillensis	Alkali weed													X		X						X		X		
Crassulaceae	**Stonecrop Family**																									
Crassula aquatica/solieri	Water pygmy-weed										X	X														
*Crassula tillaea**	Moss pygmy-stonecrop									X																

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
Elatinaceae	**Waterwort Family**																									
*Elatine ambigua**	Asian waterweed							X			X					X							X			
Elatine brachysperma/rubella	Waterweed							X			X															
Euphorbiaceae	**Spurge Family**																									
*Chamaesyce maculata**	Spotted spurge															X									X	
Chamaesyce serpyllifolia ssp. *serpyllifolia*	Thyme-leaved spurge							X			X															
Eremocarpus setiger (setigerus)	Doveweed															X						X		X		
Fabaceae	**Legume Family**																									
Acmispon americanus (Lotus purshianus)	Spanish lotus			X																						
Glycyrrhiza lepidota	Wild licorice																					X		X	X	
*Lotus corniculatus**	Bird's-foot trefoil	X	X	X												X						X		X		
Lupinus bicolor	Miniature lupine			X				X		X	X	X				X										
*Medicago polymorpha**	Bur-clover	X	X				X	X	X	X	X	X	X	X		X	X	X	X	X		X		X	X	X
*Medicago sativa**	Alfalfa					X			X	X				X								X				X
*Melilotus alba**	White sweetclover	X	X	X				X		X	X													X		
*Melilotus indica**	Indian sweetclover		X					X			X													X		
*Robinia pseudoacacia**	Black locust																									
*Trifolium campestre**	Hop clover			X												X							X			
*Trifolium dubium**	Suckling clover			X						X						X								X		
*Trifolium fragiferum**	Strawberry clover															X										
*Trifolium glomeratum**	Clustered clover															X										

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
Trifolium gracilentum	Pinpoint clover															X										
*Trifolium hirtum**	Rose clover									X														X		
*Trifolium pratense**	Red clover															X										
*Trifolium repens**	White clover															X							X			
*Trifolium subterraneum**	Subterranean clover															X										
*Vicia sativa**	Common vetch			X						X				X		X				X						
*Vicia villosa**	Hairy vetch		X					X		X	X	X				X							X	X		
Fagaceae	**Oak Family**																									
Quercus lobata	Valley oak	X		X		X					X	X		X	X	X						X	X	X	X	X
Gentianaceae	**Gentian Family**																									
Zeltnera muehlenbergii (Centaurium muehlenbergii)	Monterey centaury			X				X	X		X												X			
Geraniaceae	**Geranium Family**																									
*Erodium botrys**	Big stork's-bill		X	X	X		X		X			X	X			X	X	X	X							
*Erodium cicutarium**	Red-stemmed filaree		X		X		X	X	X	X	X	X	X		X	X	X	X	X					X		
*Erodium moschatum**	White-stemmed filaree	X	X					X	X	X	X			X		X				X		X				
*Geranium dissectum**	Cut-leaf geranium	X	X	X	X		X	X	X	X	X		X	X		X	X	X	X	X		X	X	X		
*Geranium molle**	Dove's-foot geranium										X					X										
Haloragaceae	**Water-Milfoil Family**																									
Myriophyllum sp.	Water milfoil							X	X																	
Juglandaceae	**Walnut family**																									
Juglans hindsii (Juglans californica var. *hindsii)*	California black walnut															X						X	X	X		X

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
Lamiaceae	**Mint Family**																									
*Lamium amplexicaule**	Henbit deadnettle									X		X								X						
Lycopus americanus	American bugleweed							X																		
*Mentha pulegium**	Pennyroyal										X					X										
Stachys ajugoides/albens	Hedge nettle	X																								
Trichostema lanceolatum	Vinegarweed			X												X										
Lythraceae	**Loosestrife Family**																									
Ammannia coccinea/robusta	Redstem	X		X	X		X	X			X	X				X							X	X	X	
*Lythrum hyssopifolia**	Hyssop loosestrife	X	X	X	X	X	X	X	X	X	X	X				X				X			X	X		
Malvaceae	**Mallow Family**																									
*Abutilon theophrasti**	Velvet-leaf	X			X	X	X	X		X	X	X										X	X	X	X	X
*Malva neglecta**	Common mallow		X		X		X	X					X				X	X	X			X				
*Malva nicaeensis**	Bull mallow	X	X	X		X		X	X		X	X	X	X		X				X			X	X	X	
Malvella leprosa	Alkali mallow	X	X	X	X	X	X	X	X	X	X			X	X	X	X		X	X	X	X		X	X	
*Modiola caroliniana**	Carolina bristle-mallow															X										
Montiaceae (Split from Portulacaceae)	**Miner's Lettuce Family**																									
Calandrinia ciliata	Red maids		X	X				X	X	X	X	X		X						X			X	X		
Claytonia perfoliata	Miner's lettuce			X										X		X								X		
Moraceae	**Mulberry Family**																									
*Ficus carica**	Edible fig	X		X							X				X	X						X		X		
*Morus alba**	White mulberry	X														X									X	
Myrtaceae	**Myrtle Family**																									

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
*Eucalyptus camulduensis**	River red gum															X							X			
*Eucalyptus globulus**	Blue gum															X										
*Eucalyptus polyanthemos**	Silver dollar gum															X										
Oleaceae	**Olive Family**																									
Fraxinus latifolia	Oregon ash																					X	X		X	X
Onagraceae	**Evening-Primrose Family**																									
Epilobium brachycarpum	Panicled willow-herb				X	X	X						X				X	X	X						X	
Epilobium campestre (Epilobium pygmaeum)	Smooth spike-primrose															X										
Epilobium ciliatum	Fringed willowherb	X	X	X	X	X	X	X			X	X	X		X	X	X	X	X	X		X		X		X
Ludwigia peploides	Floating water-primrose				X			X	X		X									X	X					
Ludwigia peploides ssp. *montevidensis**	Floating water-primrose		X	X				X		X	X	X				X				X						
Ludwigia peploides ssp. *peploides*	Floating water-primrose										X					X								X	X	
Oenothera elata	Evening primrose	X						X																		
Orobanchaceae (split from Scrophulariaceae)	**Broomrape Family**																									
Castilleja attenuata	Valley tassels											X														
Triphysaria eriantha	Johnny-tuck															X										
Triphysaria pusilla	Dwarf owl's clover															X										
Oxalidaceae	**Oxalis Family**																									
*Oxalis corniculata**	Yellow sorrel															X										
Oxalis sp.*	Sorrel																					X				

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
Phrymaceae (split from Scrophulariaceae)	**Lopseed Family**																									
Mimulus guttatus	Seep-spring monkeyflower	X														X										
Plantaginaceae	**Plantain Family**																									
Bacopa eisenii (Bacopa eisenmanii)	Eisen water-hyssop	X	X	X				X	X		X	X												X		
*Dopatrium junceum**	Horsefly's eye			X																						
Gratiola ebracteata	Bractless hedge-hyssop										X															
*Kickxia elatine**	Sharp-leaved fluellin							X																		
Lindernia dubia	Yellowseed false pimpernel			X																						
*Plantago coronopus**	Buckhorn plantain															X										
*Plantago lanceolata**	English plantain							X			X					X	X		X	X						
*Plantago major**	Common plantain															X										
*Veronica anagallis-aquatica**	Water speedwell								X		X									X			X			
*Veronica arvensis**	Corn speedwell															X										
Veronica peregrina ssp. *xalapensis*	Purslane speedwell	X	X	X				X	X	X	X	X		X		X				X		X		X		
*Veronica persica**	Persian speedwell															X										
Platanaceae	**Plane Family**																									
Platanus racemosa	Western sycamore		X									X				X							X			
Polygonaceae	**Buckwheat Family**																									
Persicaria amphibian (Polygonum amphibium)	Water smartweed				X	X	X																			
*Persicaria hydropiper (Polygonum hydropiper)**	Common smartweed, marsh pepper		X	X				X	X	X	X		X											X		

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
Persicaria lapathifolia (Polygonum lapathifolium)	Willow smartweed	X	X		X	X			X	X	X	X	X			X									X	
Polygonum aviculare subsp. *depressum (Polygonum arenastrum)**	Common knotweed	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
*Rumex conglomeratus**	Clustered dock															X										
*Rumex crispus**	Curly dock	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
*Rumex dentatus**	Toothed dock							X			X															
*Rumex pulcher**	Fiddle dock	X						X			X					X								X		
Portulacaceae	**Purslane Family**																									
*Portulaca oleracea**	Common purslane											X				X										
Primulaceae	**Primrose Family**																									
*Anagallis arvensis**	Scarlet pimpernel	X		X	X	X	X	X	X	X	X	X	X			X	X	X	X				X	X		X
Ranunculaceae	**Buttercup Family**																									
Myosurus minimus	Common mousetail		X									X								X						
Ranunculus bonariensis var. *trisepalus*	Carter's buttercup			X								X		X		X										
*Ranunculus muricatus**	Prickle-fruited buttercup	X						X			X					X							X	X		
Ranunculus sp.	Buttercup							X																		
Rhamnaceae	**Buckthorn Family**																									
Frangula californica (Rhamnus californica)	California coffeeberry																							X		
Rosaceae	**Rose Family**																									
*Pyracantha angustifolia**	Firethorn															X										
Rosa californica	California wild rose	X	X	X												X						X				
*Rubus armeniacus**	Himalayan blackberry	X		X	X	X			X	X					X	X						X	X	X	X	X

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
Rubus ursinus	California blackberry	X	X			X						X				X						X	X	X		X
Rubiaceae	**Madder Family**																									
Cephalanthus occidentalis var. *californicus (formally in Rosaceae family)*	Buttonwillow		X	X				X			X	X										X	X		X	
Galium aparine	Bedstraw	X		X					X													X	X			X
Salicaceae	**Willow Family**																									
Populus fremontii	Fremont cottonwood	X		X		X		X	X	X	X	X		X		X						X	X	X	X	
Salix exigua	Narrow-leaved willow	X	X	X																						
Salix gooddingii	Black willow	X		X				X	X		X	X				X							X	X	X	
Salix lasiolepis	Arroyo willow	X		X				X				X											X		X	
Scrophulariaceae	**Figwort Family**																									
Limosella acaulis	Broad-leaved mudwort							X			X															
Simaroubaceae	**Quassia Family**																									
*Ailanthus altissima**	Tree-of-heaven															X										
Solanaceae	**Nightshade Family**																									
*Datura stramonium**	Jimson weed	X																					X			
*Lycopersicon esculentum**	Tomato								X																	
*Physalis lancifolia**	Narrowleaf tomatillo	X	X										X			X									X	
*Physalis philadelphica**	Tomatillo							X			X					X										
Solanum americanum	Common nightshade			X	X	X					X		X	X		X									X	
Urticaceae	**Nettle Family**																									
*Urtica urens**	Dwarf nettle																						X			

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
Verbenaceae	**Vervain Family**																									
Phyla nodiflora var. *nodiflora*	Turkey tangle fogfruit										X					X										
*Verbena bonariensis**	Purpletop vervain		X		X	X	X	X			X	X	X				X	X	X							
Viscaceae	**Mistletoe Family**																									
Phoradendron serotinum (Phoradendron villosum)	*Oak mistletoe*	X																								
Vitaceae	**Grape Family**																									
Vitis californica	California wild grape	X																				X	X	X	X	
Zygophyllaceae	**Caltrop Family**																									
*Tribulus terrestris**	Puncture vine								X			X														
Total plant taxa for reserve		98	84	99	55	54	45	114	65	57	131	96	47	53	26	160	42	36	42	53	19	61	85	103	58	32

* Nonnative species.

[a] Nomenclature follows the 2012 second edition of *The Jepson Manual;* previous name from the 1993 first edition of *The Jepson Manual* is provided in parentheses.

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Appendix C

Avian and Other Covered Species Survey Results

Table C-1. Common and Scientific Names of Wildlife Species Observed on NBHCP Reserves, 2004–2023

Common Name	Scientific Name
Mammals	
Coyote	*Canis latrans*
Raccoon	*Procyon lotor*
River otter	*Lontra canadensis*
Striped skunk	*Mephitis mephitis*
Mink	*Neovison vison*
Long-tailed weasel	*Neogale frenata*
California ground squirrel	*Otospermophilus beecheyi*
Botta's pocket gopher	*Thomomys bottae*
Deer mouse	*Peromyscus maniculatus*
California meadow vole	*Microtus californicus*
Muskrat	*Ondatra zibethicus*
House mouse	*Mus musculus*
Brown rat	*Rattus norvegicus*
Black-tailed jackrabbit	*Lepus californicus*
Desert cottontail	*Silvilagus audubonii*
Mule deer	*Odocoileus hemionus*
Hoary bat	*Lasiurus cinereus*
Mexican free-tailed bat	*Tadarida brasiliensis mexicanus*
Birds	
Greater white-fronted goose	*Anser albifrons*
Snow goose	*Chen caerulescens*
Canada goose	*Branta canadensis*
Tundra swan	*Cygnus columbianus*
Wood duck	*Aix sponsa*
Gadwall	*Anas strepera*
American wigeon	*Anas americana*
Eurasian wigeon	*Anas penelope*
Mallard	*Anas platyrhynchos*
Blue-winged teal	*Anas discors*
Cinnamon teal	*Anas cyanoptera*
Northern shoveler	*Anas clypeata*
Northern pintail	*Anas acuta*
Green-winged teal	*Anas crecca*
Canvasback	*Aythya valisineria*
Redhead	*Aythya americana*
Ring-necked duck	*Aythya collaris*
Greater scaup	*Aythya marila*
Lesser scaup	*Aythya affinis*
Bufflehead	*Bucephala albeola*
Common goldeneye	*Bucephala clangula*
Hooded merganser	*Lophodytes cucullatus*

Table C-1. Continued

Common Name	Scientific Name
Common merganser	*Mergus merganser*
Ruddy duck	*Oxyura jamaicensis*
Ring-necked pheasant	*Phasianus colchicus*
Wild turkey	*Meleagris gallopavo*
California quail	*Callipepla californica*
Pied-billed grebe	*Podilymbus podiceps*
Eared grebe	*Podiceps nigricollis*
Horned grebe	*Podiceps auritus*
American white pelican	*Pelecanus erythrorhynchos*
Double-crested cormorant	*Phalacrocorax auritus*
American bittern	*Botaurus lentiginosus*
Great blue heron	*Ardea herodias*
Great egret	*Ardea alba*
Snowy egret	*Egretta thula*
Cattle egret	*Bubulcus ibis*
Green heron	*Butorides virescens*
Black-crowned night-heron	*Nycticorax nycticorax*
White-faced ibis	*Plegadis chihi*
Turkey vulture	*Cathartes aura*
Bald eagle	*Haliaeetus leucocephalus*
Osprey	*Pandion haliaetus*
White-tailed kite	*Elanus leucurus*
Northern harrier	*Circus cyaneus*
Sharp-shinned hawk	*Accipiter striatus*
Cooper's hawk	*Accipiter cooperii*
Red-shouldered hawk	*Buteo lineatus*
Swainson's hawk	*Buteo swainsoni*
Ferruginous hawk	*Buteo regalis*
Red-tailed hawk	*Buteo jamaicensis*
Rough-legged hawk	*Buteo lagopus*
American kestrel	*Falco sparverius*
Merlin	*Falco columbarius*
Prairie falcon	*Falco mexicanus*
Peregrine falcon	*Falco peregrinus*
Virginia rail	*Rallus limicola*
Sora	*Porzana carolina*
Common gallinule	*Gallinula galeata*
American coot	*Fulica americana*
Sandhill crane	*Grus canadensis*
Killdeer	*Charadrius vociferus*
Mountain plover	*Charadrius montanus*
Black-necked stilt	*Himantopus mexicanus*
American avocet	*Recurvirostra americana*

Table C-1. Continued

Common Name	Scientific Name
Greater yellowlegs	*Tringa melanoleuca*
Lesser yellowlegs	*Tringa flavipes*
Long-billed curlew	*Numenius americanus*
Western sandpiper	*Calidris mauri*
Least sandpiper	*Calidris minutilla*
Baird's sandpiper	*Calidris bairdii*
Dunlin	*Calidris alpina*
Short-billed dowitcher	*Limnodromus griseus*
Long-billed dowitcher	*Limnodromus scolopaceus*
Wilson's snipe	*Gallinago gallinago*
Wilson's phalarope	*Phalaropus tricolor*
Red-necked phalarope	*Phalaropus lobatus*
Ring-billed gull	*Larus delawarensis*
California gull	*Larus californicus*
Herring gull	*Larus argentatus*
Caspian tern	*Sterna caspia*
Black tern	*Chlidonias niger*
Forster's tern	*Sterna forsteri*
Rock pigeon	*Columba livia*
Eurasian-collared dove	*Streptopelia decaocto*
Mourning dove	*Zenaida macroura*
Barn owl	*Tyto alba*
Great horned owl	*Bubo virginianus*
Burrowing owl	*Athene cunicularia*
Short-eared owl	*Asio flammeus*
Lesser nighthawk	*Chordeiles acutipennis*
White-throated swift	*Aeronautes saxatalis*
Black-chinned hummingbird	*Archilochus alexandri*
Anna's hummingbird	*Calypte anna*
Rufous hummingbird	*Selasphorus rufus*
Belted kingfisher	*Ceryle alcyon*
Acorn woodpecker	*Melanerpes formicivorus*
Nuttall's woodpecker	*Picoides nuttallii*
Downy woodpecker	*Picoides pubescens*
Northern flicker	*Colaptes auratus*
Western wood-pewee	*Contopus sordidulus*
Willow flycatcher	*Empidonax traillii*
Pacific-slope flycatcher	*Empidonax difficilis*
Black phoebe	*Sayornis nigricans*
Say's phoebe	*Sayornis saya*
Ash-throated flycatcher	*Myiarchus cinerascens*
Western kingbird	*Tyrannus verticalis*
Loggerhead shrike	*Lanius ludovicianus*

Table C-1. Continued

Common Name	Scientific Name
Warbling vireo	*Vireo gilvus*
California scrub-jay	*Aphelocoma californica*
Yellow-billed magpie	*Pica nuttalli*
Common raven	*Corvus corax*
American crow	*Corvus brachyrhynchos*
Horned lark	*Eremophila alpestris*
Tree swallow	*Tachycineta bicolor*
Violet-green swallow	*Tachycineta thalassina*
Northern rough-winged swallow	*Stelgidopteryx serripennis*
Cliff swallow	*Petrochelidon pyrrhonota*
Barn swallow	*Hirundo rustica*
Oak titmouse	*Baeolophus inornatus*
Bushtit	*Psaltriparus minimus*
White-breasted nuthatch	*Sitta carolinensis*
Bewick's wren	*Thryomanes bewickii*
House wren	*Troglodytes aedon*
Marsh wren	*Cistothorus palustris*
Ruby-crowned kinglet	*Regulus calendula*
Golden-crowned kinglet	*Regulus satrapa*
Western bluebird	*Sialia mexicana*
Mountain bluebird	*Sialia currucoides*
Swainson's thrush	*Catharus ustulatus*
Hermit thrush	*Catharus guttatus*
American robin	*Turdus migratorius*
Northern mockingbird	*Mimus polyglottos*
European starling	*Sturnus vulgaris*
American pipit	*Anthus rubescens*
Cedar waxwing	*Bombycilla cedrorum*
Phainopepla	*Phainopepla nitens*
Orange-crowned warbler	*Vermivora celata*
Yellow warbler	*Dendroica petechia*
Yellow-rumped warbler	*Dendroica coronata*
Black-throated gray warbler	*Dendroica nigrescens*
Townsend's warbler	*Dendroica townsendi*
MacGillivray's warbler	*Oporornis tolmiei*
Common yellowthroat	*Geothlypis trichas*
Wilson's warbler	*Wilsonia pusilla*
Western tanager	*Piranga ludoviciana*
Spotted towhee	*Pipilo maculatus*
California towhee	*Pipilo crissalis*
Chipping sparrow	*Spizella passerina*
Lark sparrow	*Chondestes grammacus*
Savannah sparrow	*Passerculus sandwichensis*

Table C-1. Continued

Common Name	Scientific Name
Fox sparrow	*Passerella iliaca*
Song sparrow	*Melospiza melodia*
Lincoln's sparrow	*Melospiza lincolnii*
White-crowned sparrow	*Zonotrichia leucophrys*
Golden-crowned sparrow	*Zonotrichia atricapilla*
Dark-eyed junco	*Junco hyemalis*
Black-headed grosbeak	*Pheucticus melanocephalus*
Blue grosbeak	*Guiraca caerulea*
Lazuli bunting	*Passerina amoena*
Red-winged blackbird	*Agelaius phoeniceus*
Tricolored blackbird	*Agelaius tricolor*
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*
Brewer's blackbird	*Euphagus cyanocephalus*
Great-tailed grackle	*Quiscalus mexicanus*
Brown-headed cowbird	*Molothrus ater*
Western meadowlark	*Sturnella neglecta*
Bullock's oriole	*Icterus bullockii*
House finch	*Carpodacus mexicanus*
Lesser goldfinch	*Carduelis psaltria*
American goldfinch	*Carduelis tristis*
House sparrow	*Passer domesticus*
Reptiles	
Pacific pond turtle	*Actinemys marmorata*
Red-eared slider	*Trachemys scripta elegans*
Pacific gopher snake	*Pituophis catenifer catenifer*
Western yellow-bellied racer	*Coluber constrictor mormon*
California king snake	*Lampropeltis getulus californiae*
Giant gartersnake	*Thamnophis gigas*
Valley gartersnake	*Thamnophis sirtalis fitchi*
Western fence lizard	*Sceloporus occidentalis*
California alligator lizard	*Gerrhonotus multicarnatus multicarnatus*
Amphibians	
Sierran tree frog	*Pseudacris sierra*
Bullfrog	*Rana catesbeiana*

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Table C-2. Total Numbers of Bird Detections on NBHCP Mitigation Lands during 2023 Avian Surveys

	North Basin Reserve																		Central Basin Reserve										Fisherman's Lake Reserve						
Common Name	*Atkinson*	*Bennett North*	*Bennett South*	*Bolen North*	*Bolen South*	*Bolen West*	*Frazer*	*Huffman East*	*Huffman West*	*Lauppe North*	*Lauppe South*	*Lucich North*	*Lucich South*	*Nestor*	*Ruby Ranch*	*Verona*	*Vestal*	*Willey*	*Betts Kismat Silva*	*Bianchi West*	*Elsie*	*Elverta Silva South*	*Frazer South*	*Paulson Central*	*Paulson South*	*Richter*	*Sills*	*Tufts*	*Alleghany 50*	*Ann Rudin*	*Cummings*	*Natomas Farms*	*Rosa Central*	*Souza*	**Total**
Greater White-fronted Goose		846		450		5	215	135			80	638	420	75					1630	372		209	1		280		160					60			5576
Snow Goose		7									15								105																127
Canada Goose		103				10	2					268	10						329			7	31							6		37	4		807
Domestic Goose														1																					1
Wood Duck																	2		13										45		10			70
American Wigeon		8										4		1					57	2			1							6	2			81
Mallard	14	68	30	3		5	7	4		6		174	13	4	3	2	6	9	129	13	2	23	226	35	55	4	34	5		72	74	50	2		1072
Blue-winged Teal												9																							9
Cinnamon Teal		10										2	3						23				2												40
Northern Shoveler								2		12		6	80							180				32	3										315
Northern Pintail												8								72				14	8										102
Green-winged Teal			18							16			1200						12	35			6		50										1337
Greater Scaup																			32				12								2				46
Bufflehead												2							32																34
Common Goldeneye																			16				12							2					30
Common Merganser																								3											3
Ruddy Duck												1							5	2															8
Ring-necked Pheasant																			2																2
Wild Turkey	2											1																				2			5
California Quail	9				2						2																		2		1		1		17
Pied-billed Grebe		17										26							43				9							11	1				107
Eared Grebe																															1				1
American White Pelican												51							5																56
Double-crested Cormorant		18										49							23				15								6				111
American Bittern		1						1					1				1									1	1								6
Great Blue Heron	4	13	14	4		4	7	10		7	3	27	22	6	3	1	5	3	21	6	3	12	25	1	3	2	25	11		3	4	7	3		259
Great Egret	10	15	13	9		47	13	17		7	28	73	46	11	6	4	16	9	33	28	6	16	17	7	3	3	25	7		4	4	15	2	1	495
Snowy Egret		2		3		48	4					29	4			22	9		59	6	2	2	1	1		3	6	1					1		203
Cattle Egret								1			1											11													13
Green Heron												1							1											1			1		4
Black-crowned Night-Heron	3		2				1				3	1	98		2		5		25	10		2	6	1			4			1					164
White-faced Ibis						1	1	18		16						8	24		5	1		1	1												76
Turkey Vulture	17	4	5	1						3	1	2	2	1					5		1		1				1				1	1			46
Osprey		1							2	3									1																7
White-tailed Kite																			3												3	3			9
Balld Eagle								1											1																2
Northern Harrier		1	2				2				2	2	2	1	1				2			2	1	1		1	2	2		4		1			29
Cooper's Hawk							1						1	1					3												1				7
Red-shouldered Hawk	3																		1																4
Swainson's Hawk	6		2		2					2						1										1	1	1		1		3	1		21

Table C-2. Continued

	North Basin Reserve																		Central Basin Reserve										Fisherman's Lake Reserve						
Common Name	*Atkinson*	*Bennett North*	*Bennett South*	*Bolen North*	*Bolen South*	*Bolen West*	*Frazer*	*Huffman East*	*Huffman West*	*Lauppe North*	*Lauppe South*	*Lucich North*	*Lucich South*	*Nestor*	*Ruby Ranch*	*Verona*	*Vestal*	*Willey*	*Betts Kismat Silva*	*Bianchi West*	*Elsie*	*Elverta Silva South*	*Frazer South*	*Paulson Central*	*Paulson South*	*Richter*	*Sills*	*Tufts*	*Alleghany 50*	*Ann Rudin*	*Cummings*	*Natomas Farms*	*Rosa Central*	*Souza*	**Total**
Red-tailed Hawk	9	1	6			2	2	1	1			8	8	1			2		14		2	4	2				1	4	3	1	1	1	1		75
Ferruginous Hawk													1																						1
American Kestrel	1		2			1	1	3	3	2	1	1	1	1		1	4		5			2	1				1			1		3	1	2	38
Merlin														1																					1
Peregrine Falcon															1																				1
Prairie Falcon																1																			1
Common Gallinule		2										5							18				3						5						33
American Coot		52										302	303						681	200			159	17					14	26	1				1755
Killdeer	4	27	13	10		1	16	3		12		10	7	10	12		6	6	24	6	8	32	13	5	9	1	8	3			1	4			251
Black-necked Stilt		2					1															3									2				8
American Avocet							4																												4
Greater Yellowlegs			14				7			27	1	15	3						1				14		12		2								96
Long-billed Curlew				63		111		1		68	2		3		2					37					33		45								365
Western Sandpiper												5																							5
Least Sandpiper										143			220		12					36															411
Dunlin																									14										14
Long-billed Dowitcher											22	128	30							42			17		8										247
Ring-billed Gull				1				85			120		1				5		2	24			3	27	28										296
California Gull							1					2																							3
Eurasian Collared-Dove																		27	2													2			31
Mourning Dove	38		2	2	5	4	4			2	1	2	3		9	9			86		2	5	1	9	1		44		9	4	5	25	13	6	291
Great Horned Owl	2								1			6	1						3												1				14
Burrowing Owl																					4							1							5
Anna's Hummingbird																														1	1	1			3
Allen's Humminbird																			1																1
Belted Kingfisher												2							1																3
Acorn Woodpecker	3																																		3
Nuttall's Woodpecker	7																1		1										4			2			15
Northern Flicker	7														1		2																		10
Western Wood-Pewee	2																																		2
Black Phoebe	3	1	2	2	5	3	1				1	3	5		1	1	5		15			1	4						4	3	3	8		4	75
Say's Phoebe													2	1	1																	8			12
Ash-throated Flycatcher																1																			1
Western Kingbird	28	3	2		46	1		3	37	22	9	13	7	1	3	9	6	2	21				4				1		9	1	2	3	10	11	254
Loggerhead Shrike		2																																	2
California Scrub-Jay	27				1					1	1					2	2		1										6			2			43
Yellow-billed Magpie					6																														6
American Crow	10							1	18	1	1		6				10											6	1			6	4	34	98
Common Raven		2								2											1														5
Horned Lark		20			2	25				3				121		1					3					23	69	26					3		296

Table C-2. Continued

	North Basin Reserve																		Central Basin Reserve										Fisherman's Lake Reserve						
Common Name	*Atkinson*	*Bennett North*	*Bennett South*	*Bolen North*	*Bolen South*	*Bolen West*	*Frazer*	*Huffman East*	*Huffman West*	*Lauppe North*	*Lauppe South*	*Lucich North*	*Lucich South*	*Nestor*	*Ruby Ranch*	*Verona*	*Vestal*	*Willey*	*Betts Kismat Silva*	*Bianchi West*	*Elsie*	*Elverta Silva South*	*Frazer South*	*Paulson Central*	*Paulson South*	*Richter*	*Sills*	*Tufts*	*Alleghany 50*	*Ann Rudin*	*Cummings*	*Natomas Farms*	*Rosa Central*	*Souza*	**Total**
Tree Swallow	43	10	2		11					1		22	8		14		6		17				14						6	4	2	1	13		174
Cliff Swallow		31				16						1			17				39		5	3	33	9	1	1	22			28	30	8		3	247
Barn Swallow								2	1			2	16		1	1							2				1			3	12	6		10	57
Oak Titmouse	7																												8						15
Bushtit	10																																		10
White-breasted Nuthatch	2																																		2
Bewick's Wren	10																1																	1	12
House Wren	5																																		5
Marsh Wren		34	18									78	26					1	156				59							42	2				416
Ruby-crowned Kinglet	3																1		1													1			6
Western Bluebird	13				2				10			3					7					6							2		1				44
American Robin	5				1				3		1								1			1												1	13
Northern Mockingbird	6				2		1						2	1					9		1		1							2	2	9	8	5	49
European Starling	25				10			2	41	46							15		115		1	60											33	35	383
American Pipit		8		2		1	7	11		4			3	34	35	11	2	2	12	15	4	14			2	1	6					1			175
Yellow Warbler	1																																		1
Yellow-rumped Warbler	6							1					18				2														1	2			30
Common Yellowthroat	4																		2										2	1	6	4			19
Spotted Towhee	14				2											1													1			1			19
California Towhee										1	1					1													1			3		1	8
Lark Sparrow																			18																18
Savannah Sparrow	86	58	35	60	1	45	78	98	3	32	12	22	99	133	81	35	23	44	116	55	60	74	54	9	20	21	130	46		7	19	23	6	14	1599
Song Sparrow	1	4	16		1		1			1		13	12		1		1		15			1	6						4	10	5			92
White-crowned Sparrow	83	73	32		3		12					113	1			2	1		160			35	118				21		25		11	46	12		748
Golden-crowned Sparrow	33											15							26				14								10	24			122
Red-winged Blackbird	347	458	430	508	105	141	397	78	101	217	39	1910	415	46	307	337	306	253	1323	48	8	791	1139	19	3		228	13	41	19	129	134	94		10384
Tricolored Blackbird		30	10	20						10			10	1	20	20	8	20																	149
Western Meadowlark	60	122	115	73	1	55	92	63	1	32	32	59	121	142	38	116	40	32	66	25	25	19	13	7	6	57	130	26		2	15	96	10		1691
Yellow-headed Blackbird												1																							1
Brewer's Blackbird	41			68	17	12	1	51	14		12		8	6	36		33	14	138	1	8	62			1		8	2	7					6	546
Great-tailed Grackle		3										3	1						5		30		1												43
Brown-headed Cowbird	7	2					1		3			3			2		33		23			22	2						2		2	1			103
Bullock's Oriole	4				2												1												2			1			10
House Finch	103				6		8	15	13	2		8	15			8	9		42			19	12	2			6		36		2	12	20	27	365
Lesser Goldfinch	18				10	8				3					17	1	2		20										20	1				1	101
House Sparrow	7	1	1						4			5					14		26			4	2												64

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ATTACHMENT 6

ATTACHMENT 6

the NATOMAS BASIN conservancy

Chapter 10

HABITAT MITIGATION ORDINANCE

Sections:

Article 1. Title and Purposes

Sec. 10-10.101. Title.

This Chapter shall be known as the "Habitat Mitigation Ordinance" of the County. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.102. Purposes.

The County's land use planning efforts have consistently anticipated that local landowners—often in conjunction with assistance from non-profits and state agencies—will voluntarily undertake a modest amount of habitat creation, restoration, enhancement, and preservation actions. Similarly, the County has long coordinated urban development and related land use planning matters with the incorporated cities of Woodland, Davis, Winters, and West Sacramento. Projects within these jurisdictions have occasionally impacted biological resources, and the County intends to continue to accommodate the preservation of land in the unincorporated area as compensatory mitigation for such local habitat impacts.

In the foreseeable future, however, the County expects that the unincorporated area will increasingly be the subject of mitigation projects and similar efforts that arise in connection with impacts to biological resources occurring largely or entirely outside the geographic boundaries of the County. Such projects include mitigation banks with service areas extending far beyond the County—of which there are already a number—as well as various other endeavors to create, restore, enhance, and preserve habitat as a consequence of projects and activities occurring in locations outside of the County. These projects are the focus of this Chapter, while other purely local preservation and mitigation efforts are generally outside of its scope.

This Chapter provides for limited County regulation of certain habitat projects taking place within the County in connection with projects and activities occurring largely or entirely outside of the County. Such projects are unique in many respects. For example, wetland habitat projects can provide important habitat areas for fish, wildlife, and plants. They can also help maintain and enhance water quality, facilitate groundwater recharge, mitigate flooding, and control erosion. Some wetland habitat projects can also provide educational, scientific study, and recreational opportunities. The same is true of other types of habitat projects undertaken as compensatory mitigation. For these and other reasons, such projects can thus be a significant asset to the environment and the general public so long as they adequately replace the habitat area, values, and functions lost due to urban development or other projects or activities.

Nonetheless, to assure these projects benefit the County and do not unduly interfere with its land use planning efforts or the eventual implementation of the Yolo Natural Heritage Program, careful planning is necessary. Attention to matters of location, design, construction, and long-term monitoring and management is essential. Particularly for larger projects, early consideration of ways to integrate appropriate educational, recreational, scientific, and other opportunities is also desirable. Finally, the potential local and regional environmental and economic impacts of habitat projects—such as the conversion of farmland and existing species habitat, as well as conflicts with surrounding land uses and activities—deserves close attention and consideration. It is for these reasons that the Delta Reform Act of 2009 states that the goals of "providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem" are to be achieved in a manner "that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place."

Accordingly, this Chapter is intended to promote the foregoing objectives and to achieve the following purposes:

(a) To help ensure that out of county mitigation projects are located, constructed, and managed in a manner that is consistent with the General Plan and the developing Yolo Natural Heritage Program, compatible with surrounding land uses to the extent feasible, and sensitive to the need for a strong local economy, the protection of existing biological resources, flood protection, vector control, and other appropriate local and regional concerns.

(b) To encourage the proponents of such habitat projects—particularly large out of county mitigation projects—to design and implement projects that achieve multiple environmental and community objectives, and that include management plans or similar means of ensuring the responsible stewardship of such projects over time.

(c) To ensure that habitat projects undertaken in furtherance of the "coequal goals" and the habitat restoration objectives of the Delta Reform Act proceed in a manner that is faithful to the Act in its entirety, including its basic policy direction that the coequal goals of "providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem" are to be achieved in a manner "that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place."

(d) To expand opportunities for the County and interested citizens to participate in the process of reviewing such habitat projects by establishing a permitting process that includes public hearing requirements and other opportunities for public input.

(e) To continue to encourage wildlife-friendly agricultural practices and voluntary habitat restoration and preservation efforts, and to continue to accommodate other habitat projects undertaken in connection with impacts to biological resources arising from local projects and actions.

Nothing in this Chapter is intended to restrict or in any way affect or impair the agricultural use of land within the County. In some cases, state and federal laws may regulate certain types or characteristics of projects covered by this Chapter. This Chapter shall be construed to provide the County with the maximum control consistent with such other laws. (§ 5, Ord. 1426, eff. February 28, 2013)

Article 2. Definitions.

For the purposes of this Chapter, the following terms shall have the meanings stated below:

Sec. 10-10.201. Agriculture or Agricultural.

"Agriculture" or "agricultural" shall have the meaning set forth in Yolo County Code Section 8-2.307. (§ 5, Ord. 1426, eff.

February 28, 2013)

Sec. 10-10.202. Applicant.

"Applicant" shall mean a person who files an application for a permit under this Chapter and who is either the owner of the site, a vendee of that person pursuant to a contract of sale for the site, or an authorized agent for either of those persons. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.203. Covered Habitat Mitigation Project.

A "covered habitat mitigation project" is any project within the scope of that term as it is defined in Title 8, Chapter 2 of the Yolo County Code. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.204. Create or Creation.

"Create" or "creation," in the context of a habitat project, shall mean to construct or otherwise introduce new habitat area, functions, and values by excavating, flooding, or otherwise altering land not currently or historically occupied by such habitat. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.205. Deciding Authority.

"Deciding Authority" shall mean the public official(s) or County employee with authority to decide an application for a permit under this Chapter. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.206. Director.

"Director" shall mean the Director of the Planning and Public Works Department, or his or her designee or successor in function. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.207. Enhance or Enhancement.

"Enhance" or "enhancement," in the context of a habitat project, shall mean to rehabilitate a degraded or disturbed natural habitat area to bring back one or more functions or values that have been partially or completely lost due to natural causes or actions such as draining, grading, or other land uses and activities. Any project that changes the function or values of an existing habitat type so that it more closely resembles the natural (i.e., prior to disturbance by human activities) condition of a site shall be considered a habitat enhancement project for the purposes of this Ordinance. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.208. General Plan.

"General Plan" shall mean the adopted General Plan of Yolo County, as may be amended from time to time. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.209. Grading.

"Grading" shall have the same meaning as in Appendix J of the California Building Code, 2007 edition, as may be amended from time to time. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.210. Habitat.

"Habitat" shall mean the environmental factors that support one or more plant or wildlife species at a particular place or region, providing food, water, cover, and space needed for survival and reproduction. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.211. Person.

"Person" shall mean an individual, firm, partnership, corporation, or local agency (as defined in Government Code Section 53090), their successors or assigns, or the agent of any of the foregoing, and shall include any applicant or permit holder under this Chapter.

Sec. 10-10.212. Preserve or Preservation.

"Preserve" or "preservation" means the permanent protection of ecologically important habitat resources through the implementation of appropriate legal and physical mechanisms, including but not limited to conservation easements.

(§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.213. Project.

"Project" shall mean the whole of any activity or activities undertaken in connection with creating, enhancing, restoring, or preserving habitat on a site, and shall be interpreted broadly to include all related activities. This includes, by way of example only and without limitation, activities such as pilot projects, conservation easement transactions, grading, tree or vegetation removal, and the creation, restoration, or enhancement of associated buffer areas. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.214. Restore or Restoration.

"Restore" or "restoration," in the context of a habitat project, shall mean to restore lost habitat area, generally by excavating, flooding, and otherwise manipulating the physical, chemical, or biological characteristics of a site with the goal of reestablishing the natural or historic habitat values and functions of that area. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.215. Site.

"Site" shall mean all areas of real property that are within the boundaries of a proposed project, and may include more than one legal parcel. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.216. Substantial Evidence.

"Substantial evidence" includes facts, a reasonable assumption predicated upon facts, or expert opinion supported by facts. Substantial evidence is not argument, speculation, unsubstantiated opinion or narrative, or evidence that is clearly inaccurate or erroneous. (§ 5, Ord. 1426, eff. February 28, 2013)

Article 3. Permits

Sec. 10-10.301. Permit Requirement; Exemptions and Excluded Activities.

(a) Generally. Subject to the exemptions set forth below, no person shall engage in grading, clearing, or other activities, including the recordation of a conservation easement, with the intent to implement a covered habitat mitigation project without first applying for and receiving a use permit under this Chapter, together with any other approvals required by federal, state, or local law.

(b) *Advisory Determination Regarding Coverage*. Prior to asserting an exemption under subsection (c)(iii) or (vi), below, a prospective project applicant must conduct a pre-application consultation regarding the need for a use permit under this Chapter or other potential County approvals. This consultation may be initiated by contacting the Office of the County Administrator, Natural Resources Division and submitting a written project description with sufficient detail to enable an evaluation of the applicability of one or more exemptions. Prospective project applicants asserting their project is exempt under other provisions of subsection (c) may, but are not required to, also seek a pre-project consultation in the same manner.

(c) Exemptions. The following projects shall be exempt from the use permit requirement and the other provisions of this Chapter:

(i) All covered habitat mitigation projects that do not create 10 or more acres of habitat.

(ii) All covered habitat mitigation projects that do not enhance, restore, or preserve 40 or more acres of habitat. This exemption may not be combined with the exemption in subsection (a), above, to exempt any covered habitat mitigation project that creates, enhances, restores, or preserves 40 or more acres of habitat.

(iii) Covered habitat mitigation projects that create, enhance, restore, or preserve riparian corridor (buffer), oak woodland, vernal pool, or native grassland/prairie habitats, unless any such project also includes one or more other habitat types that exceed the acreage limits set forth in subsections (a) or (b), above. The proponent of any project that qualifies for this exemption shall provide notice to the County of the proposed project before commencing construction or other activities in furtherance of the project.

(iv) Any covered habitat mitigation project that received all necessary County approvals prior to the effective date of this Chapter, or for which a complete application for such approval(s) was submitted prior to effective date (for projects of less than 160 acres only) of Yolo County Ordinance No. 1401, which established a moratorium on certain types of habitat projects.

(v) Any covered habitat mitigation project(s) undertaken by a person that entered into a Memorandum of Understanding or similar written agreement with the County addressing the implementation of such project(s) during the term of Yolo County Ordinance No. 1401 (including the term extension approved pursuant to Ordinance No. 1402), which established a moratorium on certain types of habitat projects. This exemption shall be limited in scope to the project and/or other activities specifically described in the Memorandum of Understanding.

(vi) Limited term pilot projects undertaken for scientific research and related purposes, including feasibility assessments, in connection with the potential future implementation of a covered habitat mitigation project. Such projects are not covered by this Chapter so long as they occur in a time and manner that does not substantially interfere with the reasonable agricultural use of the pilot project site or adversely affect surrounding lands.

(vii) Activities that require discretionary approval pursuant to Chapters 3, 4, or 5 of this Title 10.

Notwithstanding the foregoing, any expansion or other change to a covered habitat mitigation project previously covered by one or more of these exemptions shall require a use permit if the proposed expansion or other change would remove the project, viewed as a whole, from the scope of these exemptions.

(d) Activities Not Covered. The following activities do not constitute covered habitat mitigation projects and are not subject to regulation under this Chapter so long as they are undertaken in the usual and customary manner prevailing in the County at the time this Chapter was adopted:

(i) All activities undertaken in connection with, and in furtherance of, the agricultural use of land. This includes, but is not limited to, the construction and maintenance of stock ponds and small reservoirs, tail-water ponds, irrigation canals and sloughs, rice fields, and similar activities.

(ii) Projects undertaken for the primary purpose of flood control, flood protection, or related matters of flood safety and the protection of life and property.

(iii) The winter flooding of agricultural fields for the primary purpose of providing temporary habitat for migratory waterfowl, provided such flooding does not occur in a time or manner that prevents or substantially interferes with the reasonable agricultural use of the site or adversely affect surrounding lands.

(§ 5, Ord. 1426, eff. February 28, 2013; as amended by §§ 3–4, Ord. 1501, eff. August 23, 2018)

Sec. 10-10.302. Permit Contents, Processing, and Decisions.

(a) Applications, generally. Applications for a use permit under this Chapter shall be submitted to the Director, together with payment of all application fees established by the Board of Supervisors. Except as otherwise provided in this Chapter, all provisions of the Yolo County Code relating generally to use permits shall apply to the review, issuance, and amendment or revocation of permits covered hereunder.

(b) Application contents. An application for a use permit shall include all of the following:

(i) A completed application for a permit under this Chapter, on a form provided by the County, together with payment of the application fee established by resolution of the Board of Supervisors.

(ii) Completed applications for any other required County approvals, such as a grading permit or Flood Hazard Development Permit, together with payment of the application fee(s) established by resolution of the Board of Supervisors. In addition, both with the initial application and thereafter, the applicant shall provide copies of all completed applications for other federal, state, and local approvals associated with the proposed project to facilitate coordination between the County and other agencies.

(iii) Appropriate site-specific technical reports, including but not limited to such documents as a biological resources analysis, a hydrology analysis, a geotechnical analysis, and an engineered excavation plan. The types of reports that may be required should be uniform for applications that are similar in nature, but may vary to the extent that the features of a proposed project or the characteristics of the project site and surrounding lands are unique. Upon request, the Director will advise an applicant of the types of reports that should be submitted with a permit application or, in appropriate instances, in connection with environmental review of a proposed project or at other times as specified by the Director in his or her sole discretion. In some instances, the applicant may be able to satisfy this requirement by providing documents prepared in connection with applications to other federal, state, or local agencies relating to the project.

(iv) A site plan showing property lines, assessor's parcel numbers, onsite and adjoining land uses, topography, access, and existing/proposed patterns of vegetation.

(v) A proposed management plan that identifies how the project will be operated and managed over time. Among other things, the plan should explain how the project will be actively operated and managed in perpetuity to ensure that its environmental and other benefits are realized on a continuous basis, how vector control issues will be addressed, if applicable, and how any unanticipated events and impacts to surrounding land uses will be addressed. The proposed management plan shall also include measures to address crop depredation to the extent it is a reasonably foreseeable consequence of the proposed project. The plan should also state whether the operation and management of the project will be supported by an endowment or other established source of funds.

In addition to the foregoing, the Director may require such other and further information relevant to the project as needed to perform appropriate environmental analysis, to determine whether the proposal may affect public health, safety, and welfare, and for other good cause as determined by the Director in his or her sole discretion.

(c) *Yolo HCP/NCCP and RCIS/LCP Consistency.* In addition to referrals to other County departments, as may be appropriate in the discretion of the Director, all permit applications shall be promptly referred to the following:

(i) To the Executive Director of the Yolo Habitat Conservancy. The referral shall include a request for comments regarding whether the application is consistent with the Habitat Conservation Plan/Natural Communities Conservation Plan (HCP/NCCP) and the Local Conservation Plan included within the Yolo County Regional Conservation Investment Strategy, described below.

(ii) To the Implementation Sponsor for the Yolo County Regional Conservation Investment Strategy (RCIS). As with the Yolo HCP/NCCP, the referral shall include a request for comments regarding whether the application is consistent with the RCIS.

Referrals shall encourage a response within thirty (30) days. Additional referrals may also be made later in the planning and environmental review process.

(d) Deciding Authority. The Deciding Authority for permit applications shall be as follows:

(i) For projects of less than 40 acres, the Zoning Administrator shall be the Deciding Authority.

(ii) For projects of between 40 and 159 acres, the Planning Commission shall be the Deciding Authority. For projects that

are 160 or more acres, the Planning Commission shall act in an advisory capacity to the Board of Supervisors. Acting in such capacity, the Planning Commission shall hold at least one noticed public hearing on the project prior to making a recommendation to the Board of Supervisors. The recommendation of the Planning Commission shall be in writing and shall include a detailed statement of the grounds for the recommendation.

(iii) For projects that are 160 or more acres or that include a proposed alternative approach to addressing the conversion of farmland (as set forth in Section 10-10.303(h), below), the Board of Supervisors shall be the deciding authority. The Board of Supervisors shall hold at least one noticed public hearing on the project prior to making a final decision on the application.

(e) *Decision*. After considering the application materials and, if applicable, the recommendations of County staff and the Planning Commission, the Deciding Authority shall issue, conditionally issue, or deny the application by a written decision supported by findings that address the criteria set forth in Section 10-10.303, below. Due to the unique nature of projects covered by this Chapter, the general conditions that typically apply to the review and approval or denial of a use permit, set forth in Yolo County Code Section 8-2.217, shall not apply.

(f) Costs and expenses. The applicant shall reimburse all costs and expenses reasonably incurred by the County in reviewing applications under this Chapter, including but not limited to staff time and costs and expenses associated with environmental review. At the discretion of the Director, the applicant may be required to provide a reasonable deposit for such costs, enter into a reimbursement agreement with the County, or both.

(§ 5, Ord. 1426, eff. February 28, 2013; as amended by § 5, Ord. 1501, eff. August 23, 2018)

Sec. 10-10.303. Decisionmaking Criteria.

A permit applied for under this Chapter shall be approved if, taking all feasible mitigation measures, conditions of approval, and other relevant facts into account, the Deciding Authority makes all of the following determinations based on substantial evidence in the record:

(a) That the project applicant has substantially complied with the requirements of this Chapter, including but not limited to provisions addressing the submission and contents of a management plan;

(b) That the project would not significantly conflict with surrounding land uses;

(c) That the project would not have a significant adverse effect on biological resources, is not reasonably expected to significantly conflict with the Yolo Natural Heritage Program (HCP/NCCP), and will advance one or more goals and objectives of the HCP/NCCP or otherwise contribute to its implementation

(d) That the project would not significantly compromise flood safety and the protection of life and property;

(e) That the project would not have a significant adverse economic effect—either by itself or cumulatively—within the County or region. This factor shall only be considered for projects that convert 40 or more acres of farmland;

(f) That the project, if undertaken in furtherance of the "co-equal goals" and the habitat restoration objectives of the Delta Reform Act, will proceed in a manner that is faithful to the Act in its entirety, including its basic policy direction that the coequal goals of "providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem" are to be achieved in a manner "that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place";

(g) If the project site is subject to a Williamson Act contract, that the project is an "open space use" under Government Code Section 51201(o) or that it would not otherwise cause a material breach of the contract. Any project that is an "open space" use under Section 51201(o) shall also require approval of an amended Williamson Act contract or other appropriate action to authorize the open space use;

(h) That any conversion of farmland to habitat or other non-agricultural uses will be mitigated in accordance with Yolo County Code Sections 8-2.301 et seq. (notwithstanding anything to the contrary set forth therein regarding its application to habitat projects) or, subject to the approval of the Board of Supervisors, that the applicant will implement an alternative approach to addressing the conversion of farmland that provides an equal or greater level of mitigation; and

(i) That the project would not significantly conflict with other relevant considerations of public health, safety, or welfare, sufficient to require preparation of a statement of overriding considerations pursuant to the California Environmental Quality Act.

Written findings addressing each of these matters shall be prepared in connection with a decision on a permit application.

If the Deciding Authority (other than the Board of Supervisors) finds that a project cannot be approved because one or more of these determinations cannot be made, the permit shall be referred to the Board of Supervisors for consideration at a noticed public hearing. The Board of Supervisors may approve a permit even if it finds that one or more of these determinations cannot be made, provided it finds that issuance of the permit is consistent with the purposes of this Chapter and all applicable provisions of local, state, and federal law. Any decision of the Board of Supervisors following its deliberation of these issues shall include written findings based on substantial evidence that address all of the criteria and other matters set forth above, together with an explanation of any decision to approve or deny a permit.

(§ 5, Ord. 1426, eff. February 28, 2013; as amended by § 6, Ord. 1501, eff. August 23, 2018)

Sec. 10-10.304. Permit Term; Amendments.

(a) Term. The use authorized by a permit issued under this Chapter shall commence within one to five years, as may be appropriate taking all circumstances relating to the project into account. In particular, covered habitat mitigation projects that require numerous federal, state, and local agency approvals that can take a long time to acquire may warrant an initial permit term of up to five years, in the sole discretion of the Deciding Authority. Once the authorized use commences, a permit shall be perpetual in term unless otherwise indicated at the time of its original approval.

(b) Amendments, generally. An amendment to an existing permit issued under this Chapter shall be required for any significant change to an approved covered habitat mitigation project. This shall include, but is not limited to, any change in the size or operation of an approved project that could have a significant effect on the environment. The Director shall have the discretion to determine whether an amendment to an existing permit is required.

(c) Applications for amendments; processing. Applications for amendments to previously issued permits shall be submitted to the Director on forms provided by the County. An application to amend a previously issued permit shall also be accompanied by the appropriate fee, as established by resolution of the Board of Directors. In addition, the Director may require any or all of the additional information and documents described in Section 10-10.302(b), above, that may be reasonably necessary for consideration of the application. An application for an amendment shall be handled in the same manner as an original permit application, as described in Section 10-10.302(b) - (e), above. (§ 5, Ord. 1426, eff. February 28, 2013)

Article 4. Appeals

Sec. 10-10.401. Appeal Procedure.

Any decision made pursuant to this Chapter may be appealed pursuant to Yolo County Code Section 8-2.3301, which shall apply to all appeals arising under this Chapter. (§ 5, Ord. 1426, eff. February 28, 2013)

Article 5. Violations

Sec. 10-10.501. Generally.

Any violation of this Chapter shall be subject to the administrative code enforcement ordinance of the County, set forth in Chapter 5 of Title 1 of the Yolo County Code. Any administrative enforcement action undertaken in response to a violation of this chapter, in the sole discretion of the Enforcement Officer or other responsible staff person, need not utilize the Courtesy Notice or Notice of Violation provisions of Chapter 5 of Title 1, and may instead immediately issue an administrative citation. Fines imposed by an administrative citation for a continuing violation shall apply for each day that the violation is ongoing until it is fully abated in the manner specified in the administrative citation. In the event of any conflict between the provisions of this Section and Chapter 5 of Title 1, this Section shall govern.

(§ 5, Ord. 1426, eff. February 28, 2013; as amended by § 7, Ord. 1501, eff. August 23, 2018)

Sec. 10-10.502. Public Nuisance.

Any activity in violation of this Chapter or any permit issued hereunder shall be considered a public nuisance. In his or her sole discretion, the Director may take any action authorized by law to address the public nuisance, including but not limited to referral of the matter to the District attorney for civil or criminal action. (§ 5, Ord. 1426, eff. February 28, 2013)

Article 6. Periodic Reviews; Mapping

Sec. 10-10.601. Initial Review.

Five years after this Chapter becomes effective, the Board of Supervisors shall hold a public hearing for the purpose of considering its effectiveness at achieving the purposes set forth in Article 1 hereof. During such hearing, the Board of Supervisors may identify matters that require further consideration and provide appropriate direction to staff. In addition, the Board of Supervisors may direct staff to prepare an ordinance amending, superseding, or deleting this Chapter, and it may take such other actions as may be necessary and appropriate. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.602. Future Reviews.

Every five years after the initial review under Section10-10.601, above, the Board of Supervisors shall review this Chapter at a public hearing for the reasons described in that Section, particularly to ensure its continued effectiveness in achieving the purposes described in Article 1. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.603. Failure to Conduct Reviews.

The failure to conduct a review in the time or manner required by this Article shall not affect the continuing validity of this Chapter, not shall it have any affect on the status of a permit issued hereunder. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.604. Project Mapping.

The Director shall maintain a map reflecting the location of each project approved pursuant to this Chapter. Other relevant information may also be included on the map, such as the location of preexisting mitigation banks, conservation easements, and other matters. The map shall be provided to the Deciding Authority in conjunction with each permit application presented for consideration. It shall also be provided to the Board of Supervisors as part of each periodic review. (§ 5, Ord. 1426, eff. February 28, 2013)

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RESEARCH ARTICLE

Defining population structure and genetic signatures of decline in the giant gartersnake (*Thamnophis gigas*): implications for conserving threatened species within highly altered landscapes

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Abstract Anthropogenic habitat fragmentation can disrupt the ability of species to disperse across landscapes, which can alter the levels and distribution of genetic diversity within populations and negatively impact long-term viability. The giant gartersnake (*Thamnophis gigas*) is a state and federally threatened species that historically occurred in the wetland habitats of California's Great Central Valley. Despite the loss of 93 % of historic wetlands throughout the Central Valley, giant gartersnakes continue to persist in relatively small, isolated patches of highly modified agricultural wetlands. Gathering information regarding genetic diversity and effective population size represents an essential component for conservation management programs aimed at this species. Previous mitochondrial sequence studies have revealed historical patterns of differentiation, yet little is known about contemporary population structure and diversity. On the basis of 15 microsatellite loci, we estimate population structure and compare indices of genetic diversity among populations spanning seven drainage basins within the Central Valley. We sought to understand how habitat loss may have affected genetic differentiation, genetic diversity and effective population size, and what these patterns suggest in terms of management and restoration actions. We recovered five genetic clusters that were consistent with regional drainage basins, although three northern basins within the Sacramento Valley formed a single genetic cluster. Our results show that northern drainage basin populations have higher connectivity than among central and southern basins populations, and that greater differentiation exists among the more geographically isolated populations in the central and southern portion of the species' range. Genetic diversity measures among basins were significantly different, and were generally lower in southern basin populations. Levels of inbreeding and evidence of population bottlenecks were detected in about half the populations we sampled, and effective population size estimates were well below recommended minimum thresholds to avoid inbreeding. Efforts focused on maintaining and enhancing existing wetlands to facilitate dispersal between basins and increase local effective population sizes may be critical for these otherwise isolated populations.

Keywords Population structure · Genetic diversity · *Thamnophis gigas* · Microsatellite · Bottleneck · Effective population size · Fragmentation

Introduction

Anthropogenic habitat fragmentation can negatively impact species persistence and population resilience to environmental change. When individuals cannot disperse across landscapes, the levels and distribution of genetic

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diversity can increasingly erode within populations leading to variable effective population sizes and increased potential for inbreeding effects that ultimately limit long-term viability (Fischer and Lindenmayer 2007; Frankham 2005; Miller and Hobbs 2002). Some of the most dramatic human-induced environmental disturbances have occurred within the wetland habitats of the California's Great Central Valley over the past century-and-a-half. Prior to the mid 1800s the 13 million acre Great Central Valley consisted of as much as 4 million acres of well-connected wetlands. With the encouragement of the federal government, farmers began diking and draining these wetlands for agricultural production with over 2 million acres included in the Swamp Lands Act of 1850, which provided incentives for the draining of wetlands (Gates 1975; Peterson 1974). The subsequent agricultural development, water diversion and damming, and urbanization that followed have resulted in the loss of over 93 % of historic wetlands in the Central Valley (Frayer et al. 1989; USDOI 1994).

Despite the considerable loss and degradation of aquatic ecosystems throughout the Central Valley, some species, such as the giant gartersnake (*Thamnophis gigas*) continue to persist in highly modified agricultural wetlands. The giant gartersnake is a state and federally threatened species that historically occurred in the low-gradient streams, wetlands and marshes of California's Great Central Valley (Fitch 1941; Hansen and Brode 1980). Giant gartersnake populations have become increasingly fragmented in recent decades and persist as small clusters of populations primarily in irrigation canals and drains associated with rice agriculture and remnant managed wetlands (Halstead et al. 2010). The current range of the giant gartersnake extends from the Sacramento Valley near the vicinity of Chico, CA southward to the northern and central San Joaquin Valley just north of Fresno, CA (Fig. 1). This range is currently divided into three recovery units (Fig. 1): Northern Sacramento Valley Recovery Unit (Butte, Colusa, and Sutter Basins); Southern Sacramento Valley Recovery Unit (American, Yolo, and Delta Basins); and San Joaquin Valley Recovery Unit (San Joaquin and Tulare Basins). The recovery units are presumed to be distinct from one another based on ecological and geographical characteristics and unique recovery actions needed within them (USFWS 1993, 2006). Populations of the giant gartersnake have been nearly extirpated from the San Joaquin Valley Recovery Unit, where only a few isolated populations remain within the San Joaquin Basin and are presumed extirpated further south in the Tulare Basin (Dickert 2005; Wylie and Amarello 2008). Although habitat loss remains the greatest threat to population persistence, other factors include flood control and water conveyance projects that limit water availability, maintenance activities along canals and drains, poor water quality resulting from agricultural runoff from herbicide and pesticide application, heavy metal contaminants (e.g., mercury and selenium), road disturbance, and predation and competition by non-native species all of which may contribute to further habitat degradation and population declines (USFWS 2006; Wylie et al. 2009).

Many of the remaining populations of giant gartersnakes currently exist in relatively small, isolated patches of habitat surrounded by heavily altered landscapes. Identifying populations that could be prioritized for conservation requires an understanding the species current genetic diversity and population structure (Petit et al. 1998). The reintroduction of giant gartersnakes to restored wetlands is just one example of a conservation action that would be greatly informed by understanding giant gartersnake population structure (Miller et al. 2010). Information regarding genetic diversity and effective population size are also positively linked to population persistence and represent an essential component for species genetic management and recovery programs (Frankham and Ralls 1998). Although previous genetic studies attempted to elucidate population structure and diversity of giant gartersnakes (Engstrom 2010; Paquin et al. 2006), much of the data analyzed in these studies were from a single mitochondrial gene. The studies revealed historical patterns of broad regional genetic differentiation, but little is known about more contemporary population structure and connectivity.

Here we conducted a fine-scale analysis of the genetic characteristics for giant gartersnakes using 15 microsatellite loci to characterize the genetic relationships of extant populations. Our aims were to estimate population structure and compare genetic diversity indices among populations spanning the seven drainage basins within the Central Valley. In addition, we sought to better resolve the extent to which habitat loss and fragmentation have affected genetic differentiation, loss of genetic diversity and effective population size, and what the results suggest in terms of potential management and restoration actions.

Materials and methods

Sampling

A total of 477 tissues were used in this study that covered the contemporary range of the giant gartersnake. We acquired tissue samples and DNAs from previous studies (Engstrom 2010; Paquin et al. 2006) and tail-tip and ventral scale clips from our own surveys. To define populations, we grouped individual samples that were separated by 6 km or less, an approximate maximum dispersal distance for the giant gartersnake (Valcarcel 2011; Wylie and Amarello 2006), into a single population for analyses

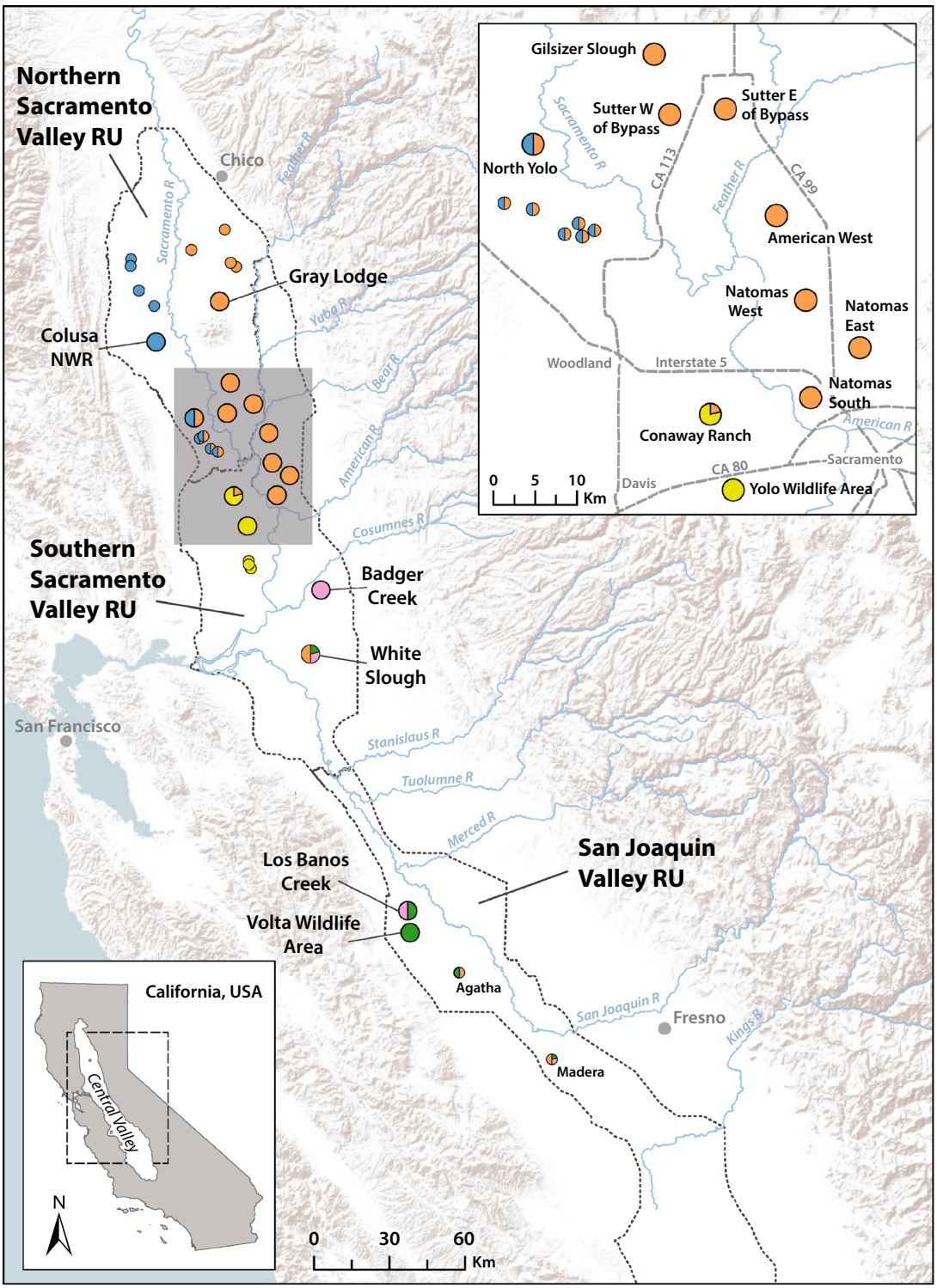

Fig. 1 Map of collection locations for giant gartersnakes in California's Great Central Valley. Populations (*large circles*) are colored according to cluster membership shown in Fig. 2. *Smaller circles* are individual samples that were grouped according to drainage basin and used only in the STRUCTURE analyses. The *lower inset* map highlights the region of study within California and the *upper inset* map highlights collections sites within the Sacramento Valley and the major highways that intersect them. The three Recovery Units are indicated with the *dashed line*: (1) Northern Sacramento Valley Recovery Unit (RU) extending from the north to the confluence of the Sacramento and Feather Rivers, (2) Southern Sacramento Valley RU extending east of the Feather River southward to the Stanislaus River, and (3) San Joaquin Valley RU extending south from the Stanislaus River to the Kern River (off the map)

unless samples were divided by potential barriers (e.g. highway, river, etc.). This resulted in 459 snakes sampled from 16 populations across the Central Valley (Fig. 1): Colusa Basin (Colusa NWR, North Yolo); Butte Basin (Gray Lodge); Sutter Basin (Gilsizer Slough, Sutter East of bypass, Sutter West of bypass); American Basin (American West, Natomas West, Natomas East, Natomas South); Yolo Basin (Conaway Ranch, Yolo Wildlife Area); Delta (Badger Creek, White Slough); San Joaquin Basin (Los Banos Creek, Volta Wildlife Area). For the individual-based population structure analyses (see below), we also included an additional 18 samples that could not be grouped into any of the 16 populations. We extracted genomic DNA from tissue samples with the Qiagen DNeasy Blood and Tissue Kit (Qiagen Inc., Valencia, CA, USA).

Microsatellite development

We developed a microsatellite library at the USGS San Diego Field Station from a single shot-gun sequencing run on a 454Jr-automated DNA sequencer (F. Hoffman—La Roche, Ltd., Basel, Switzerland). We used the program MSATCOMMANDER to scan the nucleotide sequence files that were generated from the 454Jr for dinucleotide, trinucleotide, tetranucleotide, and pentanucleotide repeat sequences and recovered 3624 sequences that contained microsatellite repeats. From these we selected 48 loci that contained adequate flanking regions for which primers could be designed.

We used three individual samples that spanned the species' range to test whether the microsatellite loci were variable. Among the 48 loci that we screened, we found 15 that were variable, consistent in amplification, and yielded reliable genotyping scores. Prior to polymerase chain reaction (PCR) amplification, one primer from each locus was labeled with a fluorescent dye for genotype assessment. We divided these loci into four groups (Table 1). Within each group, 3–4 loci were simultaneously amplified with a Qiagen multiplex PCR kit in 10 μL reactions containing 5 μL of Qiagen multiplex PCR Master Mix, 1 μL primer mix (containing 2 μM of each primer), 1 μL Q-solution and 2 μL of RNase-free water. Amplified products were genotyped at BATJ, Inc. (San Diego, CA) on an Applied Biosystems 3130 Genetic Analyzer using the LIZ 500 size standard.

Genetic diversity

We used GENE-MARKER v1.90 (SoftGenetics®) to edit the raw allelic data and score allele sizes. We used several different methods to minimize genotyping errors. First, the possibility of scoring errors and presence of null alleles were evaluated with MICROCHECKER (Van Oosterhout et al. 2004). Additionally, approximately ten percent of the samples were arbitrarily chosen and reanalyzed across all loci for quality assurance. We also tested each microsatellite locus for evidence of linkage disequilibrium and departure from Hardy–Weinberg equilibrium with the program GENEPOP ON THE WEB (Raymond and Rousset 1995; Rousset 2008). For both linkage disequilibrium and Hardy–Weinberg tests, we performed global (i.e., across all loci) and population-level tests (i.e., across loci in each population).

We evaluated genetic diversity by calculating allelic richness (A), corrected for sample size, with FSTAT 2.9 (Goudet 1995) and observed heterozygosity (H_O), and expected heterozygosity (H_E) with GENALEX v6.41 (Peakall and Smouse 2012). We used a nonparametric, two-sided test implemented in FSTAT with 10,000 permutations to assess whether expected heterozygosity (H_E) and allelic richness (A) differed significantly between regional basins and between populations. The inbreeding coefficient (F_{IS}; Nei 1987), which relates the observed heterozygosity within a subpopulation to the expected heterozygosity, is expected to be elevated in individuals that are a product of non-random mating and has been widely used as an indicator of inbreeding. We estimated F_{IS} for each population and assessed whether F_{IS} differed significantly among populations in GENODIVE 2.0b23 (Meirmans and Van Tienderen 2004) on the basis of 5000 permutations.

Inferring population structure

We evaluated patterns of population genetic structure with multiple analytical methods. First, we used the Bayesian clustering framework implemented in STRUCTURE version 2.3.2 (Pritchard et al. 2000) to identify discrete genetic clusters across the range of the giant gartersnake. This approach uses Markov Chain Monte Carlo (MCMC) simulations to simultaneously estimate population-level allele frequencies and probabilistically group individuals into the most likely number of genetic clusters (K) that maximizes the within-cluster Hardy–Weinberg and linkage equilibria. The expectations of Hardy–Weinberg and linkage equilibria are met when a group of individuals has a common gene pool, without major barriers to gene flow among them for numerous generations. We used the admixture model option for all runs and evaluated two different allele frequency models (correlated and uncorrelated; Falush et al. 2003).

For all STRUCTURE analyses we arbitrarily specified a range for the maximum number of clusters ($K = 1$–16) to which individuals could be assigned. For each K that was evaluated, we performed 10 separate runs with 500,000 iterations of the MCMC algorithm after a burn-in of 500,000 iterations, and then calculated the mean posterior

Table 1 Characteristics of polymorphic microsatellite loci developed in the giant gartersnake (*Thamnophis gigas*)

Locus	Repeat motif	Primer sequences (5′–3″)	Dye	Multiplex	Allele range (bp)	Number of alleles	H_O	H_E
DI_907	GT	F: GAAACGGAGATGAGCACACA	NED	MP1	178–188	6	0.362	0.372
		R: AGGCCTCTTCCACATGTTTC						
DI_2229	CT	F: TCAAAGTTACGACGACACAGAAA	6-FAM	MP2	147–179	15	0.716	0.709
		R: TGAAATAGCTCGAGGCGTTC						
TRI_3VL	GTT	F: GAACATGAGCCCCATGAACT	PET	MP4	350–365	4	0.515	0.496
		R: TTCATCCATCCATTTGGACA						
TRI_58P	GAT	F: AGTTTTGATGCCACCCACTCa	VIC	MP1	219–258	13	0.716	0.705
		R: TCCCACAAGATCTTCACCATC						
TRI_AOC	TAG	F: ACAGTGGGAATTGAGGTGGA	PET	MP3	227–254	10	0.703	0.671
		R: CAGAAGGCCGAAATGAAAAC						
TRI_ISV	AAC	F: GCTAGGTGCAGGTGTGTGTC	NED	MP2	232–247	5	0.283	0.287
		R: ATGGCTCCTGCATATCCATC						
TRI_ONY	CAT	F: ACCCTTAGAGTTGGGGGTGA	NED	MP3	223–253	7	0.426	0.454
		R: CAGGATATGCATTGCTCCAA						
TRI_TOA	GTT	F: TTTTCCCCTTCCTCAGGATT	VIC	MP2	167–185	6	0.494	0.484
		R: AATTGCAACAACAGCAGCAG						
TRI_TSC	ATT	F: CCAATAAAGCTGGGGATCAA	PET	MP1	324–351	8	0.422	0.472
		R: CTCCTCCTCTGCACTCACCT						
TET_567	CATA	F: CACATGCATACATACAGACGAAG	NED	MP4	138–174	10	0.469	0.676
		R: CCAGGCAAAGGAAGAAAGTG						
TET_790	ATCC	F: CTTCCCATCTTTTTGCCAGA	6-FAM	MP4	192–224	9	0.663	0.692
		R: GGCTTTGCAGTTCTGGAGAT						
TET969	AAGG	F: TTGCGTTAGCCTCCCATATC	6-FAM	MP3	303–331	8	0.500	0.487
		R: TCCAACAACCAGTTCACCAA						
PEN_5ZB	ACGCC	F: ACATTATGGCCGGTTCAGAG	PET	MP2	265–295	7	0.698	0.695
		R: TTCCACCTTCCCTAGGCTTT						
PEN_61U	AGAAT	F: GAGGGCTTTTTGTTTTGTTTGT	VIC	MP4	154–189	8	0.578	0.641
		R: AAGACCATATGCACCAAAGACA						
PEN1170	ATGGT	F: GGAACAGAAATTGCCTCCAG	VIC	MP3	281–306	6	0.141	0.295
		R: TCAACCAGGTCTATATCAGCACA						

Locus designation, repeat motif, primer sequences, 5′ primer fluorescent dye, allele range, total number of alleles, observed heterozygosity (H_O), and expected heterozygosity (H_E) in the giant gartersnake across all 477 snakes

We divided these loci into 4 multiplex groups (MP) and performed PCRs (annealing temperature at 58 °C) using a Qiagen Multiplex PCR Kit®, and following recommended PCR conditions: 10 μL reactions contained 5 μL of Qiagen multiplex PCR Master Mix, 1 μL primer mix (containing 2 μM of each primer), 1 μL Q-solution and 2 μL of RNase-free water

probability of the data for a given K at each step of the MCMC for the 10 runs combined. The most probable number of clusters (K) was inferred by comparing the average scores of the log likelihood of the data for each K value (LnP(D|K)) against the K_{MAX} (i.e. where the LnP(D|K) curve plateaus) and the ΔK criterion of Evanno et al. (2005) using the online program STRUCTURE HARVESTER (Earl and vonHoldt 2012). Once the optimal K value was identified, we summarized 10 independent runs at the optimal K value with the program CLUMPP (Jakobsson and Rosenberg 2007) with LargeKGreedy algorithm and 10,000 repeats. We used the program DISTRUCT (Rosenberg 2004) to graphically display the result of the CLUMPP output.

We estimated population genetic differentiation (F_{ST}) using Weir and Cockerham's (1984). We estimated F_{ST} globally, between pairs of populations, and among drainage basins. We used the program GENALEX v6.41 to estimate F_{ST} and assessed statistical significance with 9999 permutations. Alpha significance ($\alpha = 0.05$) was adjusted for multiple tests with the B–Y correction method (Narum 2006) and set at 0.009 for population comparisons and 0.002 for drainage basin comparisons. We also performed

an analysis of molecular variance (AMOVA; Excoffier et al. 1992) to determine the partitioning of genetic variation among four hierarchical levels: within individuals, among individuals at each population, among populations within each drainage basin, and among drainage basins using GENODIVE (Meirmans and Van Tienderen 2004).

To test whether genetic differentiation among populations increased as geographic distance increased (indicating a stepping-stone model of gene flow), we compared pairwise matrices of Euclidean geographic distance and pairwise estimates of F_{ST} with Mantel tests for matrix correlation (Mantel 1967). We assessed significance with 10,000 randomizations of the genetic distance matrix. All isolation-by-distance analyses were performed in IBDWS 3.21 (Jensen et al. 2005).

Population bottleneck and effective population size estimation

We used the program BOTTLENECK (Cornuet and Luikart 1996; Piry et al. 1999) to determine if populations within basins may have undergone significant reductions in size (i.e., population bottleneck) in the recent past (i.e. $2N_e$–$4N_e$ generations; Luikart and Cornuet 1998). The method is based on the assumption that large declines in effective population size (N_e) decrease allelic diversity at a greater rate than overall heterozygosity. Therefore, if a population exhibits an excess of heterozygotes relative to what would be expected on the basis of observed allelic diversity, then the population may have experienced a bottleneck. We used the Wilcoxon signed-rank test, implemented in BOTTLENECK, to examine whether each population exhibited an excess of observed heterozygotes relative to that predicted for a population at mutation-drift equilibrium. Because this method is sensitive to the mutational model under which the null range of alleles is simulated, heterozygote excess and allele frequencies were tested with 10,000 simulations under the infinite alleles (IAM), two-phase (TPM), and strict step-wise (SMM) mutation models. For the TPM model, we implemented recommendations of Peery et al. (2012) and Miller et al. (2012) for testing significance across a range of two specified parameters: (1) the proportion of single step mutations ($p_g = 0.3$, 0.6, and 0.8) and (2) the mean sizes (δ_g) of multistep mutations (4, 8, and 16) that incrementally approached the SSM model.

We also estimated effective population sizes (N_e) for each population and genetic cluster using approximate Bayesian computation in ONeSAMP 1.2 (Tallmon et al. 2008). For each ONeSAMP analysis, we specified a noninformative, flat prior on N_e (2–5000) and performed replicate analyses to verify the consistency in our results.

Results

Genetic diversity

All 15 loci conformed to mutational expectations in that they varied in accordance with repeat type.

The global tests for Hardy–Weinberg equilibrium for all loci were non-significant (in ESM Appendix 1, 2). However, our population-level tests of Hardy–Weinberg equilibrium recovered ten populations that had at least one locus not in equilibrium (alpha significance was corrected for 16 tests with the B–Y method and set at 0.0147). All loci were in equilibrium for North Yolo, Gray Lodge, Sutter East, Sutter West, Conaway Ranch, and White Slough populations. Global evaluations for linkage disequilibrium indicated six pairs of loci had non-random associations. When tested within populations, significant non-random associations were revealed between the same pairs of loci as in the global test, but each pair was restricted to specific populations: Natomas West (TRI_AOC and TRI_58P), Yolo Wildlife Area (TRI_AOC and TRI_ONY), and Volta Wildlife Area (DI_2229 with TRI_ONY and TRI_TSC; PEN_61U with TRI_ISV and TRI_TSC). We detected genetic bottlenecks in most of these populations, and effective population size estimates were low for all populations (see below). Both bottlenecks and low effective population size are expected to increase non-random mating within populations and therefore influence overall linkage disequilibrium. Nonetheless, we removed three main loci (TRI_AOC, DI_2229, and PEN_61U) with apparent non-random associations to test whether these loci affected our results. Removal of these loci did not change the results of population structure, genetic differentiation, or molecular variance, so we made no adjustments to the data in any of our analyses (in ESM Appendix 3–6). We also detected the possible presence of null alleles at two loci: PEN1170 and TET567. However, the only measurable effect that we observed in analyses run with and without these loci was a change in significance among genetic differentiation estimates between Gray Lodge and the Natomas basin populations (in ESM Appendix 3).

Allelic richness ranged from 3.08 (Volta Wildlife Area) to 4.03 (Natomas West) and expected heterozygosity (H_E) ranged from 0.467 (Los Banos Creek) to 0.604 (Gray Lodge). Comparisons of both measures of diversity were significantly different among drainage basins ($P < 0.002$ and $P < 0.006$, respectively) with the southern basins (e.g. Yolo, Delta, and San Joaquin Basins) generally having lower estimates than more northern basins. Levels of inbreeding (F_{IS}) were nonsignificant and close to zero for many populations. However, five populations had statistically significant F_{IS}: Gilsizer Slough, Natomas West,

Table 2 Summary of genetic diversity statistics by population: number of samples (N), the average number of alleles at each locus (A_L), allelic richness corrected for sample sizes (A_R), observed heterozygosity (H_O), expected heterozygosity (H_E), the inbreeding coefficient (F_{IS})

Drainage Basin	Population	N	A_L	A_R	H_O	H_E	F_{IS}
Colusa Basin	Colusa NWR	46	4.53	3.33	0.530	0.543	0.024
	North Yolo	15	4.13	3.60	0.502	0.558	0.099
Butte Basin	Gray Lodge	14	4.27	3.59	0.627	0.604	0.000
Sutter Basin	Gilsizer Slough	37	4.40	3.66	0.539	0.601	**0.102**
	Sutter East of Bypass	15	3.50	3.27	0.492	0.531	0.073
	Sutter West of Bypass	32	4.73	3.66	0.561	0.562	0.002
American Basin	American West	35	3.93	3.44	0.547	0.558	0.020
	Natomas West	30	5.27	4.03	0.546	0.593	**0.080**
	Natomas East	30	4.27	3.58	0.502	0.574	**0.124**
	Natomas South	8	3.33	3.20	0.446	0.488	0.086
Yolo Basin	Conaway Ranch	34	4.00	3.25	0.483	0.493	0.022
	Yolo Wildlife Area	41	4.73	3.22	0.458	0.499	**0.083**
Delta Basin	Badger Creek	45	4.20	3.53	0.494	0.538	**0.082**
	White Slough	20	3.93	3.58	0.497	0.522	0.047
San Joaquin Basin	Los Banos Creek	10	3.33	3.28	0.450	0.467	0.036
	Volta Wildlife Area	47	3.87	3.08	0.488	0.525	0.070

Bold values indicate $P < 0.001$; based on 5000 permutations

Natomas East, Conaway Ranch, and Badger Creek (Table 2).

Population structure and genetic differentiation

Bayesian clustering analysis strongly supported five genetic units (Fig. 2), and we obtained similar results whether we assumed the allele frequencies were correlated or uncorrelated across populations. Several populations were highly distinctive and there was a strong relationship between the geographic location of populations and the grouping of individuals.

Populations from the Colusa Basin west of the Sacramento River (i.e., Colusa National Wildlife Refuge and all other singleton samples within Colusa and Glenn Counties) formed the first genetic cluster. Multiple populations east of the Sacramento Valley formed the second cluster (Figs. 1, 2): Butte Basin (Gray Lodge), Sutter Basin (Gilsizer Slough, Sutter East of Bypass, and Sutter West of Bypass), and American Basin (American West, Natomas West, Natomas East, Natomas South), and all singletons from northern Butte and Glenn Counties east of the Sacramento River. Admixture among these two clusters was detected in southern Colusa Basin, where individuals from North Yolo (and further south along the Yolo Bypass) had equal (0.5) probability of membership in clusters one and two (Fig. 2). Individuals from within the Yolo Basin at the Conaway Ranch and Yolo Wildlife Area formed the third cluster. However, individuals from Conaway Ranch (the more northern population) shared ~40 % of their

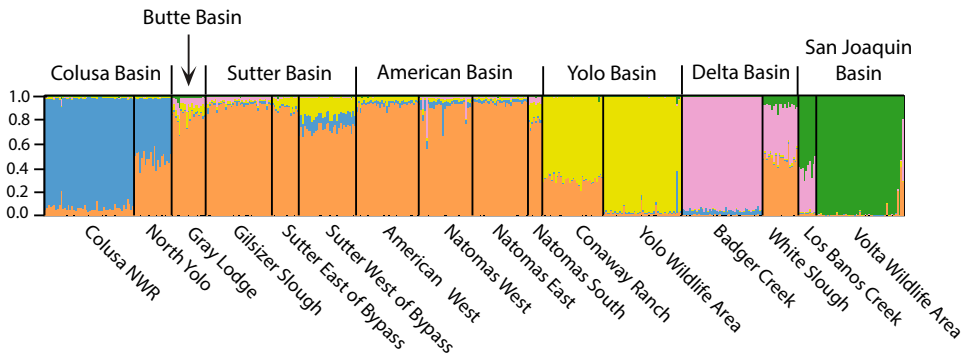

Fig. 2 Assignment plot on the basis of a correlated allele frequencies model estimated in STRUCTURE at $K_{MAX} = 5$. Drainage basins (*top label*) and populations (*bottom label*) are arranged in geographic order from north to south (*left* to *right*, respectively), each of which are denoted with *solid black lines*. Within each population, assignment probabilities for each individual are indicated as the relative proportion of each color

overall membership probabilities with more northern genotypes from cluster two. The fourth and fifth clusters were comprised of Badger Creek and Volta Wildlife Area, each of which contained individuals with distinctive genotypes that likely reflect their geographic isolation. Genotypes of individuals from White Slough had mixed assignments from those from Badger Creek, more northern drainage basins, and Volta (clusters 2, 4, and 5), and individuals from Los Banos Creek shared membership probabilities with their geographically proximate sister site (Volta Wildlife Area) and the more northern Badger Creek cluster. One individual from Agatha (Merced County) and one from Madera (Fresno County) had admixed assignment probabilities between San Joaquin and more northern Basins (Fig. 1, southernmost individuals in the map).

Population differentiation (F_{ST}) ranged from 0.00 to 0.297 and the global population differentiation was statistically significant (F_{ST} = 0.108; $P < 0.001$). Pairwise F_{ST} estimates were statistically significant in most population comparisons. Pairwise comparisons between northern populations across the Sacramento Valley (within Butte, Sutter, and American Basins) were the only non-significant estimates (Table 3); these patterns were consistent with the population structure inferred from the Bayesian cluster analysis. Pairwise differentiation estimates among drainage basins showed a similar pattern: only pairwise comparisons between Butte Basin and American Basin were non-significant (Table 4). Partitioning of genetic variation from the seven drainage basins revealed significant structure among hierarchical groups but percentage of variance was low with 9 % of the total variation partitioned among basins ($P < 0.001$), 4 % among populations within basins ($P < 0.001$), 5 % among individuals within populations ($P < 0.001$), and the remainder within individuals.

Isolation by distance was evident among populations ($r = 0.86$, $P = 0.001$; Fig. 3a). This pattern remained significant even when the geographically separated populations from within the San Joaquin Basin (Los Banos Creek and Volta Wildlife Area) were removed from the analysis ($r = 0.425$, $p = 0.015$; Fig. 3b).

Population bottlenecks and effective population size

We detected evidence of bottlenecks (i.e., heterozygote excess) in several populations using the Wilcoxon test. Regardless of the mutational model employed, there was no evidence of population bottlenecks recovered for Sutter West, Yolo Wildlife Area, and Los Banos Creek populations. Under the IAM model, all other populations showed significant heterozygote excess. Under the TPM model, eight of the sixteen populations were significant for heterozygote excess, although significance decreased as we adjusted parameters to approach a strict step-wise mutation model (Table 5). Overall, the population bottlenecks were most consistently detected at Gray Lodge, Gilsizer Slough, American West, Natomas East, Badger Creek, and Volta Wildlife Area, many of which also had significant inbreeding coefficients (F_{IS}; Table 2).

Effective population size (N_e) estimates varied across the Central Valley, with the lowest population estimate recovered in the south at Volta Wildlife Area ($N_e = 7.5$) and the highest estimate found in the Sacramento Valley at Gilsizer Slough ($N_e = 101.8$). Overall population N_e estimates were generally low (Table 6). We also estimated N_e for each of the genetic clusters that were identified in our STRUCTURE analyses, each of which comprised multiple populations. These estimates mirrored those at the population level, where the lowest estimate was recovered in the south within the San Joaquin Basin ($N_e = 56.9$) and highest estimates recovered within the more interior drainage basins (Table 6).

Discussion

Genetic diversity

Genetic diversity of giant gartersnake populations across the Central Valley, as measured by allelic richness and expected heterozygosity, was relatively low compared to other diversity estimates for snakes (Anderson et al. 2009; Chiucchi and Gibbs 2010; Clark et al. 2008; Manier and Arnold 2005; Marshall Jr et al. 2008; Tzika et al. 2008). Although direct comparisons are not possible because the above studies were based on different microsatellite loci, another obligate wetland snake listed as threatened under federal and state endangered species acts (Copperbelly watersnake, *Nerodia erythrogaster*; Marshall Jr et al. 2008) had higher estimated levels of genetic diversity than the giant gartersnake. Compared to giant gartersnakes, the copperbelly watersnake is not as strongly associated with permanent wetlands and is more likely to move over land. Thus, the difference in genetic diversity between the two species might reflect differences in ecology and demography. Alternatively, low levels of genetic diversity in the giant gartersnake may stem from reductions in local population size and inbreeding, which can reduce population viability by mechanisms such as inbreeding depression and accumulation of deleterious mutations that can ultimately lead to loss of adaptive potential (Frankham et al. 2010, 2014). Small populations and low genetic diversity in snakes have been associated with chromosomal abnormalities and birth deformities resulting in reduced juvenile survival rates (e.g., Gautschi et al. 2002; Madsen et al. 1996; Újvári et al. 2002). However, it is unknown whether low levels of genetic variability will affect fitness in the

Table 3 Pairwise genetic differentiation estimates (F_{ST}) among populations (below diagonal) and p values (above diagonal)

	Colusa Basin		Butte Basin	Sutter Basin			American Basin				Yolo Basin		Delta Basin		San Joaquin Basin	
	Colusa NWR	North Yolo	Gray Lodge	Gilsizer Slough	Sutter East Bypass	Sutter West Bypass	American West	Natomas West	Natomas East	Natomas South	Conaway Ranch	Yolo Wildlife Area	Badger Creek	White Slough	Los Banos Creek	Volta Wildlife Area
Colusa NWR	–	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
North Yolo	**0.046**	–	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Gray Lodge	**0.086**	**0.047**	–	0.007	0.007	0.000	0.000	0.045	0.024	0.007	0.000	0.000	0.000	0.000	0.000	0.000
Gilsizer Slough	**0.079**	**0.051**	**0.019**	–	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sutter East Bypass	**0.094**	**0.040**	**0.026**	**0.025**	–	0.001	0.004	0.009	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sutter West Bypass	**0.060**	**0.045**	**0.032**	**0.016**	**0.026**	–	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000
American Basin	**0.089**	**0.042**	**0.032**	**0.047**	**0.022**	**0.045**	–	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Natomas West	**0.062**	**0.027**	0.013	**0.023**	0.018	**0.018**	**0.017**	–	0.693	0.030	0.000	0.000	0.000	0.000	0.000	0.000
Natomas East	**0.066**	**0.038**	0.016	**0.029**	**0.032**	**0.024**	**0.028**	0.000	–	0.056	0.000	0.000	0.000	0.000	0.000	0.000
Natomas South	**0.112**	**0.068**	**0.047**	**0.055**	**0.078**	**0.049**	**0.061**	0.024	0.019	–	0.000	0.000	0.000	0.004	0.000	0.000
Conaway Ranch	**0.136**	**0.112**	**0.062**	**0.074**	**0.082**	**0.069**	**0.071**	**0.077**	**0.075**	**0.072**	–	0.000	0.000	0.000	0.000	0.000
Yolo Wildlife Area	**0.149**	**0.120**	**0.094**	**0.091**	**0.104**	**0.071**	**0.104**	**0.094**	**0.096**	**0.109**	**0.054**	–	0.000	0.000	0.000	0.000
Badger Creek	**0.123**	**0.093**	**0.087**	**0.067**	**0.099**	**0.072**	**0.112**	**0.077**	**0.078**	**0.084**	**0.149**	**0.130**	–	0.000	0.000	0.000
White Slough	**0.140**	**0.116**	**0.057**	**0.058**	**0.085**	**0.060**	**0.095**	**0.053**	**0.045**	**0.044**	**0.116**	**0.107**	**0.063**	–	0.000	0.000
Los Banos Creek	**0.252**	**0.228**	**0.175**	**0.170**	**0.222**	**0.198**	**0.232**	**0.177**	**0.180**	**0.215**	**0.296**	**0.276**	**0.127**	**0.159**	–	0.000
Volta Wildlife Area	**0.255**	**0.225**	**0.179**	**0.199**	**0.214**	**0.222**	**0.224**	**0.194**	**0.197**	**0.210**	**0.287**	**0.297**	**0.182**	**0.187**	**0.125**	–

Statistical significance at $\alpha < 0.009$ after B–Y correction (Narum 2006) is indicated by *bold* face

Table 4 Pairwise genetic differentiation (F_{ST}) among regional drainage basins (below diagonal) and p values (above diagonal)

	Colusa Basin	Butte Basin	Sutter Basin	American Basin	Yolo Basin	Delta Basin	San Joaquin Basin
Colusa Basin	–	0.000	0.000	0.000	0.000	0.000	0.000
Butte Basin	**0.053**	–	0.009	0.075	0.000	0.000	0.000
Sutter Basin	**0.053**	**0.012**	–	0.000	0.000	0.000	0.000
American Basin	**0.047**	0.006	**0.019**	–	0.000	0.000	0.000
Yolo Basin	**0.111**	**0.055**	**0.059**	**0.065**	–	0.000	0.000
Sacramento Delta	**0.095**	**0.057**	**0.052**	**0.062**	**0.103**	–	0.000
San Joaquin Basin	**0.218**	**0.163**	**0.182**	**0.179**	**0.260**	**0.145**	–

Statistical significance at $\alpha < 0.0137$ after B–Y correction (Narum 2006) is indicated by *bold* face

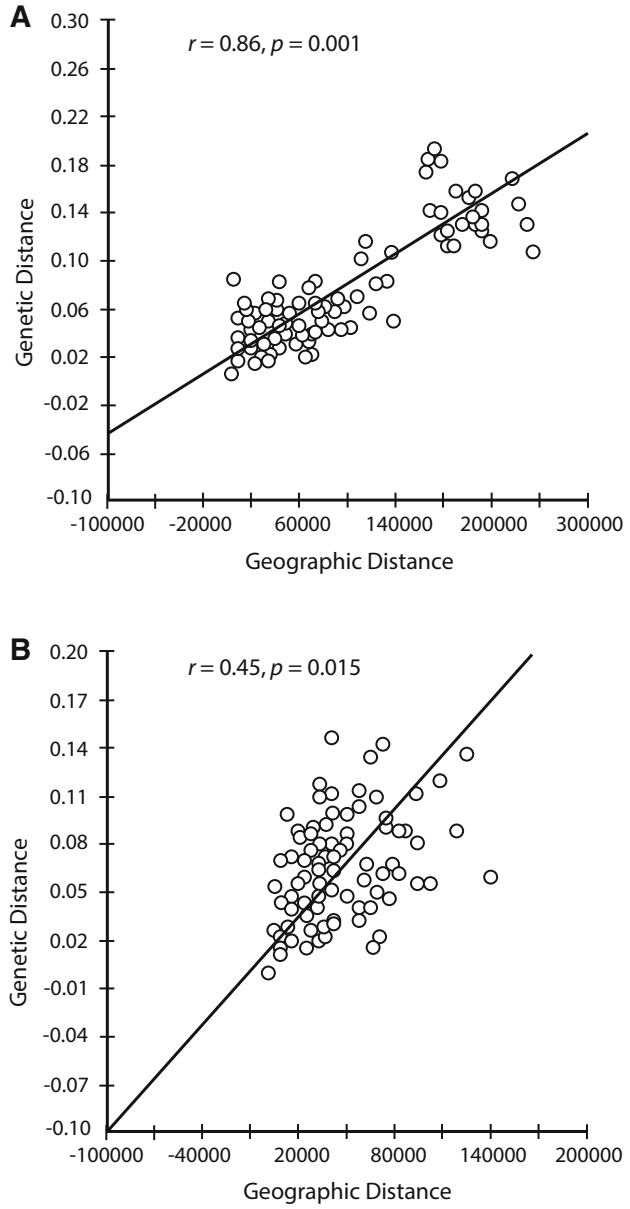

Fig. 3 Mantel tests for matrix correlation between genetic distance and geographic distance for: **a** all 16 populations and **b** after removing San Joaquin populations

giant gartersnake, but these patterns may warrant further investigation. Although detection of inbreeding was not widespread, we did observe significant inbreeding coefficients in Gilsizer Slough, Natomas West, Natomas East, Conaway Ranch, and Badger Creek populations.

Population structure and genetic differentiation

Across the Central Valley, evidence for five regional units are revealed by the microsatellite data: Colusa Basin, Yolo Basin, Delta Basin, San Joaquin Basin, and the Sacramento Valley. Genetic structure within the northern Sacramento Valley appears to be defined largely by the Sacramento River, where significant genetic differentiation (F_{ST}) estimates exist between Colusa Basin and populations immediately east of the river. Differentiation is weaker in the southern portion of the Sacramento Valley (vicinity of North Yolo), where admixture patterns from STRUCTURE analyses indicate genetic exchange in this area across the river. On the east side of the Sacramento River, no genetic subdivision among drainage basins is evident. Butte, Sutter, and American Basins are grouped into a single regional genetic unit in the STRUCTURE analyses and F_{ST} estimates among these basins are low or non-significant. Only pairwise comparisons between the most geographically separated sub-basins were significant (American West with Natomas East and South), indicating that geographic distance among the sub-basins may play a role in restricting gene flow, although fragmentation of habitat likely further inhibits successful migration and gene flow (Fahig 1997; Forman et al. 2003). We also found evidence of genetic subdivision within the central and southern basins, where Yolo, Delta, and San Joaquin Basins each form distinct genetic clusters. Paquin et al. (2006) report similar results for these basin populations using mtDNA. They showed that Badger Creek mtDNA haplotypes were genetically divergent from both northern and southern basins and that this pattern of mtDNA divergence was replicated for more southern populations in the San Joaquin Basin.

Table 5 Genetic bottlenecks in *Thamnophis gigas* populations estimated by heterozygote excess

Population	N	IAM	TPM									SMM
			30|16	30|8	30|4	60|16	60|8	60|4	80|16	80|8	80|4	
Colusa NWR	46	**0.004**	0.076	0.115	0.195	0.227	0.281	0.381	0.532	0.555	0.640	0.932
North Yolo	15	**0.009**	**0.028**	**0.042**	0.084	0.094	0.104	0.179	0.211	0.244	0.281	0.511
Gray Lodge	14	**0.004**	**0.047**	**0.047**	**0.047**	**0.047**	**0.047**	**0.047**	**0.047**	0.053	0.068	0.084
Gilsizer Slough	37	**0.000**	**0.001**	**0.002**	**0.021**	**0.024**	**0.037**	0.138	0.165	0.262	0.281	0.756
Sutter East of Bypass	15	**0.018**	**0.047**	0.054	0.115	0.115	0.115	0.151	0.165	0.179	0.195	0.339
Sutter West of Bypass	32	0.094	0.339	0.402	0.423	0.489	0.555	0.661	0.719	0.756	0.820	0.964
American West	35	**0.000**	**0.000**	**0.001**	**0.002**	**0.005**	**0.011**	**0.015**	**0.024**	**0.032**	0.068	0.360
Natomas West	30	**0.021**	0.195	0.359	0.555	0.511	0.661	0.789	0.820	0.862	0.906	0.991
Natomas East	30	**0.000**	**0.005**	**0.018**	**0.024**	**0.024**	0.054	0.084	0.138	0.195	0.262	0.773
Natomas South	8	n/a		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Conaway Ranch	34	**0.032**	0.126	0.195	0.281	0.402	0.555	0.640	0.681	0.700	0.789	0.958
Yolo Wildlife Area	41	0.115	0.281	0.381	0.489	0.489	0.619	0.700	0.773	0.820	0.874	0.976
Badger Creek	45	**0.000**	**0.005**	**0.009**	**0.018**	**0.032**	0.076	0.104	0.195	0.359	0.402	0.940
White Slough	20	**0.021**	0.054	0.094	0.138	0.195	0.227	0.319	0.340	0.402	0.467	0.773
Los Banos Creek	10	0.271	0.393	0.446	0.473	0.473	0.527	0.527	0.554	0.601	0.632	0.830
Volta Wildlife Area	47	**0.000**	**0.001**	**0.002**	**0.003**	**0.007**	**0.012**	**0.015**	**0.021**	**0.034**	0.067	0.335

Bold values indicate statistical significance of heterzygote excess ($\alpha < 0.05$; one tailed), n, sample size; *IAM* infinite alleles mutation model; *TPM* the two-phase mutation model assessed at various proportions (p_g) and mean sizes (δ_g) of multistep mutations ($p_g|\delta_g$,); *SMM* the step-wise mutation models

Table 6 Effective size estimates and 95 % confidence intervals for populations and clusters

Population	ONeSAMP N_e	Clusters	ONeSAMP N_e
Colusa NWR	44.6 (33.1–115.1)	Colusa Basin	203.3 (94.8–683.4)
North Yolo	21.1 (17.0–44.2)		
Gray Lodge	13.3 (11.1–20.0)	Sacramento Valley	515.3 (258.9–2061.6)
Gilsizer Slough	32.8 (22.7–73.2)		
Sutter East of Bypass	23.4 (18.0–36.6)		
Sutter West of Bypass	33.6 (26.9–59.5)		
American West	54 (42.7–125.5)		
Natomas West	63.7 (39.8–174.6)		
Natomas East	39.7 (29.4–88.8)		
Natomas South	–	–	–
Conaway Ranch	55.1 (40.9–120.3)	Yolo Basin	571.0 (279.3–3496.6)
Yolo Wildlife Area	44.6 (30.8–109.6)		
Badger Creek	82 (54.0–260.6)	Delta Basin	636.2 (285.1–3846.9)
White Slough	41.1 (30.7–107.5)		
Los Banos Creek	14.6 (10.6–32.0)	San Joaquin Basin	56.9 (39.4–199.0)
Volta Wildlife Area	18.9 (15.1–33.3)		

Natomas South had too few individuals sampled (n = 8) to yield reliable estimates

Despite the geographic and genetic isolation evident for populations within the Yolo and Delta genetic units, admixture patterns revealed in the STRUCTURE analyses indicate populations have experienced some past genetic exchange with more northern drainage basins. Within the Delta Basin, White Slough is the only population to exhibit admixed genotypes from the northern Sacramento Valley, Badger Creek, and lower San Joaquin Basin, suggesting that White Slough may have been established during periodic flood events in the past. Similarly, admixtures at

North Yolo and Conaway Ranch sites might also indicate the establishment of populations from multiple sources during flood events. Prior to water diversion, the Central Valley frequently flooded during winter and spring, and on rare occasions floodwaters inundated the entire valley from the foothills of the Coast Ranges to the foothills of the Sierra Nevada (Garone 2007). The confluence of several major river systems at the southern end of the Sacramento Valley likely led to increased frequency and severity of flooding there than farther north in the Sacramento Valley. These historical flood events could have transported individuals across the Sacramento River, resulting in the observed admixtures at North Yolo and Conaway Ranch sites. The admixture observed at Los Banos Creek is more enigmatic, and not readily explained by hydrologic events. Although flooding is a parsimonious hypothesis, we cannot rule out other mechanisms, including human movement of individuals.

Our results show that northern drainage basins have higher connectivity than among central and southern basins. Although moderate levels of genetic differentiation exist among the drainage basins (global $F_{ST} = 0.108$), highest pairwise F_{ST} estimates are recovered among populations that are geographically isolated, especially the southern populations within Yolo, Delta, and San Joaquin Basins (Tables 3, 4). In contrast, genetic differentiation among northern drainage basins east of the Sacramento River is relatively low suggesting greater connectivity between drainages along the Sacramento Valley. These patterns are consistent with expectations based upon both historic and current habitat conditions. Prior to water diversion and agricultural activity, marsh habitat east of the Sacramento River was likely contiguous from the Butte Basin in the north to the Sutter Basin, southward across the downstream reaches of the Feather River and the southern portion of the American Basin (Kuchler 1977). Current land use in the Sacramento Valley region is dominated by rice agriculture, which with its supporting infrastructure of canals, has likely maintained enough habitat connectivity to enable historical levels of gene flow among these basins despite otherwise limited dispersal. While allele frequency differences between drainage basins and populations could result through the population bottleneck events we detected throughout the Central Valley, isolation-by-distance is likely a stronger driver of population structure for the giant gartersnake (Leblois et al. 2006). Our inference of stepping-stone gene flow is consistent with expectations for a species largely distributed along a north–south axis where populations that are close to each other are likely to be more connected, and therefore more genetically similar, than populations that are farther apart (Guillot et al. 2009).

Conservation implications

Populations across the Central Valley have been affected by diversion of water (i.e., dams, levees, and irrigation systems) and the expansion of agriculture for over a century, which has resulted in the loss of over 93 % of historic wetlands in the Central Valley (Frayer et al. 1989; USDOI 1994; USFWS 2006). Our microsatellite data indicate that reductions in effective population size (i.e., genetic bottlenecks) have occurred in about half the populations we sampled throughout the Central Valley. Trapping efforts and field surveys have detected relatively low numbers of individuals in San Joaquin Valley populations relative to more northern Sacramento Valley populations (Hansen 2008, 1988; Sousa and Sloan 2007; Wylie and Amarello 2008), and our estimates of genetic diversity and effective size are consistent with these field data. However, we also found genetic evidence of bottlenecks and relatively small N_e estimates for several northern populations (Tables 5 and 6), indicating that giant gartersnake declines are not limited to the San Joaquin Valley. Although rice cultivation within the Sacramento Valley provides beneficial wetland habitat for giant gartersnakes, flooding of rice fields only occurs during a limited portion of the year (June through August). Therefore, perennial wetland habitat is primarily restricted within irrigation canals or marshes in close proximity to these canals, and may not be sufficient to curb local population declines.

Of five genetic clusters identified in our population structure analyses, only the Sacramento Valley cluster has multiple populations with point estimates of $N_e > 50$ individuals, and enough remaining habitat to potentially support several additional populations (Halstead et al. 2010; Wylie et al. 2010). The San Joaquin Basin cluster, in particular, has only two known extant populations, and both of these have relatively low effective population size estimates, with upper confidence limits of $N_e < 33$. The remaining three clusters (Colusa, Yolo, and Delta Basins) are represented by only a few populations, and with the exception of the Colusa Basin, there is little additional habitat surrounding these sampled populations. Given accounts of historic abundance and what is known about the available habitat at all of our sampling locations, the low N_e values we recovered for the giant gartersnake may be further evidence of declining populations. Although measures of effective population size require careful interpretation, the measure is valuable as a relative comparison despite possible inaccuracies due to sampling close relatives or overlapping generations (as our sampling almost certainly included). Therefore, our estimates may be best viewed as a range of possible values and we place

emphasis on the upper CI for each population estimate. If the effective population sizes of giant gartersnake populations throughout the Central Valley are as low as our analyses suggest, then they may be too small to avoid considerable inbreeding depression in the long term. According to theoretical and empirical evidence, a minimum N_e of 100 individuals is necessary to avoid the negative genetic effects of inbreeding over 5 generations (Frankham et al. 2014; Jamieson and Allendorf 2012). Most of the populations sampled here do not meet these thresholds, having upper N_e estimates below 100, suggesting that the fitness of many populations throughout the Central Valley may be vulnerable. Although our basin-wide N_e estimates reveal higher effective sizes, both Colusa and San Joaquin Basins, which occur at the northern and southern range limits, have N_e estimates well below the minimum threshold of $N_e \geq 1000$ that is recommended for long-term viability and persistence in the face of environmental change (Frankham et al. 2014; Jamieson and Allendorf 2012; Traill et al. 2010). Ensuring the continued existence of the southern-most clusters (Yolo, Delta, and San Joaquin Basin populations) may be critical for maintaining overall genetic diversity within the species. This is especially important considering that populations in the southernmost portion of the Central Valley (Tulare Basin: Buena Vista Lake, Kern Lake, and Tulare Lake) have already been extirpated (Hansen 1988; Hansen and Brode 1980). The Tulare Basin, which extends from the southern portion of the San Joaquin River southward to the Kings River, was connected to the San Joaquin Basin only during rare hydrological events when Tulare Lake (now dry) reached flood stage (Garone 2007). Therefore, if the genetic structure of the now extinct Tulare Basin populations was similar to the divergence patterns we recovered among the other basins in the Central Valley, then it is likely that at least one (Tulare Basin) to as many as three distinct genetic clusters (Buena Vista Lake, Kern Lake, and Tulare Lake populations) have already been lost.

Sustaining populations as distinctive gene pools within Yolo, Delta and San Joaquin Basins, particularly those represented by few individuals, could prove to be a daunting task. Pursuing management actions to ameliorate continued loss of genetic connectivity between existing populations within each cluster may help to decrease their extinction risk. Even with quality wetland habitat surrounding individual populations within a basin, corridors connecting these wetlands are integral to maintain gene flow. Small effective population sizes and geographic isolation leave these populations susceptible to stochastic events (e.g., disease, prolonged drought) and the deleterious consequences of genetic drift, which along with other ecological disturbances (e.g. habitat degradation, invasive species) can interact to drive a small population to extinction (Brook et al. 2008; Gilpin and Soulé 1986). Therefore, management strategies focused on maintaining and enhancing existing wetland habitat and canals for continued migration within basin populations may be critical for these otherwise isolated populations. Furthermore, perennial habitat restoration efforts within each of these basins could potentially improve conditions for giant gartersnakes, and boost regional population sizes. However, it may be that too few individuals currently remain in some basins to consider them as sources for translocation to newly restored wetlands and given their genetic distinctiveness, the translocation of individuals from other basins might be contraindicated (Gautschi et al. 2002; Madsen et al. 1996; Újvári et al. 2002). Should it be deemed necessary to augment populations to achieve long-term persistence, augmenting from the most geographically proximate populations would be consistent with the measured patterns of genetic structure.

Maintaining genetic connectivity would be recommended within the Colusa Basin and in the Sacramento Valley east of the Sacramento River (Butte, Sutter, and American basins) and is consistent with earlier recommendations by Paquin et al. (2006). Managing the landscape to maintain a network of canals that contain water and emergent vegetation during the giant gartersnake's active season may be a cost-effective means of supporting genetic connectivity among populations, but more research is needed on this topic. Additional construction of marshes that approximate historic habitat conditions might promote abundant populations (Wylie et al. 2010) that provide sources of dispersing individuals. The genetically distinctive Yolo Basin cluster may also benefit from increased landscape management. Continued habitat conversion encroaching from the west, as a result of the ongoing expansion of Dixon, Woodland, and Davis communities, may further isolate and reduce these unique populations. Management practices aimed at increasing, then maintaining, large effective population sizes and facilitating dispersal within all these clusters would likely benefit *T. gigas*. Finally, results suggest that a periodic genetic sampling program (e.g., every 2–5 generations) would provide useful information for the management of giant gartersnakes. This would facilitate monitoring efforts to quantify genetic changes resulting from threats and compensatory management actions within each of the drainage basins, and allow for the assessment of management efforts within an adaptive framework.

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Supplemental Material for:

Defining population structure and genetic signatures of decline in the giant gartersnake (*Thamnophis gigas*): Implications for conserving threatened species within highly altered landscapes

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Appendix 1. Hardy-Weinberg equilibrium results (population-level test). Statistical significance at $\alpha < 0.0147$ after B-Y correction is indicated by bold face.

Locus	Colusa NWR	Yolo	Gray Lodge	Gilsizer Slough	Sutter East	Sutter West	American Basin West	Natomas West
TRI_58P	0.438	0.051	0.323	0.247	0.281	0.962	0.363	0.484
DI_907	0.732	0.197	0.051	0.729	0.578	0.598	1.000	0.053
TRI_TSC	0.076	0.264	0.062	**0.001**	0.760	0.140	0.130	0.320
DI_2229	0.357	0.063	0.027	0.190	0.304	0.910	0.520	0.141
TRI_TOA	0.911	0.155	0.297	0.686	0.199	1.000	0.679	0.145
TRI_ISV	0.239	0.232	0.488	0.389	0.102	0.217	0.830	0.018
PEN_5ZB	0.961	0.605	0.515	0.978	0.702	0.273	0.378	0.118
TET969	0.944	0.434	0.448	0.491	1.000	1.000	0.940	0.021
PEN1170	0.016	1.000	0.035	**0.000**	0.034	0.162	**0.000**	**0.000**
TRI_ONY	0.136	0.028	0.279	0.392	0.598	0.317	0.642	0.078
TRI_AOC	0.925	0.070	0.101	0.752	0.710	0.952	0.505	0.061
TET_790	0.357	0.288	0.310	0.266	0.043	0.366	1.000	0.933
TET_567	**0.001**	0.088	0.076	0.017	0.269	**0.010**	**0.001**	**0.001**
PEN_61U	0.219	0.357	0.024	0.094	0.113	0.033	0.798	0.455
TRI_3VL	0.203	0.229	0.320	0.471	0.665	0.705	0.457	0.157

Locus	Natomas East	Natomas South	Conaway Ranch	Yolo Wildlife Area	Badger Creek	White Slough	Los Banos	Volta Wild Life Area
TRI_58P	0.913	0.261	0.983	0.294	0.567	0.273	1.000	0.470
DI_907	0.091	no info	1.000	1.000	0.426	0.032	1.000	0.458
TRI_TSC	0.208	1.000	0.221	**0.000**	0.053	0.249	1.000	0.424
DI_2229	0.750	1.000	0.099	0.086	0.941	0.584	0.811	0.615
TRI_TOA	0.411	0.198	0.522	0.471	0.547	1.000	1.000	0.028
TRI_ISV	0.600	1.000	1.000	1.000	0.066	1.000	no info	0.199
PEN_5ZB	0.206	0.582	0.227	0.793	0.278	0.625	1.000	0.543
TET969	0.742	0.554	0.621	**0.003**	0.389	0.766	0.736	0.369
PEN1170	**0.003**	no info	no info	0.027	**0.000**	0.247	0.018	**0.000**
TRI_ONY	1.000	1.000	0.392	0.282	0.340	0.167	no info	0.849
TRI_AOC	0.747	0.560	0.125	0.027	0.341	0.298	0.794	0.045
TET_790	0.646	0.435	0.894	0.043	0.860	0.124	0.776	0.090
TET_567	**0.000**	0.027	0.056	0.022	**0.000**	0.441	**0.002**	**0.000**
PEN_61U	0.019	0.022	0.594	0.548	0.838	0.396	1.000	0.454
TRI_3VL	0.076	0.483	0.490	0.770	0.666	1.000	no info	no info

Appendix 2. Hardy-Weinberg equilibrium results (global tests) with p-values and standard errors (S.E.).

Population (multi-locus)			Locus (multi-populations)		
Population	p- value	S.E.	Locus	p- value	S.E.
Colusa NWR	0.969	0.003	TRI_58P	0.905	0.007
North Yolo	0.996	0.001	DI_907	0.968	0.002
Gray lodge	0.926	0.005	TRI_TSC	1.000	0.000
Gilsizer Slough	1.000	0.000	DI_2229	0.743	0.012
Sutter East of Bypass	0.953	0.003	TRI_TOA	0.026	0.002
Sutter West of Bypass	0.982	0.002	TRI_ISV	0.846	0.004
American West	0.654	0.009	PEN_5ZB	0.406	0.011
Natomas West	1.000	0.000	TET969	0.708	0.009
Natomas East	1.000	0.000	PEN1170	1.000	0.000
Natomas South	0.916	0.003	TRI_ONY	0.981	0.001
Conaway Ranch	0.972	0.003	TRI_AOC	0.189	0.010
Yolo Wildlife Area	1.000	0.000	TET_790	0.892	0.008
Badger Creek	1.000	0.000	TET_567	1.000	0.000
White Slough	0.947	0.003	PEN_61U	0.996	0.001
Los Banos Creek	0.879	0.005	TRI_3VL	0.747	0.005
Volta Wildlife Area	0.973	0.002	–	–	–

Appendix 3. Pairwise genetic differentiation estimates (F_{ST}) among populations using 12 loci (TRI_AOC, DI_2229, and PEN_61U were removed from the dataset) below the diagonal, and *p*-values above the diagonal. Statistical significance at $\alpha < 0.009$ after B-Y method correction is indicated by bold face.

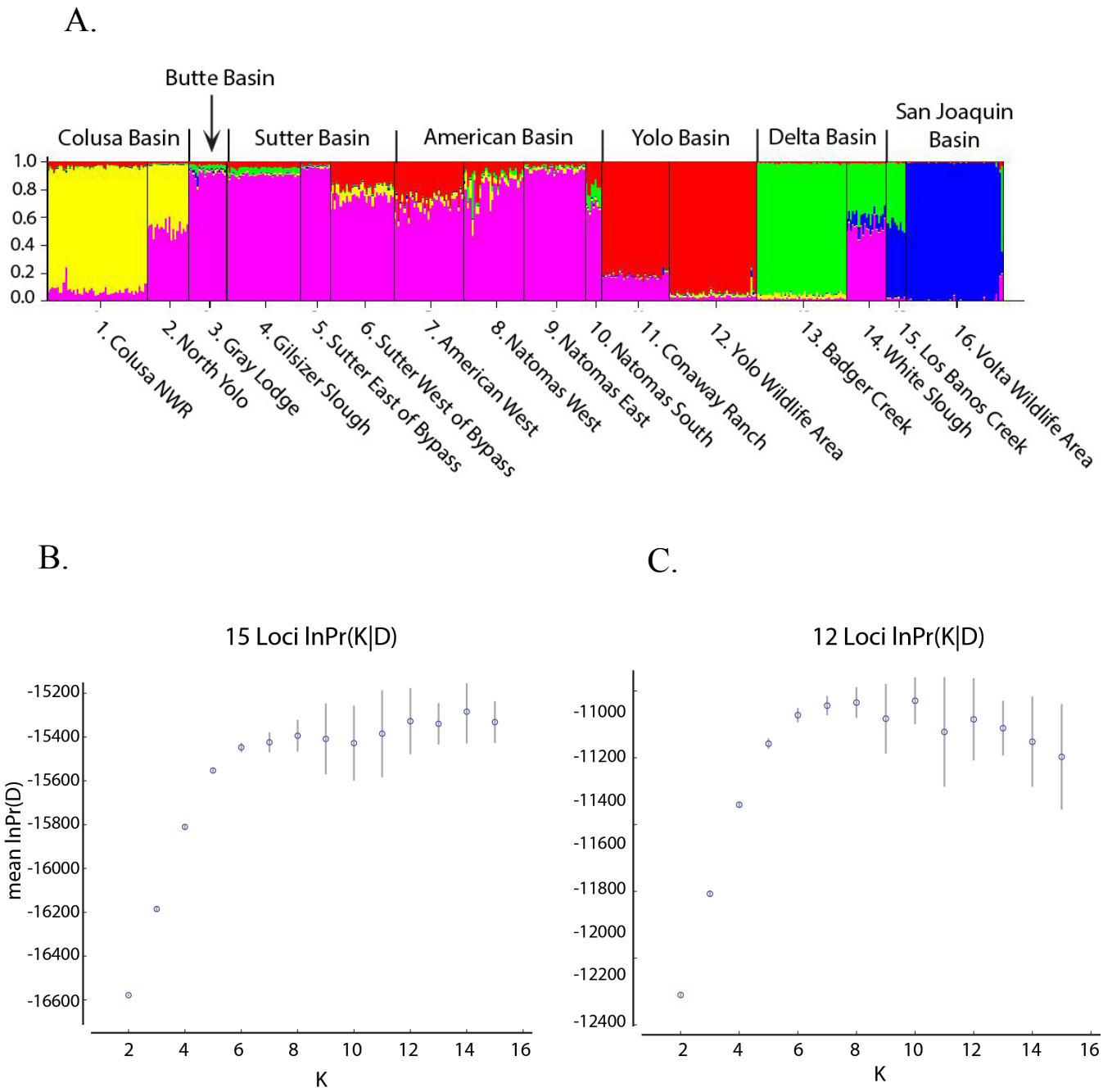
	Colusa Basin		Butte Basin	Sutter Basin			American Basin				Yolo Basin		Delta Basin		San Joaquin Basin	
	Colusa NWR	North Yolo	Gray Lodge	Gilsizer Slough	Sutter East Bypass	Sutter West Bypass	American West	Natomas West	Natomas East	Natomas South	Conaway Ranch	Yolo Wildlife Area	Badger Creek	White Slough	Los Banos Creek	Volta Wildlife Area
Colusa NWR	--	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
North Yolo	**0.042**	--	0.001	0.000	0.002	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Gray Lodge	**0.079**	**0.039**	--	0.027	0.017	0.004	0.006	0.372	0.067	0.021	0.000	0.000	0.000	0.000	0.000	0.000
Gilsizer Slough	**0.089**	**0.046**	0.013	--	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sutter East Bypass	**0.091**	**0.042**	0.022	0.021	--	0.008	0.005	0.049	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sutter West Bypass	**0.063**	**0.040**	**0.020**	**0.019**	**0.021**	--	0.000	0.020	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000
American Basin	**0.085**	**0.040**	**0.019**	**0.047**	**0.026**	**0.041**	--	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Natomas West	**0.058**	**0.026**	0.001	**0.021**	0.014	0.011	**0.016**	--	0.646	0.059	0.000	0.000	0.000	0.000	0.000	0.000
Natomas East	**0.061**	**0.038**	0.011	**0.029**	**0.040**	**0.022**	**0.033**	0.000	--	0.183	0.000	0.000	0.000	0.000	0.000	0.000
Natomas South	**0.123**	**0.080**	0.032	**0.066**	**0.094**	**0.056**	**0.070**	0.021	0.011	--	0.000	0.000	0.000	0.011	0.000	0.000
Conaway Ranch	**0.152**	**0.131**	**0.063**	**0.085**	**0.103**	**0.083**	**0.083**	**0.087**	**0.087**	**0.098**	--	0.000	0.000	0.000	0.000	0.000
Yolo Wildlife Area	**0.132**	**0.118**	**0.068**	**0.070**	**0.099**	**0.057**	**0.084**	**0.080**	**0.082**	**0.097**	**0.034**	--	0.000	0.000	0.000	0.000
Badger Creek	**0.131**	**0.096**	**0.082**	**0.060**	**0.096**	**0.076**	**0.101**	**0.064**	**0.068**	**0.078**	**0.166**	**0.121**	--	0.000	0.000	0.000
White Slough	**0.152**	**0.135**	**0.064**	**0.069**	**0.108**	**0.077**	**0.110**	**0.057**	**0.050**	0.047	**0.145**	**0.105**	**0.061**	--	0.000	0.000
Los Banos Creek	**0.268**	**0.242**	**0.202**	**0.189**	**0.256**	**0.224**	**0.250**	**0.192**	**0.202**	**0.228**	**0.332**	**0.278**	**0.123**	**0.185**	--	0.000
Volta Wildlife Area	**0.262**	**0.228**	**0.188**	**0.204**	**0.230**	**0.231**	**0.225**	**0.185**	**0.196**	**0.205**	**0.308**	**0.280**	**0.191**	**0.191**	**0.110**	--

Appendix 4. Pairwise genetic differentiation (F_{ST}) among regional drainage basins (below diagonal) using 12 loci (TRI_AOC, DI_2229, and PEN_61U were removed from the dataset) and *p*-values (above diagonal). Statistical significance at $\alpha < 0.0137$ after B-Y correction (Narum, 2006) is indicated by bold face.

	Colusa Basin	Butte Basin	Sutter Basin	American Basin	Yolo Basin	Delta Basin	San Joaquin Basin
Colusa Basin	–	0.000	0.000	0.000	0.000	0.000	0.000
Butte Basin	**0.053**	–	0.009	0.080	0.000	0.000	0.000
Sutter Basin	**0.050**	**0.012**	–	0.000	0.000	0.000	0.000
American Basin	**0.047**	0.006	**0.019**	–	0.000	0.000	0.000
Yolo Basin	**0.111**	**0.055**	**0.059**	**0.065**	–	0.000	0.000
Sacramento Delta	**0.095**	**0.057**	**0.052**	**0.062**	**0.103**	–	0.000
San Joaquin Basin	**0.220**	**0.166**	**0.181**	**0.181**	**0.263**	**0.148**	–

Appendix 5. Analysis of molecular variance (AMOVA) with 12 loci (TRI_AOC, DI_2229, and PEN_61U were removed from the dataset).

Source of genetic variation	Percent Variance	P-value
Among Drainage basins	9%	0.000
Among populations with basins	3%	0.000
Among individuals within populations	7%	0.000
Within individuals	81%	0.000



Appendix 6. Genetic structure of populations on the basis of 12 loci and a correlated allele frequencies model. **A**. Each individual sampled is represented by a single column with group membership probabilities for each cluster (*K*) indicated as the relative proportion of each color. **B**. Maximum number of clusters to which individuals could be assigned on the basis of 15 loci where the LnP(*K*|D) plateaus. **C**. Maximum number of clusters to which individuals could be assigned on the basis of 12 loci where the LnP(*K*|D) plateaus. In B and C, data points are the means and standard deviations for 10 MCMC simulations at each *K* (range = 1 - 16).

Friends of the Swainson's Hawk
www.swainsonshawk.org

Send all notices & correspondence to: Friends of the Swainson's Hawk, 8867 Bluff Lane, Fair Oaks, CA 95628 916-769-2857 friendsoftheswainsonshawk@gmail.com

October 21, 2024

Sacramento County,
Department of Community Development, Planning and Environmental Review Division Attention: Environmental Coordinator
827 7th Street, Room 225 Sacramento, CA 95814;
Via email CEQA@saccounty.gov

Re: Upper Westside Specific Plan (State Clearinghouse No 2020100069, County Control Number PLNP2018-00284)

Friends of the Swainson's Hawks concurs with the comments of the Environmental Council of Sacramento (ECOS), forthcoming, which incorporate our concerns about the DEIR as an informational document and address the deficiencies in the DEIR.

We are transmitting via separate attachments to this letter, references not included in the DEIR which are referenced in the ECOS comments. Please include these documents in the record. 16-1

The following two documents are included in Appendix J, to the NBHCP, on the Natomas Basin Conservancy website, attached.

1994 Permit Number 199200719 U.S.ARMY ENGINEER DISTRICT.SACRAMENTO CORPS OF ENGINEERS 1325 J STREET SACRAMENTO,CALIFORNIA 95814-2922

March 11, 1994, US Fish and Wildlife Service, Endangered Species Act Consultation on the Revised Natomas Area Flood Control Improvement Project (PN 199200719) in Sacramento and Sutter Counties, California

2003 IMPLEMENTATION AGREEMENT FOR THE NATOMAS BASIN HABITAT CONSERVATION PLAN

June 24, 2003 United States Department of the Interior FISH AND WILDLIFE SERVICE, Sacramento Fish and Wildlife Office
Intra-Service Biological and Conference Opinion on Issuance of a Section 10(a)(1)(B) Incidental Take Permit to the City of Sacramento and Sutter County for Urban Development in the Natomas Basin, Sacramento and Sutter Counties, California.

National Wildlife Federation v. Norton, Civ-S-04-0579 DFL JFM (E.D. Cal. Sep. 8, 2005)

ICF. 2024. *Natomas Basin Habitat Conservation Plan Area Biological Effectiveness Monitoring Report: 2023 Annual Survey Results*. July. Prepared for the Natomas Basin Conservancy, Sacramento, CA. Prepared by ICF, Sacramento, CA).

Yolo County Ordinance Chapter 10, "Habitat Mitigation Ordinance"

Wood, et al, "*Defining Population Structure And Genetic Signatures Of Decline In The Giant Gartersnake (Thamnophis gigas)"* Conservation Genetics (April 11, 2015)

16-1 cont.

Thank you for your assistance in this matter.

James P. Pachl

Judith L. Lamare

Appendix J

Documents Regarding Sacramento Area Flood Control Agency Army Corps of Engineers Permit Compliance.

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA 95814-2922

REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY PERMIT

Permittee: Sacramento Area Flood Control Agency
F.I. Hodgkins, Executive Director
926 J Street, Suite 424
Sacramento, California 95814

Permit Number: 199200719

Issuing Office: U.S. Army Engineer District, Sacramento
Corps of Engineers
1325 "J" Street
Sacramento, California 95814-2922

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below.

Project Description:

The discharges of dredged or fill material into waters of the United States associated with the following activities are authorized by this permit:

a. Raising the levees along the Natomas East Main Drain (NEMDC) using top only and sliver fill techniques.

b. Construction of a new 1000 cfs pump station on the NEMDC approximately 2600 north of Dry Creek.

c. Replacing the existing Main Avenue Bridge with a new four-lane structure.

d. Raising the levee, rebuilding the levee access road, and modifying the stoplog structures on Arcade Creek between the NEMDC and Marysville Boulevard.

e. Enlarging existing levees, construction of a new levee segment and construction of a floodwall along Dry Creek between the NEMDC and Marysville/Rio Linda Boulevard.

f. Extending the NEMDC north to Sankey Road.

g. Constructing a stoplog structure, a retaining wall, and raising the existing levee along the Pleasant Grove Creek Canal.

h. Raising the Natomas Cross Canal south levee between the Sacramento River and State Highway 99 along its existing alignment.

All work is to be completed in accordance with the attached plan(s).

Project Location:

The project is located in the City of Sacramento and Sacramento and Sutter Counties as shown on the attached location maps.

Permit Conditions

General Conditions:

1. The time limit for completing the work authorized ends on 31 March 1999. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.

3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.

5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.

6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

Special Conditions:

a. The Permittee shall fully implement all measures described in the Wetland Mitigation Plan for the Revised Natomas Area Flood Control Improvement Project, March 1994. The contents of this document are expressly incorporated into the terms of this permit except as otherwise modified by these Special Conditions. Permit Special Conditions shall supersede similar or conflicting conditions within this and other documents named within these special conditions.

Wetland mitigation acreage shall be 28.62 as described in the Wetland Mitigation Plan for the Revised Natomas Area Flood Control Improvement Project.

b. Construction of the compensatory mitigation areas shall commence concurrently with or in advance of the start of construction of the authorized activity and be complete within two years. The permittee shall notify the District Engineer of the start date and the completion date of mitigation construction in writing and no later than ten (10) calendar days after each date.

c. The following actions shall be taken prior to the start of construction of the authorized project.

1. Establishment of a long term funding mechanism intended to provide for maintenance and monitoring of mitigation areas.

2. Recordation of deed restrictions maintaining all preservation and mitigation areas as wetland preserve and wildlife habitat in perpetuity. Copies of the proposed deed restriction language shall be provided to the Corps of Engineers for approval prior to recordation.

3. Copies of the recorded documents shall be provided to the Corps of Engineers no later than 30 days prior to the start of construction of any of the activities authorized by this permit.

d. The permittee shall provide two complete sets of as-builts of the completed work within the mitigation areas to the Corps of Engineers. The as-builts shall indicate any changes made from the original plans in red ink. These as-builts shall be provided no later than 60 days after the completion of mitigation area wetland construction.

e. Monitoring of the vernal pool and freshwater marsh mitigation areas shall occur for five years or until the success criteria described in the Wetland Mitigation Plan for the Revised Natomas Area Flood Control Improvement Project are met, whichever is longer. This period shall commence upon completion of the construction of the mitigation wetlands. Additionally, continued success of the mitigation wetlands, without human intervention, must be demonstrated for three consecutive years, once the success criteria have been met. The mitigation will not be deemed successful until this criteria has been met. Monitoring reports shall be submitted annually to the Corps of Engineers, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, and the CA Department of Fish and Game for the five year monitoring period, and for each additional year, if needed due to remediation to the mitigation program.

f. Monitoring of riparian mitigation areas shall occur for ten years or until the success criteria described in the incorporated documents describing the mitigation plan are met, whichever is greater. This period shall commence upon completion of the construction of the mitigation wetlands. Additionally continued success of the mitigation wetlands, without human intervention, must be demonstrated for three consecutive years once the success criteria have been met. The mitigation plan will not be deemed successful until this criteria has been met.

Monitoring reports shall be submitted annually for years one through six and for years eight, and ten of the monitoring period, and for each additional year if needed due to remediation to the mitigation areas.

An additional monitoring report shall be provided at the end of the three year period demonstrating continued success of the mitigation program without human intervention. The only exception to this last requirement shall be if the three year period occurs wholly within the ten year monitoring period, in which case the ten year report may be used to meet this requirement.

g. All pumps shall be screened in accordance with the requirements of the California Department of Fish and Game Code.

h. Documentation of all sites potentially eligible for listing in the National Register of Historic Places that would be affected by construction activities shall be accomplished in accordance with standards developed in consultation with the California State Historic Preservation Officer.

i. Prior to initiating any construction on the pump station north of Dry Creek, a Historic Property Treatment Plan (HPTP) shall be developed and approved in accordance with the Programmatic Agreement Among the Corps of Engineers, Bureau of Reclamation, California State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding implementation of the American River Watershed Project.

j. Prior to initiating any construction on the pump station north of Dry Creek, the permittee shall develop a Natomas Basin Habitat Management Plan (Plan). This Plan shall provide the framework within which a mitigation program for the effects of development within the Natomas floodplain will proceed. The framework shall be incorporated into future planning processes by State, local, and Federal authorities as development reaches the appropriate planning stages. The plan shall: ensure that the development within the Natomas floodplain complies with applicable Federal, State and local laws and regulations, including the Endangered Species Act and the Clean Water Act; identify at a conceptual level, appropriate and practicable mitigation measures that may be contemplated under Federal, State, and local laws pertaining to future development; and describe the mechanism to be used for the long-term management and protection of any mitigation lands. The Plan shall be developed by the permittee in coordination with the on-going Corps of Engineers activities for the American River Watershed Investigation. The Plan, including its development, shall be coordinated with the Corps, the U.S. Fish and Wildlife Service, the Environmental Protection Agency, and other Federal, State, and local agencies having interest, expertise and jurisdiction over the Natomas floodplain.

The District Engineer will verify that the Final Plan is in compliance with this condition before work commences on the pump station. The final Plan shall be incorporated by reference as a condition of this permit. Enforcement of mitigation requirements of State and local land use agencies shall be the responsibility of the applicable State or local agency.

k. The applicant shall prepare and implement a plan for avoiding and minimizing construction related impacts to the giant garter snake. The plan shall be submitted to the Corps and Service for review and approval prior to the start of project construction.

l. The permit applicant shall not begin construction on the pumping station along the East Main Drain or otherwise complete the proposed project by providing 100-year flood protection for the lower American Basin until the Service first issues an incidental take permit and associated implementing agreement pursuant to Section 10(a)(1)(b) of the Act to the City and County of Sacramento, Sutter County and any other parties necessary to guarantee the successful implementation of a habitat conservation plan for the giant garter snake resident in the American Basin. This plan shall be compatible with and a component of the multispecies habitat management plan otherwise required by the Department of the Army as a condition of permit authorization.

m. The Biological Opinion from the U.S. Fish and Wildlife Service to the U.S. Army Corps of Engineers dated March 11, 1994 is expressly incorporated as a condition of this permit.

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:

( ) Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).

(X) Section 404 of the Clean Water Act (33 U.S.C. 1344).

( ) Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

2. Limits of this authorization.

a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law.

b. This permit does not grant any property rights or exclusive privileges.

c. This permit does not authorize any injury to the property or rights of others.

d. This permit does not authorize interference with any existing or proposed Federal projects.

3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:

a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.

b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.

c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.

d. Design or construction deficiencies associated with the permitted work.

e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4. Reliance on Applicant's Data. The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5. Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant.

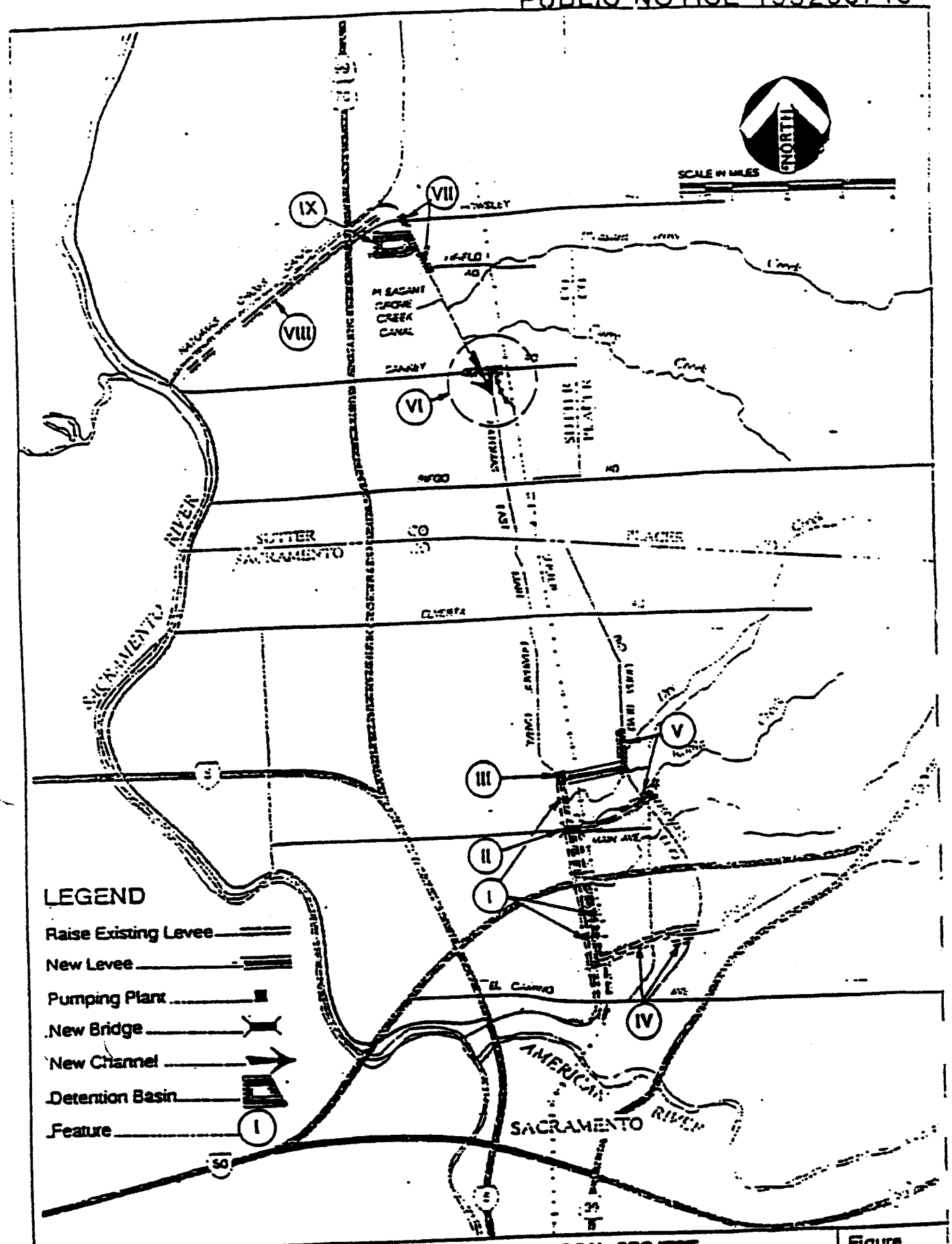
Circumstances that could require a reevaluation include, but are not limited to, the following:

a. You fail to comply with the terms and conditions of this permit.

b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (see 4 above).

c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative

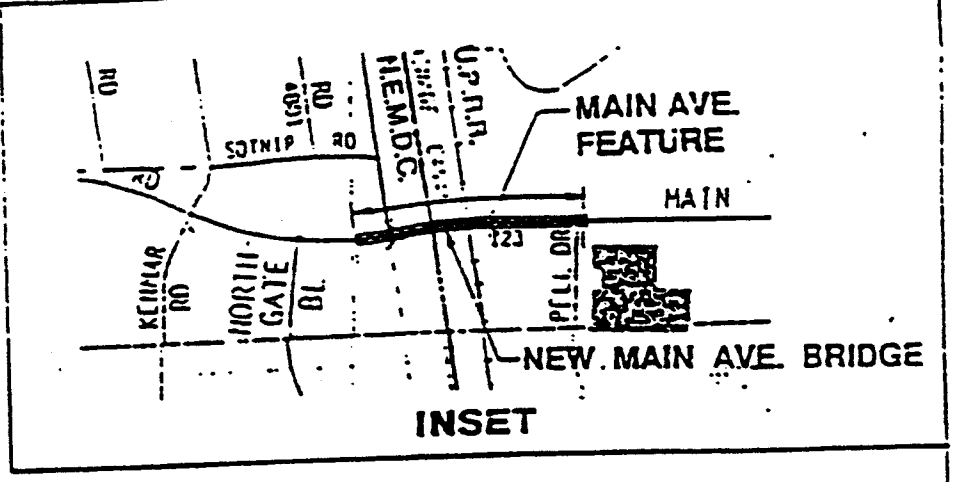


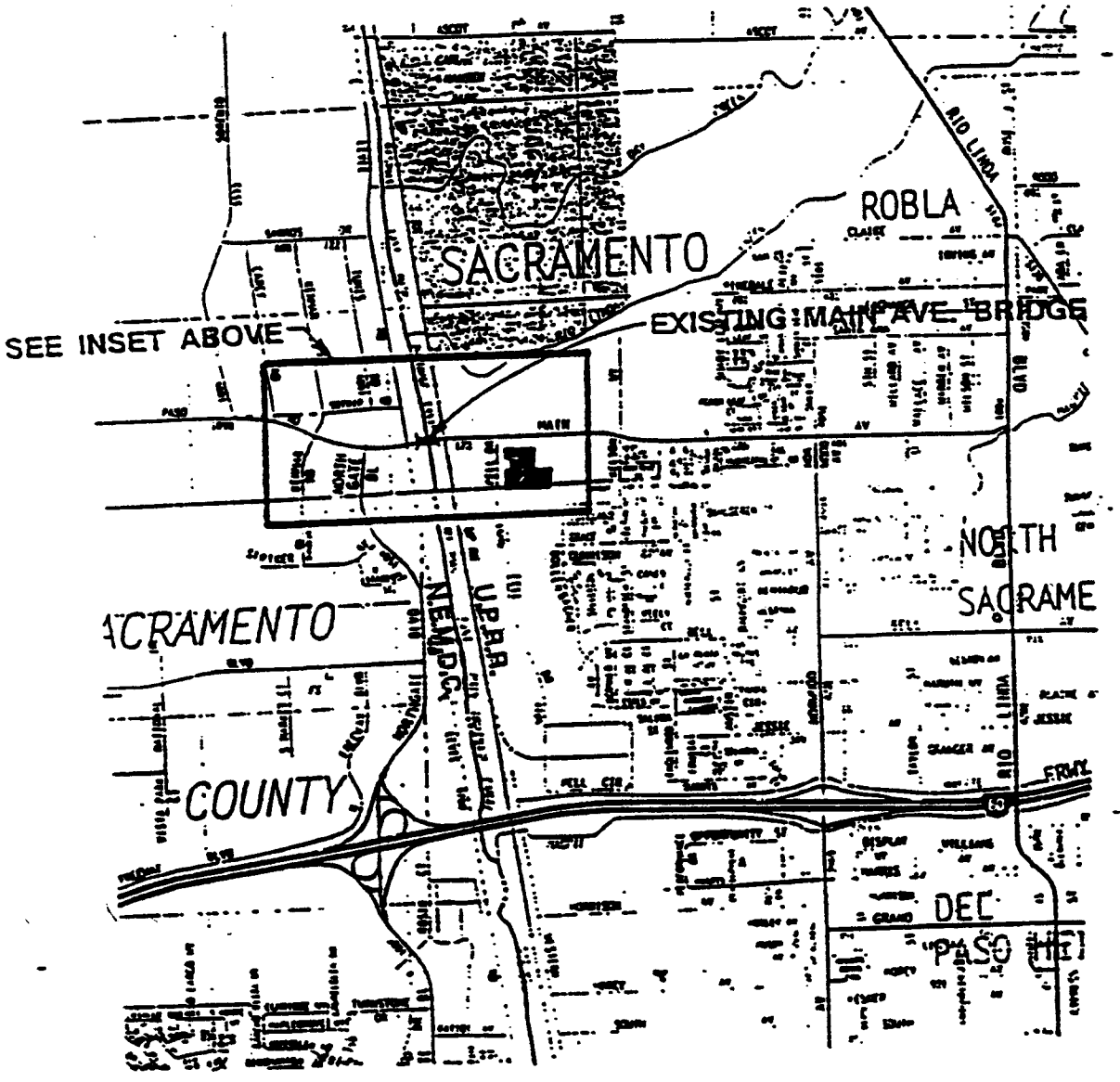
SAFCA LOCAL PROJECT

NATOMAS AREA FLOOD CONTROL

Parsons

Figure 2





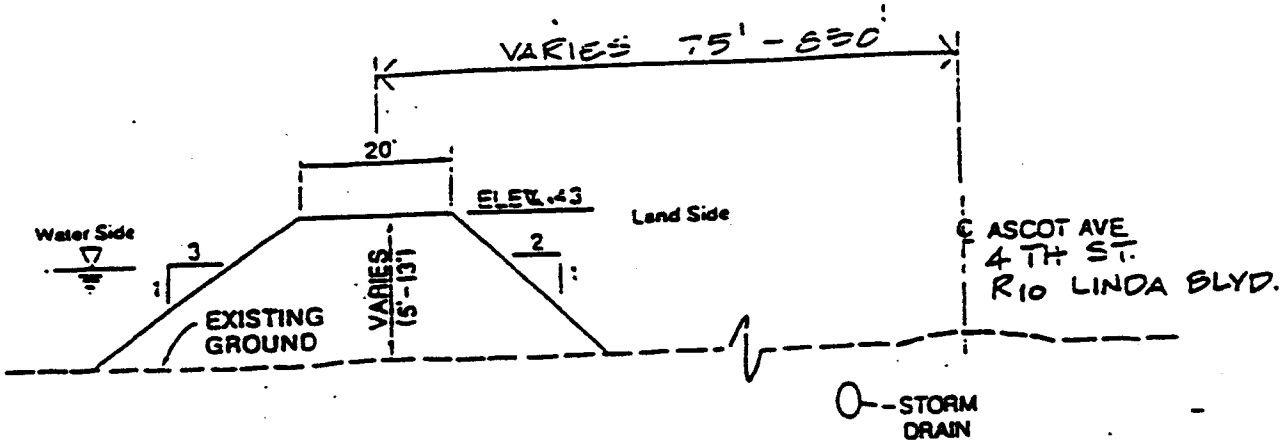
Parsons Brinckerhoff 100 YEARS

SAFCA LOCAL PROJECT

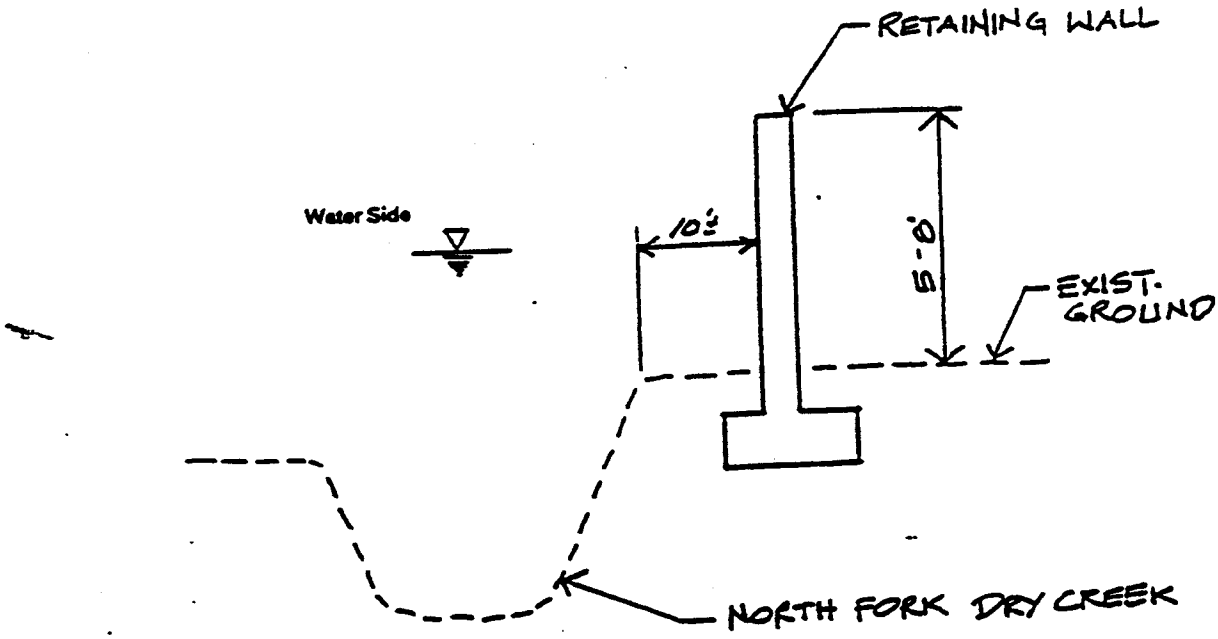
MAIN AVE. BRIDGE

VICINITY / LOCATION MAP

Figure 5

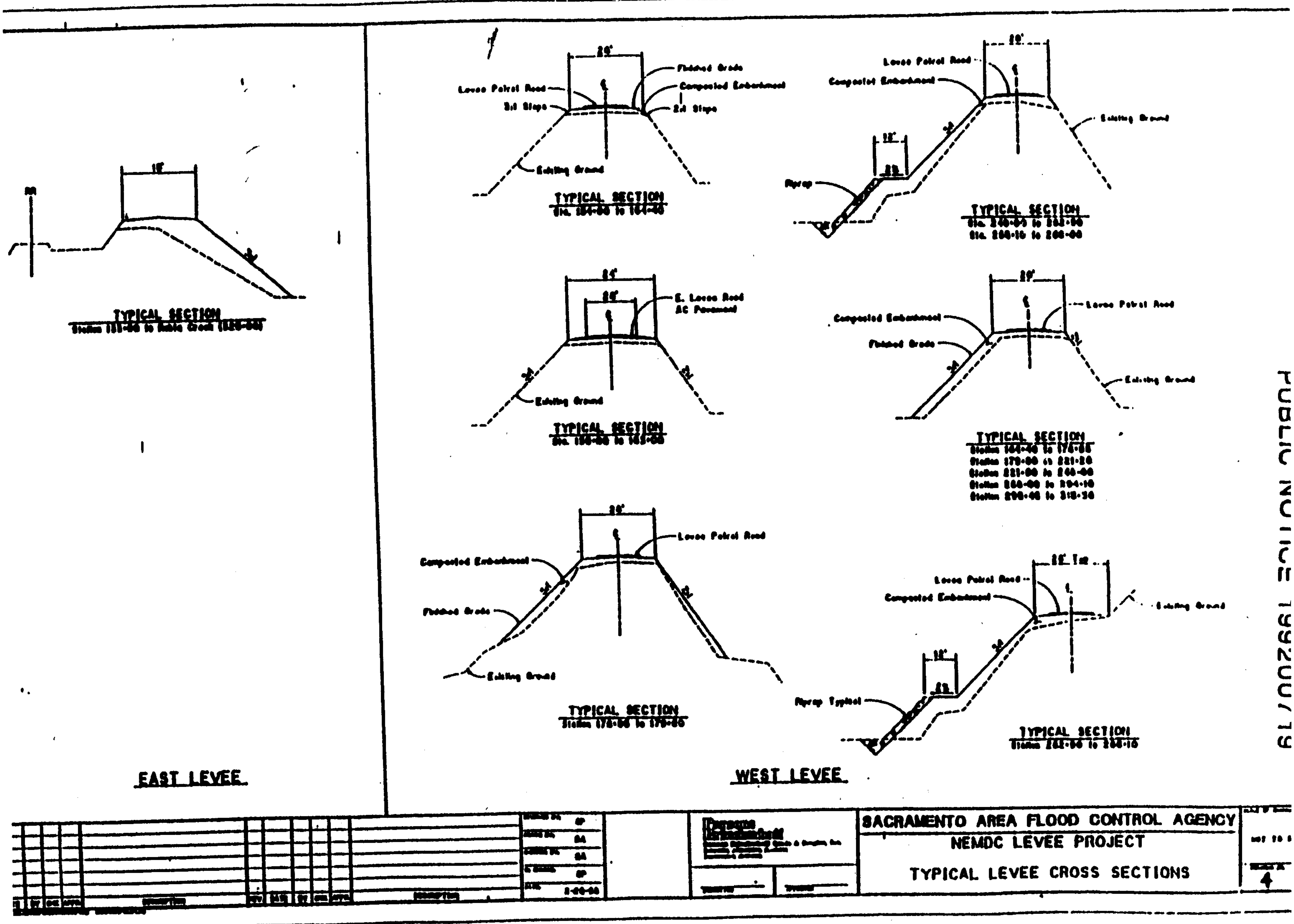


U.P.R.R. TO W. 2nd ST.

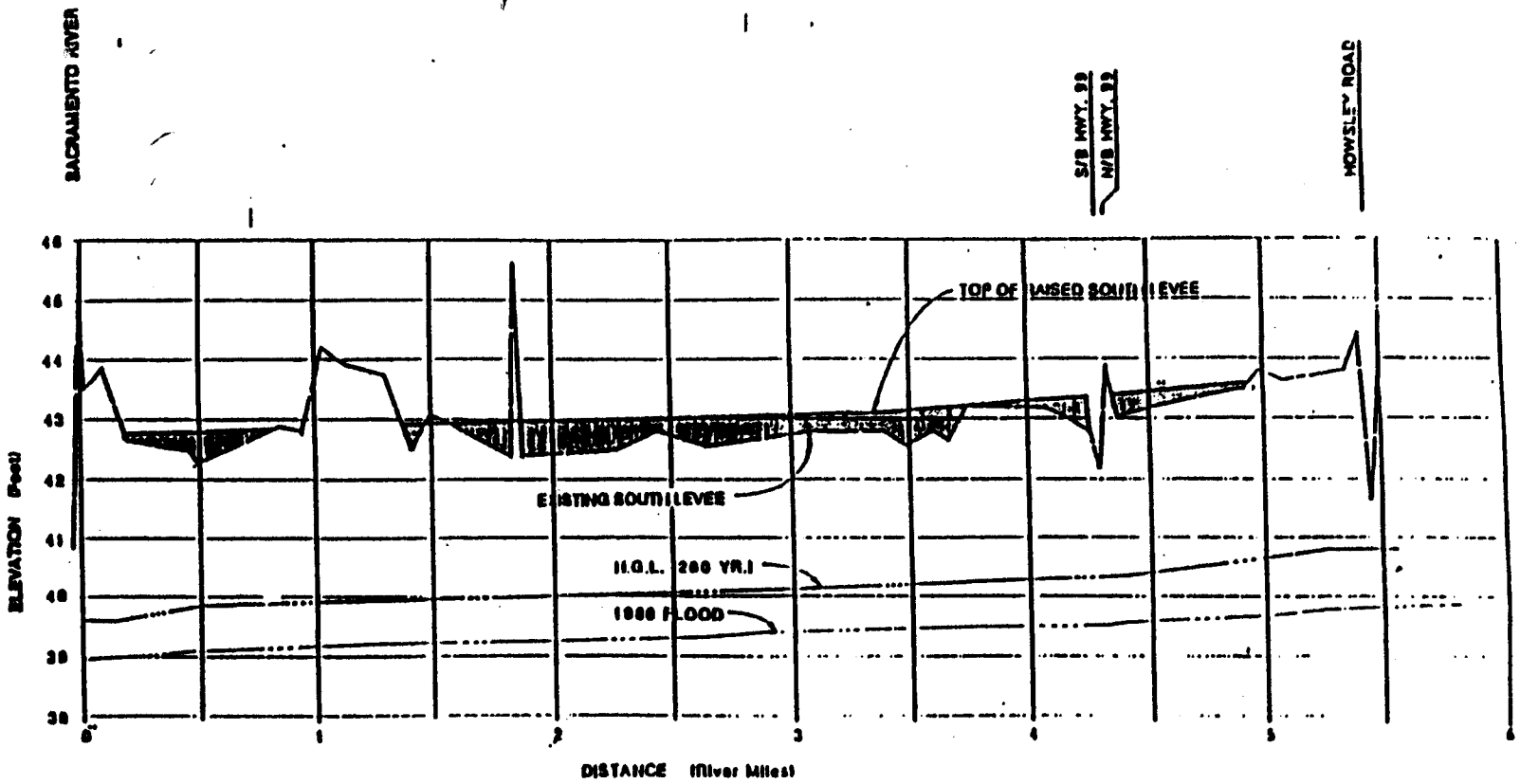


TYPICAL SECTION - DRY CREEK FLOOD WALL
STA. 73+20 TO 79+65
STA. 85+00 TO 89+25

Parsons Brinckerhoff 100 YEARS	SAFCA LOCAL PROJECT NORTH DRY CREEK LEVEE TYPICAL SECTIONS	Figure 12



PUBLIC NOTICE



SOURCE:

Topography is based on Corps of Engineers information contained in the American River Watershed Investigation, Interim Report, December 1991 and augmented by Field Surveys, conducted by Parsons Brinckerhoff Dec and Jan 1992

H.G.L. (200 YR) is based on Parsons Brinckerhoff hydraulic analysis using COE adopted flows

PUBLIC NOTICE 19920719

Parsons Brinckerhoff Quade & Douglas, Inc.		SACRAMENTO LOCAL PROJECT NATOMAS CROSS CANAL SOUTH LEVEE MODIFICATIONS	SHEET 21

STATE OF CALIFORNIA—THE RESOURCES AGENCY

PETE WILSON, Governor

DEPARTMENT OF FISH AND GAME
REGION 2
1701 NIMBUS ROAD, SUITE A
RANCHO CORDOVA, CA 95670

(916) 355-7020

May 3, 1995

Colonel John N. Reese
District Engineer
US Army Corps of Engineers
1325 J Street
Sacramento, California 95814

Dear Colonel Reese:

The Department of Fish and Game recently received a copy of a letter from Mr. Butch Hodgkins of the Sacramento Area Flood Control Agency (SAFCA) regarding Permit No. 199200719 with a request for changes to two of the conditions.

These changes would require that the Habitat Conservation Plan (HCP) be completed and approved prior to the completion of the construction of the pump station rather than prior to commencement of construction. The original requirement was designed to facilitate the expeditious preparation of the HCP so that the indirect effects of the flood control project would be mitigated.

At this point in time, we would ask that you postpone your decision on this request. Currently, SAFCA, the City of Sacramento, and Sacramento and Sutter counties are expected to approve submittal of the HCP on July 18, 1995, prior to August when SAFCA needs to award the contract for the pump station. While we fully expect the HCP to be submitted on July 18, there has been some opposition to the overall concept of an HCP by some members of the public.

Our recommendation regarding the request for changes in the permit condition will depend, in part, on the actions by the various boards and councils on July 18. This delay in a decision should not prejudice SAFCA's proposed project because the contract wouldn't be awarded until August and it will allow us to better gauge the likelihood of success in the efforts to prepare an HCP.

If you have any questions, please contact myself at (916) 355-0922, or Ms. Cindy Chadwick, Environmental Services Supervisor, at (916) 355-0267.

Sincerely,

for L. Ryan Broddrick
Regional Manager

cc: Ms. Cindy Chadwick
Department of Fish and Game
Rancho Cordova, California

Mr. Wayne White
U.S. Fish and Wildlife Service
2800 Cottage Way, Room E-1803
Sacramento, California 95825

Mr. Butch Hodgkins
Sacramento Area Flood
Control Agency
926 J Street, Suite 424
Sacramento, California 95816

Copy Furnished:

U.S. Fish and Wildlife Service, Attn: Joel Medlin, 2800 Cottage Way, Room E-1803, Sacramento, California 95825
The Honorable Vic Fazio, Representative in Congress, 3rd District, California, 2113 Rayburn, Post Office Building, Washington, D.C. 20515
The Honorable Robert T. Matsui, Representative in Congress, 5th District, California, 2311 Rayburn, Post Office Building, Washington, D.C. 20515
The Honorable John T. Doolittle, Representative in Congress, 4th District, California, 2130 Professional Drive, Suite 190, Roseville, California 95661
The Honorable Richard W. Pombo, Representative in Congress, 11th District, California, 1519 Longworth, House Office Building, Washington, D.C. 20515
The Bohl Corporation, Attn: John A. Bohl, 1330 "Q" Street, Sacramento, California 95814
Law Offices Of Gregory D. Thatch, Attn: Gregory D. Thatch, 1730 I Street, Suite 220, Sacramento, California 95814

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA 95814-2922

REPLY TO
ATTENTION OF

May 5, 1995

Regulatory Branch (199200719)

F.I. Hodgkins, Executive Director
Sacramento Area Flood Control Agency
926 J Street, Suite 424
Sacramento, California 95814

Dear Mr. Hodgkins:

In response to your letter of April 19, 1995, we have modified Special Conditions i, j, and l of Department of the Army Permit number 199200719. These conditions have been modified as follows:

For purposes of these three conditions "complete construction" shall mean the placement of the embankment from the pump station east to the Union Pacific railroad tracks.

i. Prior to completing construction on the pump station north of Dry Creek, a Historic Property Treatment Plan (HPTP) shall be developed and approved in accordance with the Programmatic Agreement Among the Corps of Engineers, Bureau of Reclamation, California State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding implementation of the American River Watershed Project.

j. Prior to completing construction on the pump station north of Dry Creek, the permittee shall develop a Natomas Basin Habitat Management Plan (Plan). This Plan shall provide the framework within which a mitigation program for the effects of development within the Natomas floodplain will proceed. The framework shall be incorporated into future planning processes by State, local, and Federal authorities as development reaches the appropriate planning stages. The plan shall: ensure that the development within the Natomas floodplain complies with applicable Federal, State and local laws and regulations, including the Endangered Species Act and the Clean Water Act; identify at a conceptual level, appropriate and practicable mitigation measures that may be contemplated under Federal, State, and local laws pertaining to future development; and describe the mechanism to be used for the long-term management and protection of any mitigation lands.

The Plan shall be developed by the permittee in coordination with the on-going Corps of Engineers activities for the American River Watershed Investigation. The Plan, including its development, shall be coordinated with the Corps, the U.S. Fish and Wildlife Service, the Environmental Protection Agency, and other Federal, State, and local agencies having interest, expertise and jurisdiction over the Natomas floodplain.

The District Engineer will verify that the Final Plan is in compliance with this condition before completing construction on the pump station. The final Plan shall be incorporated by reference as a condition of this permit. Enforcement of mitigation requirements of State and local land use agencies shall be the responsibility of the applicable State or local agency.

1. The permit applicant shall not complete construction on the pumping station along the East Main Drain or otherwise complete the proposed project by providing 100-year flood protection for the lower American Basin until the Service first issues an incidental take permit and associated implementing agreement pursuant to Section 10(a)(1)(b) of the Act to the City and County of Sacramento, Sutter County and any other parties necessary to guarantee the successful implementation of a habitat conservation plan for the giant garter snake resident in the American Basin. This plan shall be compatible with and a component of the multispecies habitat management plan otherwise required by the Department of the Army as a condition of permit authorization.

All other conditions of the permit remain in full force and effect.

If you have any questions, please write to Tom Cavanaugh, Room 1444, or telephone (916) 557-5261.

Sincerely,

John N. Reese
Colonel, Corps of Engineers
District Engineer

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Sacramento Field Office
2800 Cottage Way, Room E-1803
Sacramento, California 95825-1846

IN REPLY REFER TO:

In Reply Refer To:
1-1-95-I-900

May 19, 1995

Colonel John Reese
District Engineer
U.S. Army Corps of Engineers
1325 J Street
Sacramento, California 95814-2922

Subject: Endangered Species Act Consultation on the Revised Natomas Area Flood Control Improvement Project (PN 199200719, 1-1-94-F-13) in Sacramento and Sutter Counties, California

Dear Colonel Reese:

This letter is in response to the April 19, 1995, letter from the Sacramento Area Flood Control Agency to your office regarding modifications to the above mentioned Army Corps of Engineers (Corps) permit, and your May 5, 1995, response. At issue are similar provisions of the Corps permit and the March 11, 1994, biological opinion prepared pursuant to section 7 of the Endangered Species Act of 1973, as amended (Act), requiring that construction of the pumping station along the East Main Drain not be initiated until the applicants obtain a permit pursuant to section 10(a)(1)(B) of the Act. Since issuance of the biological opinion, the applicants have made substantial progress toward completing the section 10(a)(1)(B) process. To date, the applicants have submitted a draft Habitat Conservation Plan (HCP) that my staff has reviewed. We have determined that, with minor additions to provide clarification, this draft will be acceptable in principle. At this time my staff is working with the applicants to complete the HCP process.

It has come to our attention, however, that to meet timing needs, the applicants must initiate construction on the pumping station prior to completion of the section 10(a)(1)(B) process. To aid the local community in this matter, we are modifying term and condition 2) of the biological opinion to read as follows:

> The Sacramento Area Flood Control Agency shall not commence construction of the pumping station along the East Main Drain until it and any other necessary parties have submitted to the Service an application for an incidental take permit pursuant to section 10(a)(1)(B) of the Act accompanied by an Habitat Conservation Plan and Implementing Agreement for the giant garter snake that have been conceptually agreed to by the Service. This plan will be compatible with and a component of the multi-species habitat management plan otherwise required by the Corps as a condition of permit authorization. The permit applicants shall not complete construction of the pumping station or otherwise complete the proposed project until the Service issues the subject section 10(a)(1)(B) permit. For purposes of this condition, "complete construction" shall mean the placement of the embankment from the pump station east to the Union Pacific railroad tracks.

This modification will allow the applicants to initiate construction activities, thus alleviating their concerns.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Sacramento Field Office
2800 Cottage Way, Room E-1803
Sacramento, California 95825-1846

In Reply Refer To:
1-1-94-F-13

March 11, 1994

District Engineer
U.S. Army Corps of Engineers
Regulatory Branch (Attention: Tom Kavanaugh)
1325 J Street
Sacramento, California 95814-2922

Subject: Endangered Species Act Consultation on the Revised Natomas Area Flood Control Improvement Project (PN 199200719) in Sacramento and Sutter Counties, California

Dear Sir:

This responds to your request of January 21, 1994, for initiation of formal consultation pursuant to section 7 of the Endangered Species Act of 1973, as amended (Act), on the proposed provision of 200-year flood protection for the lower American Basin. Your request was received by the U.S. Fish and Wildlife Service (Service) on January 25, 1994. At issue are the effects of the proposed project on the giant garter snake (*Thamnophis gigas*), listed as a threatened species by the State and Federal governments.

This biological opinion is based on the public notice for this project, numerous environmental documents prepared under the National Environmental Policy Act and California Envnironmental Quality Act, and other scientific and commercial information in Service files.

Biological Opinion

It is our biological opinion that the proposed Revised Natomas Area Flood Control Improvement Project, together with the five proposed permit conditions described in the Corps' letter dated January 21, 1994, is not likely to jeopardize the continued existence of the giant garter snake. Critical habitat has not been designated for this species; therefore, none will be adversely modified or destroyed.

Description of the Proposed Action

Please refer to the public notice (PN 199200719) for a description of the construction related details of the proposed project. In brief, the Sacramento Area Flood Control Agency (SAFCA) proposes to improve levee systems needed to provide 200-year flood protection to the 55,000-acre lower American

(Natomas) Basin. Your January 21, 1994, request for consultation included a list of five special conditions proposed for inclusion as part of any permit issued for the proposed project--three conditions designed to avoid, minimize, and offset the direct effects of project construction on the garter snake, and two conditions that would offset the indirect effects of the proposed flood control project. By mutual agreement, the Corps and Service consider these permit conditions to be part of the project proposal. Please refer to the Incidental Take section below for more details on conditional language to be included in any Department of the Army authorization of the proposed project.

To avoid, minimize, and offset the direct effects of the proposed project on the giant garter snake, the Corps proposed three permit conditions to supplement the applicant's proposed Wetland Mitigation Plan, dated June 1993. These three permit conditions, as described by letter dated January 21, 1994, would (1) require preconstruction surveys for the giant garter snake, (2) include measures to minimize the extent of incidental take, and (3) compensate for any direct losses of giant garter snake habitat. To address indirect effects of the proposed project, the Corps also proposed (in the same letter) to require (4) completion of a habitat management plan prior to start of construction of the proposed pumping station, per direction of the Assistant Secretary of the Army (Civil Works), that addresses mitigation requirements for the giant garter snake, and (5) inclusion of a habitat management plan and signed agreement among the City of Sacramento, Sacramento and Sutter counties, and the Service, to guarantee implementation of the plan. Relative to items #1 and 2 above, the permit applicant, by letter dated February 3, 1994, submitted a proposed plan to avoid direct effects of project construction on the giant garter snake. This plan will be modified and approved by the Service per requirements described in the Incidental Take section below.

Species Account/Environmental Baseline

Please refer to the October 20, 1993, Federal Register notice (58 FR 54053-54066) listing the giant garter snake as a threatened species, for detailed information on the biology/ecology of the species. One of the largest garter snakes, reaching a total length of at least 64 inches, this highly aquatic species feeds exclusively on small fishes, tadpoles, and frogs. The giant garter snake inhabits small mammal burrows and other soil orifices above prevailing flood elevations throughout its winter dormancy period (November to mid-March). The breeding season commences immediately upon emergence in the spring, extending through March and April; females give birth to live young from late July through early September (Hansen and Hansen 1990). Brood size is variable, ranging from 10 to 46 young, with a mean of 23.1 (n=19) (*ibid.*). Although growth rates are variable, young typically more than double in size by one year of age (*ibid.*). Sexual maturity averages 3 years of age in males and 5 years for females (*ibid.*).

The giant garter snake is endemic to valley floor emergent marshes in the Central Valley, historically distributed throughout the large flood basins from the former Buena Vista lakebed in Kern County northward to the Butte Basin. Reclamation of wetlands for agriculture and flood control have resulted in severe habitat fragmentation, to the extent that wetland habitats with natural hydrologic and vegetative characteristics effectively have been eliminated throughout the entire range of the species. The remaining giant garter snake populations identified since the mid-1970s are clustered in 13

distinct areas that largely coincide with historical riverine flood basins and tributary streams (Hinds 1952, Brode and Hansen 1992). In agricultural areas (predominantly rice), giant garter snakes primarily occur along water delivery and drainage canals. Nine of the remaining 13 regional populations occur discontinuously in typically small, isolated patches of valley floor habitat that support few individuals due to limited extent and quality of suitable habitat (Hansen 1988). These nine populations, encompassing about 75 percent of the species' current geographic range, are vulnerable to extinction at any time from anthropogenic causes, as well as stochastic (random) environmental, demographic, and genetic processes. Despite repeated censusing, giant garter snakes have not been observed throughout the San Joaquin Valley since the mid-1970's. Considering the urbanization threats to the American Basin population portended by the proposed project, 10 of the 13 (77 percent) extant populations are imminently imperiled.

The American Basin supports the largest extant giant garter snake population (Broda and Hansen 1992). Throughout this area, reconnaissance level surveys (USFWS 1991) indicate that about 1,400 acres of giant garter snake habitat exist in the form of man-made irrigation and drainage canals, as well as an undetermined acreage of suitable habitat within nearly 13,000 acres of adjoining rice fields. The giant garter snake also uses an undetermined amount of habitat at higher elevations to escape from winter flooding during the inactive winter phase of the snake's life cycle.

Effects of the Proposed Action

Direct Effects

The proposed levee improvement work could directly affect giant garter snakes if they occur along the reaches specified for upgrading. The applicant proposes to conduct field surveys to determine if suitable habitat and the species occur in any of the proposed work areas. If giant garter snakes are found, construction will be scheduled to avoid the period between October 1 to May 1, thereby precluding the likelihood of impacting snakes while dormant underground. Levee construction will predominantly occur along levee tops and banks, areas seldom used by this highly aquatic species during its active season. Therefore, death or injury from construction activities during the summer along levee banks and slopes is unlikely because snakes center their activities in aquatic habitats at this time.

Nonetheless, as currently formulated, the proposed levee improvements do not address the possibility of eliminating terrestrial retreat habitat during the summer while garter snakes are restricted largely to aquatic habitats. Under this scenario, terrestrial retreat habitat may become a limiting factor to any garter snakes inhabiting project reaches scheduled for levee improvement. However, it is likely that small mammals and other processes that create soil holes and fissures will relatively quickly reestablish any terrestrial retreat habitat lost due to project construction.

Indirect Effects

The proposed flood control project would provide 200-year flood protection for the 55,000-acre lower American Basin. This area currently consists 7,140 of acres of urban land uses and 47,742 acres of agricultural lands. The draft

and final Environmental Impact Statement (EIS) for the American River Watershed Investigation (U.S. Army Corps of Engineers 1991) and Environmental Impact Report (EIR) for the Revised Natomas Area Flood Control Improvement Project (SAFCA 1993) defined this 55,000-acre basin as the project area. Both documents acknowledged that flood control would result in intensive urbanization of the Basin throughout the foreseeable future. In addition, various City and County plans identify proposed development for the region, to wit: draft EIR for the Sutter Bay Village Specific Plan and Golf Course Residential (Sutter County 1992); draft EIR for the Metropolitan Airport/Vicinity Special Planning Area General Plan Amendment and Rezone No. 89-GPB-ZOB-0781 (Sacramento County 1992); North Natomas Community Plan (City of Sacramento 1993); draft and final EIR's for the South Sutter County General Plan Amendment (Sutter County 1991, 1992). These documents establish a clear link between the proposed flood protection and resulting flood plain development. For example, the North Natomas Community Plan acknowledges that further development is precluded until the proposed flood control project is constructed. The Sutter Bay Village Specific Plan states that "[u]ltimate approval of the proposed project (Sutter Bay) is dependent on the eventual approval of a regional flood control project, which is being proposed by the Sacramento Area Flood Control Agency, the Army Corps of Engineers, and the State Reclamation Board." Moreover, Joe Serna, Mayor of the City of Sacramento, stated at a September 16, 1993, meeting of the Floodplain Management Association, that "the decision already has been made in Natomas, we're going to develop it" (Sacramento Bee, 9/17/93).

Absent measures to address the prospect of future basin-wide losses of existing giant garter snake habitat, this flood control project and consequent urban development could extirpate the giant garter snake from the American Basin [California Department of Fish and Game (CDFG) 1992, Brode and Hansen 1992)]. The North Natomas Community Drainage System and associated urban development, proposed by the City of Sacramento, would affect about 26 miles of giant garter snake habitat along existing canals and ditches, and additional rice field habitat (*ibid.*). Potential effectiveness of a proposed mitigation plan remains undetermined. The proposed Sutter Bay project, at the north end of the American Basin, could eliminate and/or degrade about 42 miles of suitable canals (*ibid.*) and thousands of acres of associated rice fields and giant garter snake habitat. The proposed South Sutter Industrial Center, located near the Sutter Bay project, could eliminate another 9.0 miles of aquatic habitat and associated rice fields. The Metro Air Park is proposing about 1,890 acres of development on agricultural and vacant lands that potentially could result in major adverse impacts to the species, including the loss of about 9.0 miles of canal habitat and 1,500 acres of rice fields, as well as the disruption of movement corridors (*ibid.*). Roadway improvement and construction projects, or the planned extension of the Sacramento Regional Transit system in this area, also increases the likelihood for major impacts to the species, including elevated mortality from increased traffic on local roads and highways (*ibid.*). Numerous species of aquatic snakes are vulnerable to roadway mortality (Bernardino *et al.* 1992). Giant garter snakes also are killed and injured by vehicular traffic, as evinced by numerous observations (Sacramento County 1992; G. Hansen, pers. comm., 1992; J. Brode, pers. comm., 1992); of the cumulative total of 1,056 giant garter snake records compiled by G. Hansen over his many years of study, 76 (7.2 percent) were road kills (G. Hansen, pers. comm., 1992).

With nine of the twelve other extant populations on the verge of extinction throughout 75 percent of the current range of the species, including the entire San Joaquin Valley (see Species Account/Environmental Baseline), survival of the species cannot be assured by the additional loss or degradation of the largest remaining population. Because of the severe, declining trends in habitat suitability/availability and population levels throughout 75 percent of the range of the species, the Service concludes that the maintenance of a viable giant garter snake population in the American Basin is vital to the survival of the species.

To address the prospective habitat losses of the proposed project to the American Basin population, the Corps has proposed, by letter dated January 21, 1994, a special permit condition that would establish a multispecies habitat management plan for the 55,000-acre lower American Basin, scheduled for completion prior to the start of construction of the proposed pumping station. An element of this habitat management plan would include an agreement among local governments and the Service that guarantees the conservation needs of the giant garter snake. Based on ongoing habitat conservation planning discussions with representatives of the applicant, Corps, CDFG, and landowners, this agreement, at the Federal level, will take the form of an incidental take permit and implementing agreement issued by the Service under section 10(a)(1)(B) of the Act, and at the State level, a permit issued by the CDFG under section 2081 of the State Fish and Game Code.

This habitat management plan would provide certainty for the maintenance of a viable population in the American Basin if the proposed project is authorized. The Service, therefore, concludes that the proposed project is not expected to reduce appreciably the likelihood of the survival and recovery of the giant garter snake by adversely affecting reproduction, numbers, and distribution of the species.

Cumulative Effects

Cumulative effects are those effects of future non-Federal (State and local governments, or private) activities on endangered and threatened species or critical habitat that are reasonably certain to occur during the course of the Federal activity subject to consultation. Future Federal actions are subject to the consultation requirements established in section 7 and, therefore, are not considered cumulative to the proposed action.

Various farming and canal maintenance practices adversely affect most remaining giant garter snake populations (58 FR 54063). For example, sodium sulfate and selenium contamination throughout most of the Grasslands region of the San Joaquin Valley has been documented to adversely affect giant garter snake prey species and overall habitat quality (USFWS file information). In addition, acrolein (Magnacide H) is commonly used as a herbicide in irrigation and drainage canals throughout much of the range of the giant garter snake. This compound, when used at levels needed to control target plant species, is toxic to virtually all aquatic vertebrates (CDFG and USFWS file information). Livestock grazing is known to be contributing to the elimination and degradation of available habitat at four populations (58 FR 54061).

Cumulative effects together with the impacts of the proposed project are not likely to reduce appreciably the likelihood of the survival and recovery of the giant garter snake.

Incidental Take

Sections 4(d) and 9 of the Act, as amended, prohibit any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without special exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as actions that create the likelihood of injury to such an extent as to significantly disrupt normal behavioral patterns that include but are not limited to breeding, feeding, or sheltering.

Under the terms of §7(b)(4) and §7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such take is in compliance with this incidental take statement. The measures described below are nondiscretionary and must be undertaken by the agency so that they become binding conditions of any permit issued to the applicant for the exemption in §7(o)(2) to apply. The Federal agency has a continuing duty to regulate the activity that is covered by this incidental take statement. If the agency fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit, the protective coverage of §7(o)(2) may lapse.

The Service anticipates that an unquatified amount of potential giant garter snake habitat could be lost during construction of the proposed levee improvements. Surveys have not been conducted to determine the extent, if any, of giant garter snake habitat within the project reaches proposed for improvement. The Corps and applicant propose preconstruction surveys to obtain the information needed to design and schedule the project so that impacts can be avoided and minimized to the extent possible. The Service also anticipates that an unquantifiable amount of giant garter snake habitat would be eliminated by future commercial development over the next ±50 years throughout much of the lower American Basin consequent to the provision of the proposed flood protection.

The Service establishes the following reasonable and prudent measures to minimize the impact of take. The measures below are nondiscretionary and must be undertaken by the Corps:

1) Construction related disturbance to the giant garter snake shall be minimized.

2) A conservation plan to address indirect effects of the proposed project shall be approved by the Service prior to the start of construction on the pumping station.

To be exempt from the prohibitions of section 9 of the Act, the following terms and conditions, which implement the reasonable and prudent measures described above, must be complied with in their entirety and included as

special conditions in any Department of the Army permit issued for the proposed project:

1) The applicant shall prepare and implement a plan for avoiding and minimizing construction related impacts to the giant garter snake. The plan shall be submitted to the Corps and Service for review and approval prior to the start of project construction.

2) The permit applicant shall not begin construction on the pumping station along the East Main Drain or otherwise complete the proposed project by providing 100-year flood protection for the lower American Basin until the Service first issues an incidental take permit and associated implementing agreement pursuant to §10(a)(1)(B) of the Act to the City and County of Sacramento, Sutter County, and any other parties necessary to guarantee the successful implementation of a habitat conservation plan for the giant garter snake population resident within the American Basin. This plan shall be compatible with and a component of the multispecies habitat management plan otherwise required by the Department of the Army as a condition of permit authorization.

Pursuant to 50 CFR §402.14(i)(4), if during the course of the action the amount or extent of incidental taking is exceeded, the causative action must cease and the Corps must reinitiate consultation immediately with the Service to avoid violation of section 9 of the Act.

Reporting Requirements: The Service shall be notified immediately of any information about take or suspected take of giant garter snakes associated with project construction and implementation of the habitat conservation plan for the giant garter snake. Upon locating a dead, injured, or sick giant garter snake specimen, the Corps, permittee, and/or contractors must immediately notify the Service within 3 working days of any such information. Notification must include the date, time, and precise location of the incident/specimen, and any other pertinent information. The Service contact for this information is the Field Supervisor at 916/978-4866. Care shall be taken in handling sick or injured specimens to ensure effective treatment and care and in handling dead specimens to preserve biological material in the best possible state for later analysis of cause of death. The finder and handler of any such animals has the responsibility to ensure that evidence intrinsic to the specimen is not unnecessarily disturbed. Injured animals or specimens shall be delivered to the Service's Division of Law Enforcement at 2800 Cottage Way, Sacramento, California 95825-1846 (916/978-4861).

This concludes formal consultation on the project as described above. Reinitiation of formal consultation is required if (1) the amount or extent of incidental take is exceeded, as previously described, or the requirements under the Incidental Take section are not implemented, (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent that was not considered in this opinion, (3) the proposed action is subsequently modified in a manner that causes an effect to the giant garter snake that was not considered in this opinion, and/or (4) a new species is listed or critical habitat is designated that may be affected by the action.

The 404 permit expressly incorporates the decision by the Assistant Secretary of the Army (Civil Works), and the biological opinion including accompanying terms and conditions of the incidental take statement provided by the Service. Your May 5, 1995, letter purports to modify the 404 permit in a manner inconsistent with the decision rendered by the Assistant Secretary and the terms and conditions of the biological opinion or the modified language set out above. Consequently, the Service recommends that the Corps either modify the Corps permit conditions to be consistent with the above modified term and condition of biological opinion 1-1-94-F-13, or that we meet at your earliest convenience to resolve this issue.

The Corps also should be aware that the Service is currently working with local entities to develop a procedure that will allow the completion of the proposed flood control project prior to the issuance of a section 10(a)(1)(B) permit. We welcome your participation in these discussions. If you have any questions, please contact Mr Joel Medlin, Field Supervisor, Sacramento Field Office at (916) 979-2710.

Sincerely,

Wayne S. White
State Supervisor

Literature Cited

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IMPLEMENTATION AGREEMENT FOR THE

NATOMAS BASIN HABITAT CONSERVATION PLAN

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LIST OF EXHIBITS

IMPLEMENTATION AGREEMENT FOR THE NATOMAS BASIN HABITAT CONSERVATION PLAN

THIS IMPLEMENTATION AGREEMENT FOR THE NATOMAS BASIN HABITAT CONSERVATION PLAN is entered into as of the _____ day of _____, 2003 by and among the UNITED STATES FISH AND WILDLIFE SERVICE, an agency of the Department of the Interior of the United States of America ("USFWS"), the CALIFORNIA DEPARTMENT OF FISH AND GAME, a subdivision of the Resources Agency of the State of California ("CDFG"), the CITY OF SACRAMENTO, a chartered city ("CITY"), the COUNTY OF SUTTER ("SUTTER"), a political subdivision of the State of California, and The Natomas Basin Conservancy, Inc. ("TNBC", or "Conservancy"), a California nonprofit public benefit corporation, (hereafter collectively referred to as "Parties"). The CITY, SUTTER and TNBC are hereafter also referred to collectively as "Permittees" and each is individually referred to as "Permittee."

1. RECITALS AND PURPOSES

The Parties have entered into this Agreement in consideration of the following facts and assumptions, intentions and expectations:

1.1 Purpose. This Implementation Agreement ("Agreement") describes the mechanisms for implementation of the Natomas Basin Habitat Conservation Plan ("NBHCP" or "Plan") a cooperative federal, state and local program for the conservation of those plant and animal species listed on Exhibit D (collectively the "Covered Species") and their habitats in the Natomas Basin. The purposes of this Agreement are: a) to ensure the implementation of each of the terms of the NBHCP; b) to describe remedies and recourse should any party fail to perform its obligations as set forth in this agreement; and c) to provide assurances to the Permittees that as long as the terms of the NBHCP are properly implemented, no additional mitigation will be required of them except as provided for in this Agreement or required by law. This Agreement also establishes terms and conditions that support issuance of Permits by the USFWS under Section 10(a)(1)(B) of the Endangered Species Act ("ESA") and CDFG under Section 2081 of the California Fish and Game Code to allow the taking of the Covered Species within the Permit Area a) by the CITY and SUTTER, and third persons under the CITY's and SUTTER's direct control, incidental to Authorized Development and b) by TNBC, and third persons under TNBC's direct control, incidental to management activities for a period of fifty (50) years.

1.2 Parties' Intent. The intent of the Parties, in addition to the purposes set forth above, is that a comprehensive conservation program be established, and be implemented under the auspices of TNBC for the conservation of the Covered Species and their habitats, to provide an opportunity for individual Authorized Development project proponents to obtain incidental take authorization, through CITY's and SUTTER's Take Permits, for a broad array of Covered Species under the ESA and CESA including both currently listed species and species that may be listed in the future; to minimize the review of individual projects by the USFWS and CDFG; and to standardize take mitigation and onsite take avoidance and minimization measures for projects covered by the NBHCP.

1.3 Coordination. The NBHCP will be implemented by the Parties through execution of this Agreement, subject to and in accordance with the Permits.

1.4 Habitat. The Covered Species may use or inhabit portions of the Natomas Basin area which is situated northeasterly of the confluence of the American River and Sacramento River. Consequently, Planned Development of 17,500 acres, including CITY and SUTTER Authorized Development and Metro Air Park's 1,983 acres of authorized development, related infrastructure, and government public works planned in this area over the next fifty (50) years may result in a loss

of habitat and takings of the Covered Species, incidental to the normal course of this Planned Development.

1.5 Mitigation. Implementation of the NBHCP through this Agreement is intended to avoid, minimize and mitigate to the maximum extent practicable, and minimize and fully mitigate, the individual and cumulative impacts of take of Covered Species resulting from Authorized Development within the CITY's and SUTTER's respective Permit Areas in the Natomas Basin. All required mitigation is specified in the NBHCP.

1.6 Integrity and Viability of NBHCP. While the NBHCP was developed as a comprehensive multi-species habitat conservation plan to avoid, minimize and mitigate for the expected loss of habitat values and incidental take of the Covered Species that could result from urban development, operation and maintenance of irrigation and drainage systems, and certain activities associated with TNBC management of its system of reserves within the Natomas Basin when it is fully implemented, the biological viability of the NBHCP is not compromised by the failure of other Potential Permittees to participate in the NBHCP and execute this Agreement. The mitigation strategies provided in the NBHCP are designed to allow for separate and independent implementation of NBHCP mitigation measures by CITY, SUTTER or other Potential Permittees, and may be adjusted under the terms of the Plan if fewer than all land use jurisdictions or other Potential Permittees participate, so that the NBHCP is viable and will minimize and mitigate the impacts associated with take of Covered Species resulting from Covered Activities carried out within the Natomas Basin by each Permittee, even if the Plan is not implemented by other Potential Permittees.

1.7 Reliance. In reliance upon this Agreement, CITY and SUTTER are making long range plans and financial investments in public infrastructure improvements necessary for the preservation of the public health, safety and welfare. Without the assurances identified in this Agreement, they would not enter into, support or approve any such plans or financial commitments.

1.8 Local Land Use Authority. The parties to this Agreement intend that nothing in the NBHCP or in this Agreement shall be interpreted to mean or operate in a manner that expressly or impliedly diminishes or restricts the local land use decision making authority of CITY or SUTTER, provided that the Parties acknowledge that should either CITY or SUTTER exercises its respective land use authority in a manner that conflicts with the terms of the NBHCP, this Agreement or the Permits, the Service and/or CDFG may suspend or revoke CITY's or SUTTER's Permits pursuant to Section 7.4 of this Agreement and applicable laws and regulations.

1.9 CITY, SUTTER and TNBC as Permittees. This Agreement also establishes the conditions under which the incidental take granted to CITY and SUTTER under their respective Permits will apply to landowners and developers within their respective Permit Areas in the Natomas Basin as of the Effective Date (as depicted on Exhibits B and C attached hereto and incorporated herein) in order to allow the taking of the Covered Species incidental to Authorized Development. TNBC's Permit will authorize incidental take of the Covered Species by TNBC anywhere within its Permit Area with respect to the management and other activities and responsibilities that TNBC or third parties under its control assumes on behalf of CITY and SUTTER under the NBHCP.

1.10 USFWS Authorities. USFWS is authorized to enter into this Agreement pursuant to the ESA (16 U.S.C. 1531 et seq.), the United States Fish and Wildlife Coordination Act (16 U.S.C. 661-666c) and the Fish and Wildlife Act of 1956 (16 U.S.C. 742(f) et seq.).

1.11 CDFG Authorities. CDFG is authorized to enter into this Agreement pursuant to CESA sections 2080 and 2081.

AGREEMENT

FOR AND IN CONSIDERATION of the recitals set forth above, which are incorporated by reference herein, the covenants set forth herein, and other considerations, the receipt and adequacy of which is hereby acknowledged, the Parties hereto agree as follows:

2 DEFINITIONS

Terms used in this Agreement with reference to the ESA shall have the same meaning as those same terms have under the ESA, or in regulations adopted by the USFWS, and terms used in this Agreement with reference to CESA, shall have the same meaning as those same terms have under CESA, or regulations adopted by CDFG. Capitalized terms used in this Agreement shall have the defined meanings specified in the NBHCP as attached hereto as Exhibit A and incorporated herein into this Agreement. Where additional terms are used in this Agreement, definitions are included within the applicable text. Any amendments to the definitions contained in this Agreement shall be deemed automatically to be amendments to the definitions contained in the NBHCP.

3 OBLIGATIONS OF THE PARTIES

3.1 CITY and SUTTER.

3.1.1 Limitation on Total Development in Natomas Basin and Individual Permit Areas. The NBHCP anticipates and analyzes a total of 17,500 acres of Planned Development in the Natomas Basin, 15,517 acres of which constitutes Authorized Development within CITY and SUTTER. (An additional 1,983 acres of development is allocated to the Metro Air Park project in Sacramento County under the Metro Air Park Habitat Conservation Plan and is analyzed within the NBHCP.) CITY agrees not to approve more than 8,050 acres of Authorized Development and to ensure that all Authorized Development is confined to CITY's Permit Area as depicted on Exhibit B to this Agreement). SUTTER agrees not to approve more than 7,467 acres of Authorized Development and to ensure that all Authorized Development is confined to SUTTER's Permit Area as depicted on Exhibit C to this Agreement). The Parties further agree:

(a) Because the effectiveness of the NBHCP's Operating Conservation Program is based upon CITY limiting total development to 8,050 acres within the CITY's Permit Area, and SUTTER limiting total development to 7,467 acres within SUTTER's Permit Area, approval by either CITY or SUTTER of future urban development within the Plan Area or outside of their respective Permit Areas would constitute a significant departure from the Plan's Operating Conservation Program. Thus, CITY and SUTTER further agree that in the event this future urban development should occur, prior to approval of any related rezoning or prezoning, such future urban development shall trigger a reevaluation of the Plan and Permits, a new effects analysis, potential amendments and/or revisions to the Plan and Permits, a separate conservation strategy and issuance of Incidental Take Permits to the permittee for that additional development, and/or possible suspension or revocation of CITY's or SUTTER's Permits in the event the CITY or SUTTER violate such limitations.

(b) For purposes of the NBHCP and this Agreement, CITY agrees that although the West Lakeside Annexation area is proposed by the landowners to be annexed to the CITY, this area currently is located within Sacramento County and is outside of the County's Urban Services Boundary and the City's Sphere of Influence, and it is not included in the 8,050 acres of Authorized Development or within the CITY's Permit Area. Thus, CITY agrees that in the event this annexation occurs, it shall, prior to approval of any rezoning or prezoning associated with such annexation, trigger a reevaluation of the Plan, a new effects analysis, potential amendments and/or revisions to the Plan and Permits, a separate conservation strategy and issuance of Incidental Take Permits to the City for that additional urban development, and/or possible

suspension or revocation of CITY's Permit in the event the CITY violates such limitations without completing such reevaluation, amendment, or revision or new conservation strategy for that additional urban development.

3.1.2 EXCLUSION OF DEVELOPMENT FROM SWAINSON's HAWK ZONE. With the exception of 252 acres included as Authorized Development by CITY in the NBHCP, the Parties agree that the CITY's and SUTTER's Permit Areas shall exclude a one mile wide strip of land adjacent to the Sacramento River within their respective jurisdictions known as the Swainson's Hawk Zone (SHZ). The Parties further agree as follows:

(a) CITY and SUTTER shall not approve any future urban development within their respective portions of the Swainson's Hawk Zone beyond the 252 acres of Authorized Development identified by CITY in the NBHCP.

(b) Within One Hundred and Eighty (180) days of the Effective Date, SUTTER shall initiate a General Plan Amendment to remove all land within SUTTER's portion of the Swainson's Hawk Zone from the Industrial/Commercial Reserve designation in the Sutter County General Plan and to redesignate such land for agricultural uses.

(c) Because the effectiveness of the NBHCP to adequately minimize and mitigate the effects of take of the Covered Species depends, in part, on the exclusion of urban development from both the CITY and SUTTER's portions of the Swainson's Hawk Zone, approval by either CITY or SUTTER of future urban development in the Swainson's Hawk Zone, except as otherwise explicitly allowed under the NBHCP, would constitute a significant departure from the Plan and would trigger a reevaluation of the Plan and Permits, a new effects analysis, potential amendments to the Plan and/or Permits, a separate conservation strategy and issuance of Incidental Take Permits to the permittee for that additional development, and/or possible suspension or revocation of CITY or SUTTER's Permits in the event CITY or SUTTER violate such restrictions.

3.1.3 Timing of Mitigation. CITY and SUTTER agree to comply with the NBHCP Chapter VI requirements applicable to the timing of acquisition of Mitigation Lands, including, but not limited to, the requirement to maintain a 200-acre cushion of Mitigation Lands, and other timing restrictions on approval of Authorized Development as provided in Sections 4 and 5 of this Agreement and Chapter VI of the NBHCP.

3.1.4 Baseline Map. CITY and SUTTER have prepared, and USFWS and CDFG have approved, the Baseline Maps set forth in Exhibits B and C, attached hereto and incorporated herein by this reference, which depict: (1) those land areas within their respective Permit Areas which are designated as "Exempt Area-Existing Development" and therefore not subject to the NBHCP, the Permits, or this Agreement; (2) those land areas designated as "Development Subject to 1997 HCP," within their respective Permit Areas for which Authorized Development projects have been approved between 1997 and 2002 and have been developed in compliance with the Mitigation Requirements of the NBHCP in effect in 1997; and (3) those undeveloped land areas designated as "Development Subject to 2002 HCP," within the Permit Areas which will be subject to the Mitigation Requirement of the NBHCP.

3.1.5 Restriction on Urban Development/Mitigation Alternatives. CITY and SUTTER shall not issue any Urban Development Permit for any Authorized Development project on a parcel of land in their respective Permit Areas, outside of those areas depicted as "Exempt Area-Existing Development" on the Baseline Map, unless the Authorized Development project proponent has satisfied the Mitigation Requirement specified in Chapters IV through VI of the NBHCP.

3.1.6 Determination of Compliance. CITY and SUTTER shall ensure that an Authorized Development project proponent has complied with the Mitigation Requirements of Chapters IV through VI of the NBHCP prior to issuing an Urban Development Permit for the Authorized Development project.

3.1.7 Urban Development Permit Conditions. CITY and SUTTER shall include in any Urban Development Permit the on-site Take avoidance, minimization and mitigation measures specified in Chapter V of the NBHCP (the "Conservation Measures") to reduce or eliminate to the extent feasible, the direct and indirect impacts of Authorized Development on the Covered Species and shall include in such Urban Development Permit notice of the need to comply with the requirements of other agencies applicable to the project.

3.1.8 Full Compliance with the NBHCP. The Parties agree that for purposes of CITY's and SUTTER's determination that an Urban Development Permittee is in full compliance with the NBHCP, the Urban Development Permittee must: (1) comply with the Mitigation Requirement, (2) implement the Conservation Measures including any such measures that are required to be conducted prior to commencement of grading and/or construction (e.g., pre-construction surveys, species avoidance measures, allowing USFWS or TNBC to conduct transplantation and relocation of Covered Species, etc.), and (3) implement any measures specified in or provided for in Chapter V of the NBHCP which are required to be implemented after commencement of grading and/or construction, including but not limited to, pre-construction surveys, retention of Swainson's Hawk nesting trees, and elderberry shrub preservation.

3.1.9 Transfer of Mitigation Fees. CITY and SUTTER shall promptly transfer all Mitigation Fees collected on account of Authorized Development to TNBC in accordance with the provisions of Chapter VI of the NBHCP.

3.1.10 Enforcement. CITY and SUTTER shall comply with the NBHCP, this Agreement and the Permits and, following their applicable land use permit enforcement procedures and practices, shall take all necessary and appropriate actions to enforce the terms of the Section 10(a)(1)(B) Permit, the Section 2081 Permit, the NBHCP, and this Agreement as to themselves and all third persons subject to their jurisdiction or control, including Urban Development Permittees, that are subject to the requirements established by the NBHCP, the Permits and this Agreement, specifically including the urban permitting and approval requirements set forth in this Section 3. Provided CITY and SUTTER take actions within their respective authorities to enforce compliance with the terms of the NBHCP, this Agreement and the Permits, a violation of the Permits by such third persons shall not be a basis to suspend or revoke the CITY or SUTTER Permits, unless USFWS or CDFG determine that continuation of the Permits would appreciably reduce the likelihood of the survival and recovery of a Covered Species in the wild or USFWS or CDFG determine that the violation renders CITY or SUTTER unable to implement successfully the NBHCP.

3.1.11 Relationship of TNBC to CITY and SUTTER. To comply with the requirements of the NBHCP, CITY and SUTTER have chosen to implement their Mitigation Requirement and other obligations under the NBHCP, including their reporting and monitoring obligations, in part, through the selection of TNBC as the Plan Operator. The Parties further agree:

(a) In the event that the Service determines pursuant to Section 7.6.1 of this Agreement, or CDFG determines pursuant to Section 7.6.2 that TNBC has violated the terms of the NBHCP, the Permits or this Agreement, such violation shall be considered a failure by CITY and SUTTER to implement their obligations of the Operating Conservation Program under the NBHCP. Provided, however, that if the violation by TNBC related to MAP mitigation acquisition or management requirements, or to other violations resulting from and solely pertaining to a violation of the MAP HCP, the provisions of this subsection shall not apply and neither City nor Sutter shall be considered to have failed to implement their obligations of the Operating Conservation Program under the NBHCP.

(b) Notwithstanding the foregoing in the event USFWS or CDFG make the determination set forth in Section 3.1.11(a), CITY's and SUTTER's Permits shall not be revoked or suspended, if CITY and/or SUTTER implement corrective measures, within the period

specified by the USFWS and/or CDFG, to remedy TNBC's violation which may include, but shall not be limited to (1) replacing TNBC with another conservation entity qualified to serve as a Plan Operator, (2) transferring the Mitigation Lands to CDFG in accordance with Section 3.2.12 of this Agreement, (3) implementation by TNBC of measures specified by the USFWS and/or CDFG as necessary to remediate the violation unless USFWS or CDFG determine that continuation of the Permits would appreciably reduce the likelihood of the survival and recovery of a Covered Species in the wild or USFWS or CDFG determine that the violation renders CITY or SUTTER unable to implement successfully the NBHCP; or (4) implementation by CITY and/or SUTTER of measures necessary to remediate the violation.

(c) Should the USFWS or CDFG determine that CITY or SUTTER has violated their separate obligations under the NBHCP, the Permits or this Agreement, such violation shall not be attributed to TNBC nor shall TNBC's Permits be affected, so long as TNBC continues to properly implement its obligations under the NBHCP with respect to the Mitigation Lands, including its obligations as the Plan Operator.

3.1.12 Certification of Urban Development Permittee. Urban Development Permits (i.e., the grading permit or notice to proceed) issued by CITY and SUTTER shall constitute a certification to the Urban Development Permittee that the Urban Development Permittee has complied with the Mitigation Requirements of the NBHCP and will be allowed to construct, maintain and operate a public or private project which may result in the Incidental Take of the Covered Species consistent with the conditions in the Permits and the Urban Development Permit, on the parcels for which the Urban Development Permit was issued. The issuance of such certifications shall be considered ministerial actions for the purposes of the laws of the State of California.

3.1.13 Public Works Projects. CITY and SUTTER shall apply the Mitigation Requirement and Conservation Measures set forth in this Section and in Chapters IV through VI of the NBHCP to all public works projects in their respective Permit Areas.

3.1.14 Assistance. CITY and SUTTER shall provide staff members to serve on the NBHCP Technical Advisory Committee.

3.1.15 Annual Report of Authorized Development. CITY and SUTTER shall each implement the Annual Report requirements described at Chapter VI of the NBHCP. In addition, at any other time during the Permit terms, CITY and SUTTER, at the request of USFWS or CDFG, shall provide within thirty (30) days, to the Wildlife Agencies additional information relevant to implementation of the NBHCP reasonably available to CITY and SUTTER.

3.1.16 Adaptive Management. CITY and SUTTER agree to abide by and implement all Adaptive Management provisions specified in, and subject to the limitations of, Chapter VI of the NBHCP, including, but not limited to, implementing revisions to management of Mitigation Lands, such as those which may be included in recovery plans for the Covered Species, in response to monitoring results in the Plan Area or to peer-reviewed new scientific information, in response to substantial land use changes in the Basin outside the Permit Areas and system of reserves, and Plan responses to Changed Circumstances.

3.1.17 Overall Program Review/Independent Midpoint Reviews. CITY and SUTTER agree to implement the Overall Program Review and Independent Mid-Point Reviews described in Chapter VI of the NBHCP to evaluate the performance and effectiveness of the NBHCP in achieving its biological goals and objectives.

3.1.18 CITY and SUTTER Liaison. CITY and SUTTER shall each designate a liaison to CDFG and USFWS for communications concerning this Agreement and the NBHCP. The CITY's and SUTTER's liaisons shall be responsible for reporting on their respective agency's implementation of and compliance with this Agreement, the NBHCP, and the Permits. CITY and SUTTER shall notify CDFG and USFWS of the name, address and telephone number of the liaison within 30 days of the Effective Date and shall subsequently notify CDFG and USFWS within 30 days in writing if the name, address or telephone number of the liaison is changed.

3.1.19 Implementation of other NBHCP Components. CITY and SUTTER agree to implement each of the other components of the NBHCP identified in the Plan or this Agreement, specifically including enactment of and periodic revisions to the Mitigation Fee ordinances and Catch Up Fee ordinances or through other funding mechanisms except for the CITY or SUTTER general funds, as described in Chapter VI of the Plan as necessary to ensure the NBHCP is fully funded. The commitments set forth herein shall be subject to the limitation that implementation of such measures is within the CITY's or SUTTER's land use or other legal authority.

3.2 The Natomas Basin Conservancy.

3.2.1 Establish Mitigation. TNBC agrees that it will serve as the Plan Operator under the NBHCP, and will Acquire, locate, operate, manage, and maintain Mitigation Lands in accordance with Chapters IV through VI of the NBHCP and Section 5 of this Agreement. To the extent provided in the NBHCP, such activities shall be carried out in consultation with the TAC and with the approval of the Wildlife Agencies.

3.2.2 Acceptance of Mitigation Fees. TNBC agrees that it will accept Mitigation Fees from CITY and SUTTER and use them exclusively to implement its Acquisition, management, monitoring, reporting and other responsibilities identified in Chapters IV through VI of the NBHCP.

3.2.3 TNBC Land Management; Site Specific Management Plan/NBHCP Biological Monitoring Plans/Surveys. TNBC agrees that it shall be responsible for implementing the following management obligations within its Permit Area:

(a) TNBC, in consultation with the TAC and subject to the approval of the Wildlife Agencies as provided in the NBHCP, shall prepare a Site Specific Management Plan for each Mitigation Land site acquired by TNBC under the Plan. Each Site Specific Management Plan shall be completed in accordance with the timing requirements specified in Chapter IV and VI, of the NBHCP and shall contain each of the elements described in Chapters IV and VI, E. of the NBHCP. TNBC agrees to implement the Site Specific Management Plans in accordance with the NBHCP and upon approval.

(b) TNBC, in consultation with the TAC and subject to the approval of the Wildlife Agencies as provided in the NBHCP, shall prepare an overall Biological Monitoring Plan consistent with the provisions of Chapter VI of the NBHCP. Upon approval, TNBC agrees to implement the overall NBHCP Biological Monitoring Plan in accordance with the NBHCP.

(c) TNBC shall conduct annual surveys of the Covered Species on Mitigation Lands and periodic surveys of the Covered Species throughout the Plan Area as provided in the NBHCP, the Site Specific Management Plans and Plan-wide Biological Monitoring Plan.

3.2.4 Implementation Annual Report. TNBC shall provide the Parties with an Implementation Annual Report by May 1 of each calendar year the NBHCP is in effect. The Implementation Annual Report shall include all of the information identified in Chapter VI of the NBHCP, including the results of the Compliance Monitoring implemented by CITY, SUTTER and TNBC and the Effectiveness Monitoring implemented by TNBC during the prior calendar year, and provide an accounting of all Mitigation Fees collected, all Urban Development Permits Issued, and all Mitigation Lands Acquired.

3.2.5 Implementation Annual Meeting. On or before July 1 of each calendar year each Permittee, USFWS and CDFG shall meet to discuss the Implementation Annual Report submitted by the TNBC, and any concerns, comments or recommendations any of the Parties may have regarding implementation of the NBHCP.

3.2.6 Funding. At least annually, TNBC shall evaluate the adequacy of Mitigation Fees to fund implementation of the NBHCP and shall recommend to CITY and SUTTER adjustments to the Mitigation Fee as necessary to ensure the Plan is fully implemented.

3.2.7 Budgeting and Planning. Prior to the end of each calendar year, the TNBC

shall prepare a budget and a plan for its proposed activities for the forthcoming year and provide copies to each Permittee, CDFG and USFWS.

3.2.8 Successor. With the prior written approval of CITY, SUTTER, USFWS and CDFG, the assets and obligations of TNBC may be transferred to any other non-profit corporation provided that the successor corporation assumes each of the obligations of TNBC as set forth under the NBHCP the TNBC Permit, and this Agreement.

3.2.9 Transfer to CDFG. In the event TNBC is unable to meet its financial obligations and is dissolved, becomes insolvent or goes bankrupt, and no other suitable successor is found, then the ownership of the Mitigation Lands (including conservation easements), accumulated Mitigation Fees and other sums designated for enhancement and maintenance of those lands, shall be transferred to the CDFG or a non-profit association or corporation organized for conservation purposes that is approved by USFWS, CDFG, CITY and SUTTER, which shall hold the Mitigation Lands (including conservation easements) in perpetuity and use the Mitigation Fees for the acquisition and permanent management, operation, maintenance, monitoring, and conservation of the Mitigation Lands in accordance with the NBHCP. In the event the ownership of Mitigation Lands (including conservation easements), accumulated Mitigation Fees and other sums designated for enhancement and maintenance of those lands are transferred to CDFG, CDFG shall have the authority to seek adjustments to the Mitigation Fee consistent with the provisions of the NBHCP.

3.2.10 Operation in Perpetuity. Subject to the requirements of Chapters IV and VI of the NBHCP, Mitigation Lands acquired to meet the NBHCP's Mitigation Requirement shall function in perpetuity to provide Habitat Values for the Covered Species. TNBC shall establish a sufficient endowment from the endowment components of the Mitigation Fees adopted by CITY and SUTTER to permanently sustain management of the Mitigation Lands in accordance with the NBHCP following expiration or termination of the Permits.

3.2.11 Conflicts of Interest. TNBC shall establish and maintain by-laws which include, at a minimum, restrictions on interests in contracts by Board members and employees which are at least as stringent as those applied to government officers and employees by California Government Code §1090 and following, as well as restrictions on participation in decisions and requirements of financial disclosure which are at least as stringent as those applied to government officers and employees by the Political Reform Act of 1974 and any regulations promulgated pursuant thereto.

3.2.12 TNBC Proceedings Open to Public. TNBC agrees that its actions and proceedings shall be conducted in public, in a manner consistent with the Ralph M. Brown Act, California Government Code Sections 54950, et seq. TNBC may conduct closed sessions for real estate negotiations as permitted in its Bylaws, referenced in the NBHCP, as may be amended from time to time ("TNBC Bylaws"). Pursuant to the TNBC Bylaws, the provisions of the Ralph M. Brown Act regarding the disclosure of information with respect to real property transactions (including, but not limited to Government Code Sections 54954.5(b), 54956.8 and 54957.1(a)(1)), whether such transactions are pending or completed, shall not apply. As used herein, "real property transactions" shall include options to purchase or lease, purchases, and leases of real property, as well as farming contracts affecting real property that TNBC has acquired or is in negotiations to acquire.

3.2.13 Implementation of Other NBHCP Components. TNBC shall implement each of the other components of the NBHCP identified in the Plan or this Agreement, including but not limited to the conservation strategies and Take avoidance, minimization and mitigation measures, to the extent such measures fall under its authority and control.

3.3 USFWS.

3.3.1 Oversight. After issuance of each Section 10(a)(1)(B) Permit, the USFWS shall monitor the implementation of such Permit, this Agreement, and each Permittee's activities thereunder, to ensure compliance with the NBHCP, this Agreement and the Permits.

3.3.2 Technical Assistance. Subject to Section 8.12 of this Agreement, the USFWS shall provide staff to serve on the NBHCP Technical Advisory Committee (TAC), shall provide responses to TNBC as required under the NBHCP in a timely manner, and recommend, as appropriate, revisions to the NBHCP under the Plan's Adaptive Management, Overall Program and Independent Mid-Point Reviews, and other applicable provisions, to ensure the viability of the Plan. USFWS shall also make available USFWS staff for informal consultations and meetings with the staffs, boards or councils of the Permittees to assist with implementation of the NBHCP. Consistent with its legal authorities, the USFWS shall cooperate with TNBC in obtaining additional funding from sources including, but not limited to, existing and future state and federal grant programs and bond issues to augment the conservation strategies of the NBHCP. Such funds are in addition to, and not in substitution of, the funding required to implement the NBHCP as described in this Agreement.

3.3.3 Newly Listed Uncovered Species. Coverage and authorization for Take of newly listed species which are not covered under the Permits shall require amendment of the NBHCP and the Permits. Until and unless the Section 10(a)(1)(B) Permits are amended to cover the newly listed species, the Permittees shall adhere to the Changed Circumstances provisions applicable to the listing of a new species as described in Chapter VI of the NBHCP. Modification of the NBHCP as necessary to amend the Permits to authorize take of new species not previously covered by the NBHCP shall be at the discretion of all parties to the NBHCP, this Agreement and the associated Permits.

3.3.4 Effective Date and Issuance of Section 10(a) Permits.

(a) For purposes of the Section 10(a)(1)(B) Permit, as to each Land Use Agency Permittee, the USFWS and TNBC, the Effective Date of this Agreement shall be the date, following execution of this Agreement by that Land Use Agency Permittee, the USFWS and TNBC, that the Section 10(a)(1)(B) Permits are issued to that Land Use Agency Permittee and TNBC.

(b) Following execution of this Agreement, the Service will issue a Section 10(a) Permit to each signatory Permittee authorizing the Take of each listed Covered animal Species incidental to the Covered Activities, subject to and in accordance with the NBHCP, this Agreement and the Permits.

(c) For Covered animal Species not listed as an endangered species or threatened species under ESA as of the Effective Date, the Section 10(a) Permits shall become effective as to each such species concurrent with the listing of the species as a threatened species or endangered species under the ESA. The NBHCP also covers seven (7) plant species. Take of listed plants is not prohibited under the ESA and therefore will not be authorized under the Section 10(a) Permits. Plants are included as Covered Species under the NBHCP and will be listed on the federal permits in recognition of the conservation measures provided for them under the NBHCP. Plant species covered under the NBHCP will also be provided assurances under the federal "No Surprises" rule.

3.3.5 Permit Findings. USFWS, based on the best scientific and commercial data available and the terms and provisions of this Agreement and the NBHCP, has found that with respect to the Covered Species:

(a) The Taking of Covered Species will be incidental to otherwise lawful activities.

(b) Implementation of the NBHCP by the Permittees will, to the maximum extent practicable, minimize and mitigate the impacts of the Incidental Take of Covered Species.

(c) CITY and SUTTER will ensure that adequate funding for the NBHCP will be provided and the NBHCP and this Agreement provide procedures for addressing Changed Circumstances and Unforeseen Circumstances.

(d) The Take of Covered Species in accordance with this

Agreement will not appreciably reduce the likelihood of the survival and recovery of the Covered Species in the wild.

(e) The measures agreed upon by the Permittees and the USFWS for purposes of the NBHCP will be met.

(f) Through this Agreement, the USFWS has received the required assurances that the NBHCP will be implemented.

3.4 CDFG.

3.4.1 Oversight. After issuance of the Section 2081 Permit to CITY and SUTTER, CDFG shall monitor the implementation of the Section 2081 Permit, this Agreement and TNBC's activities thereunder, including but not limited to, the modification, enhancement, operation and maintenance of the Mitigation Lands in order to ensure compliance with this Agreement and consistency with CDFG's trustee agency duties pursuant to CESA, and recommend any amendments to the NBHCP CDFG deems desirable, in the reasonable exercise of its discretion, under the Plan's Adaptive Management provisions as described in Chapter IV, Section E of the NBHCP or the Overall Program Review as described in Chapter IV, Section I of the NBHCP.

3.4.2 Assistance. CDFG shall provide staff to serve on the NBHCP TAC, and shall ensure the availability of its staff for informal consultations and meetings with TNBC and the staffs, boards or councils of the other Parties to this Agreement to ensure the appropriate monitoring of permitted activities which may lead to the Incidental Take of State Protected Species. CDFG will assist TNBC (to the extent authorized by the California Legislature) in obtaining additional funding from sources including, but not limited to, existing and future state and federal grant programs and bond issues to augment the conservation strategies of the NBHCP. Such funds are in addition to, and not in substitution of, the funding required to implement the NBHCP as described in this Agreement.

3.4.3 New Species. CDFG shall make available to Permittees information it has or acquires regarding new sightings or occurrences of any species in the Permit Areas which is state listed as threatened or endangered, is a candidate for listing as threatened or endangered, or is otherwise likely to be state listed, and which is determined to be dependent upon habitat in the Permit Area, if such species is not otherwise described in Exhibit D hereof. Once a year, upon the request of TNBC, CDFG shall provide TNBC with updated information from the California Natural Diversity Data Base ("CNDDB") covering new sightings and occurrences of any species not otherwise described in Exhibit D within the Permit Areas. At the same time, CDFG may propose any amendments to the NBHCP CDFG deems reasonably necessary to preserve Habitat Values for the benefit of such species.

3.4.4 CDFG Land Management. CDFG shall manage in perpetuity, in a manner consistent with the NBHCP, for the conservation of the Covered Species any Mitigation Lands conveyed to it by TNBC pursuant to the terms and provisions of this Agreement.

3.4.5 Effective Date and Issuance of Section 2081(b) Permit.

(a) For purposes of the Section 2081(b) Permit, as to each Land Use Agency Permittee, CDFG and TNBC, the Effective Date of this Agreement shall be the date, following execution of this Agreement by that Land Use Agency Permittee, CDFG and TNBC, that the Section 2081(b) Permits are issued to that Land Use Agency Permittee and TNBC.

(b) Following execution of this Agreement, CDFG will issue a Section 2081(b) Permit or modification to an existing Permit to each Permittee authorizing the Take of each Covered Species incidental to Covered Activities, subject to and in accordance with the NBHCP and this Agreement.

(c) As to each Covered Species that is not currently listed under CESA, the Incidental Take Authorization under the Section 2081(b) Permits shall become effective consistent with Section 6.2.4 of this Agreement.

3.4.6 Section 2081(b) Permit Findings.

CDFG, based on the best scientific and other information that is reasonably available, and the terms and provisions of this Agreement and the NBHCP, has found that with respect to the Covered Species:

(a) Incidental Take. The authorized Take of Covered Species will be incidental to an otherwise lawful activity.

(b) Minimize and Fully Mitigate. The impacts of the authorized Take will be minimized and fully mitigated.

(c) Roughly Proportional. The measures required to minimize and fully mitigate the impacts of the authorized Take will be roughly proportional in extent to the impact of the authorized Take of Covered Species.

(d) Applicant's Objectives. The measures required to minimize and fully mitigate the impacts of the authorized Take will preserve Permittee objectives to the greatest extent possible, consistent with the obligation to minimize and fully mitigate the impacts of the authorized Take.

(e) Capable of Successful Implementation. All required measures will be capable of successful implementation.

(f) Adequate Funding. Permittees have ensured adequate funding to implement the required minimization and mitigation measures, and for monitoring compliance with, and effectiveness of, those measures.

(g) No Jeopardy. The issuance of the Section 2081(b) Permits will not jeopardize the continued existence of any Covered Species.

(h) Unlisted Species. Covered Species that are not currently listed as threatened or endangered under CESA have been treated in the NBHCP as if they were listed, and the NBHCP identifies measures to minimize and fully mitigate the impacts of the authorized Take of such unlisted species. The findings in this Section 3.4.5 apply to all Covered Species, including Covered Species that are not listed.

4 MITIGATION

4.1 Mitigation Lands. Mitigation Lands will be established and managed pursuant to the NBHCP.

4.2 Respective Permit Areas. Developers of all lands within the respective Permit Areas that are developed pursuant to an Urban Development Permit, shall provide mitigation pursuant to the NBHCP for the direct, indirect and cumulative impacts of development upon Covered Species and their habitat. CITY and SUTTER shall require an Urban Development Permittee to provide mitigation for the conversion of land to Authorized Development in the respective Permit Areas, in conformity with the NBHCP and the following sections.

4.3 Existing Development Exempt. Parcels of land within the respective Permit Areas that are shown as "Exempt Area-Existing Development" and "Development Subject to 1997 HCP" on the Baseline Maps depicted on Exhibits B and C of this Agreement are not covered by the NBHCP, this Agreement, or the Permits, provided, however, that nothing in this Agreement shall be construed to exempt such existing development from any applicable requirements of the ESA or CESA.

4.4 Mitigation Ratio. Mitigation for the conversion of land in the respective Permit Areas to Authorized Development will be required at the ratio of one half (½) acre of land protected or conserved for every one (1) acre of land converted to Authorized Development (the "Mitigation Ratio").

4.5 Calculation of Mitigation Requirement for Authorized Development Projects. The Mitigation Requirement for each public or private project is determined by applying the Mitigation Ratio to the land area converted to Authorized Development (the "Mitigation Requirement"). The

land area converted to Authorized Development is determined as follows:

(1) For both private and public development projects, except as provided in (2) and (3) below, the gross area of a particular project is considered "land area converted to Authorized Development" whether the entire project is graded or not. The fees payable shall be calculated by multiplying the Mitigation Fees (in dollars per acre) times the land area converted to Authorized Development, prorated for fractional acres.

(2) For private development projects, a separate parcel or portion of a parcel which will be transferred to a public agency for a public use consisting of a park, school or other public building, is exempt. The Mitigation Requirement for such uses must be satisfied when the parcel of public use property is developed by the respective public agency owning the parcel. With respect to other lands designated for public use, the following criteria will apply: (a) Roads: where a road is included within the respective Land Use Agency's finance plan for purposes of financing, the land transferred or to be transferred by fee or easement to the agency for the road project is excluded; where a road is not one which is financed pursuant to the agency's finance plan, but is to be paid for entirely by the private landowner or developer of the project, even though ultimately it will be dedicated to the agency, the land transferred or to be transferred to the agency for the road is included; (b) Utilities: where the landowner or developer is required to transfer to the respective Land Use Agency or another public entity (e.g., Sacramento Municipal Utility District), by easement or fee, land for a structure such as a pump station, outfall station, or similar structure, such land is excluded; where the landowner or developer is required to transfer to the agency non-exclusive easements for utility lines (water lines, sewer lines, and similar lines), the land covered by such easements is included; if the easement is exclusive, the land covered by the easement is excluded, but the transferee agency will be required to provide mitigation upon development of the transferred parcel. With respect to each parcel or portion of a parcel exempted or excluded pursuant to this section, the Mitigation Requirement shall be satisfied by CITY or SUTTER at the time such parcel or portion of land is converted to Authorized Development.

(3) For both private and public projects, excluded is any parcel or portion of the parcel approved as Mitigation Land by TNBC and the Wildlife Agencies in accordance with the NBHCP and which will be transferred in fee to TNBC or will be encumbered by a Conservation Easement in favor of TNBC for purposes of satisfaction of the Mitigation Requirement for the particular development project.

4.6 Satisfaction of Mitigation Requirement. The Land Use Agency Permittes each retains authority to require an Urban Development Permittee/landowner to satisfy the Mitigation Requirement by: (1) payment of the Mitigation Fees; or (2) subject to the approvals required by the NBHCP, transfer of Mitigation Land to TNBC, together with payment of all components of the Mitigation Fee except the Land Acquisition Fee as specified in the NBHCP. Credit against the Land Acquisition Fee component of the Mitigation Fees is based on the number of acres of land being transferred and is not based on cost or perceived value of the land transferred. Where a Land Use Agency Permittee elects to require an Urban Development Permittee to transfer land to TNBC, (1) TNBC and the Wildlife Agencies must approve the transfer of each parcel of Mitigation Land considering its location, proximity to urban uses and roads, current land condition, and all other factors specified in the NBHCP, and (2) such land must be dedicated prior to authorization by the applicable Land Use Agency Permittee for dissturbance of the land resulting from the associated Urban Development Project. If the amount of land transferred to TNBC is less than the Mitigation Land required for the public or private project, the landowner is obligated to pay the outstanding balance of the Land Acquisition Fee component of the Mitigation Fees. If the amount of land transferred to TNBC is greater than the amount of Mitigation Land required for the development project, the landowner may choose one of the following credit options: (i) receive credit from the excess amount of land toward required Mitigation Land under the NBHCP for future Authorized Development of property owned by the landowner; or (ii) transfer credit from the excess amount of

land toward required Mitigation Land under the NBHCP for Authorized Development of property owned by another specified landowner. If either credit option is chosen, then prior to the transfer of Mitigation Land being finalized, the landowner shall inform CITY or SUTTER, as appropriate and TNBC in writing of the choice to receive or transfer credit and to whom the credit is to be transferred. Any transfer of fee title to lands or a Conservation Easement therein in order to satisfy the Mitigation Requirement shall be accomplished by a deed or grant of a conservation easement to TNBC in a form acceptable to USFWS and CDFG, in recordable form on or before issuance of an Urban Development Permit (i.e., a building permit, grading permit, or other permit which allows a disturbance of the surface of the earth for the public or private project). All land proposed to be transferred to TNBC in satisfaction of the Mitigation Requirement must meet the acquisition criteria specified in the NBHCP.

4.7 Jurisdictional Wetlands. Nothing in this Agreement shall relieve any Urban Development Permittee desiring to discharge any fill or other material into any jurisdictional wetlands, of any requirement to obtain a Clean Water Act Section 404 Permit from the U.S. Army Corps of Engineers and comply with all the terms and conditions thereof. Take of Covered Species related to jurisdictional wetlands by the Urban Development Permittee shall be authorized through the incidental take permits issued to CITY and SUTTER and shall be subject to the requirements of the NBHCP.

4.8 Rivers, Streams or Lakes. Nothing in this Agreement shall relieve any Urban Development Permittee desiring to substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated by the CDFG, or use any material from the streambeds, of any requirement to comply with Fish and Game Code, Division 2, Chapter 6, commencing with Section 1600 (concerning Streambed Alteration Agreements). This Agreement and implementation of the NBHCP are intended to satisfy only site-specific mitigation requirements for impacts of taking Covered Species as a result of an Authorized Development project which may be imposed under Chapter 6 of the California Fish and Game Code, with the exception of mitigation specifically directed at those vernal pool species included on the list of Covered Species.

4.9 Funding for Operating Conservation Program. CITY and SUTTER shall fund the Operating Conservation Program in accordance with Chapter VI of the NBHCP.

4.9.1 Mitigation Fees. Where an Urban Development Permittee selects payment of Mitigation Fees as its method of satisfying the Mitigation Requirement for the public or private project, the provisions of Section 4 shall govern the calculation and collection of such fees, and such Urban Development Permittee shall pay the Mitigation Fees as so calculated. The amount payable for the Mitigation Fee shall be the amount specified by ordinance or resolution adopted by the governing body of the CITY or SUTTER, including but not limited to the "catch-up fee" ordinances or other ordinances or resolutions adopted prior to or after the Effective Date.

4.9.2 Adjustments to the Mitigation Fee for Purposes of Funding the Operating Conservation Program Other than Changes to the Managed Marsh Component. Notwithstanding any other provision of this Agreement, upon request of TNBC or upon the written request of USFWS or CDFG as supported by documented evidence in the form of a written report and technical analysis, and as otherwise necessary, CITY and SUTTER shall review, and at the discretion of each, adjust the Mitigation Fees to take into account costs of land acquisition and TNBC operations, to maintain or meet the Mitigation Ratio specified in Section 4.4 of this Agreement, and to meet TNBC management, monitoring, adaptive management, or related costs required to fund the Operating Conservation Program as set forth in Chapters IV, V and VI of the NBHCP. The decision to adjust the Mitigation Fees may include but is not limited to consideration of the following factors: (1) the market price of land being acquired as Mitigation Land; (2) the necessity to maintain the 0.5 to 1 Mitigation Ratio; (3) the need to fund ongoing and permanent management and monitoring costs in accordance with the NBHCP; (4) the necessity to ensure the

effectiveness of the NBHCP's Operating Conservation Program; and (5) the availability of other sources of revenues, including the sale of hunting rights on Mitigation Lands, proceeds from the cultivation of rice on Mitigation Lands and other funds and grants.

(a) Notwithstanding the foregoing and in accordance with, and subject to the limitations of, Chapter VI of the NBHCP, CITY or SUTTER shall be obligated to increase the Mitigation Fees to fund recommended changes to the Operating Conservation Program resulting from future recovery plans, monitoring results from the Plan Area or peer-reviewed new scientific information relevant to the Plan only when such recommendations:

(1) Relate to the physical management of Mitigation Lands;

(2) Would improve the effectiveness of the NBHCP's Operating Conservation Program by identifying relevant new information, approaches, techniques, or species protection needs;

(3) Can be implemented within the NBHCP Plan Area; and

(4) Fit within the overall intent and framework, are consistent with the NBHCP's biological goals and objectives and would not exceed the established Mitigation Ratio of the NBHCP; and

(5) Would not substantially sacrifice habitat values for Covered Species that are not addressed by the recovery plan, the monitoring results or other peer-reviewed new scientific information.

(b) Adjustment of the Mitigation Fees pursuant to this subsection is independent of adjustments made on account of inflation/deflation pursuant to Section 4.9.4 of this Agreement. Nothing in this Agreement shall be construed to diminish or otherwise affect the discretionary authority of the Land Use Agencies with respect to fee adjustments under this Section 4.9.1.

4.9.3 Adjustments to the Mitigation Fee for purposes of Funding the Changes to the Managed Marsh Component. Upon written notification supported by documented evidence in the form of a written report and technical analysis by USFWS or CDFG to CITY and SUTTER of the adoption of a future Giant Garter Snake Recovery Plan, the availability of monitoring results from the Plan Area, or peer-reviewed new scientific information indicating an adjustment in the enhancement and management activities for managed marsh as specified in Chapter VI of the NBHCP, the CITY and SUTTER shall review, and at the discretion of each, adjust the Mitigation Fees to take into account increased costs of TNBC's enhancement and management of a higher proportion of managed marsh on Mitigation Lands acquired after adoption of the final Giant Garter Snake Recovery Plan by the USFWS, the availability of peer-reviewed new scientific information or monitoring results from the Plan Area indicate an adjustment in the enhancement and/or management activities for managed marsh is warranted as specified and subject to the limitations contained in Chapter VI of the NBHCP. The obligation to adjust the Mitigation Fees shall be subject to the following limitations set forth in Chapter VI of the NBHCP:

(b) the obligation to increase the Mitigation Fees shall be applied prospectively to future Mitigation Lands acquired after adoption of the Recovery Plan, in response to monitoring results from the Plan Area or in response to peer-reviewed new scientific information.

(c) if the Recovery Plan, monitoring results collected from the Plan Area, or peer-reviewed new scientific information indicate a higher proportion of managed marsh (1) will improve the effectiveness of the NBHCP's Operating Conservation Program to meet its biological goals and objectives, (2) is beneficial to the snake, and (3) will not adversely affect any other listed Covered Species.

(d) the maximum levels of managed marsh which may apply to future Mitigation Land acquisitions which occur after the results of monitoring from the Plan Area or

peer-reviewed new scientific information, or Giant Garter Snake Recovery Plan adoption shall not exceed seventy-five percent (75%) of such Mitigation Lands.

Adjustment of the Mitigation Fees pursuant to this subsection is independent of adjustments made on account of inflation/deflation pursuant to Section 4.9.4 of this Agreement. (Nothing in this Agreement shall be construed to diminish or otherwise affect the discretionary authority of the Land Use Agencies with respect to fee adjustments under this Section 4.9.2.)

4.9.4 Fee Adjustments for General Inflation. On or before January 1 of each year, CITY and SUTTER shall review and, at the discretion of each, adjust the dollar amount of the Mitigation Fees (as adjusted from time to time pursuant to Section 4.4.1), to take into account the effects of inflation/deflation generally. Adjustments will be calculated as follows: the current Mitigation Fee shall be multiplied by the index for October of the year prior to January 1, divided by the index for October of the preceding year [e.g., 2003 Fee = 2002 Fee x (October, 2002 CPI Index/October, 2001 CPI Index)]. For purposes of making this adjustment, the index utilized shall be the Consumer Price Index for All Urban Consumers, All Items, San Francisco–Oakland–San Jose (1982-1984=100), as published by the U.S. Department of Labor, or its successor. Technical adjustments made pursuant to this Section 4.9.4 shall be independent of, in addition to and not a part of adjustments to, the Mitigation Fee adjustments made pursuant to Section 4.9.2 and 4.9.3.

4.9.5 Failure to Adjust Mitigation Fees. CITY and SUTTER acknowledge that the failure of either CITY or SUTTER to adjust the Mitigation Fees as necessary to maintain the Mitigation Ratio and ensure implementation of each of the other requirements of the NBHCP identified in Chapters IV through VI of the NBHCP and/or in this Section 4 may result in suspension or revocation of their respective Permits as set forth in Section 7.6 of this Agreement.

5 Mitigation Lands

5.1 Location of Mitigation Lands. TNBC shall locate Mitigation Lands in accordance with Chapters IV through VI of the NBHCP and this Section.

5.2 Setbacks and Buffers. All Mitigation Lands Acquired by TNBC shall conform to the buffer and setback requirements set forth in Chapters IV and VI of the NBHCP.

5.3 In-Basin Acquisition. All Mitigation Lands shall be acquired within the Natomas Basin as provided in the NBHCP.

5.4 Coordinating Mitigation Land Acquisition With Agency Acquisitions. Prior to the Acquisition of any parcel of Mitigation Land, TNBC shall provide written notice to the USFWS, CDFG, and both CITY and SUTTER of its intent to Acquire such lands. USFWS and CDFG agree that they will not knowingly interfere or compete with TNBC for the Acquisition or control of such lands and that they will consult with TNBC in formulating any Acquisition plans. As to those lands identified by USFWS or CDFG for acquisition, TNBC, likewise, shall not knowingly interfere with or compete with the affected agency for acquisition or control until TNBC is notified by that agency that it is no longer pursuing acquisition or control of the lands.

5.5 Timing of Mitigation Land Acquisition. TNBC shall comply with the requirements of the NBHCP relating to the Acquisition of Mitigation Lands in advance of approval of Authorized Development set forth in Chapter VI of the NBHCP. The Parties further agree that in order to ensure that Mitigation Lands are Acquired in an amount sufficient to meet the Mitigation Requirement that attaches to all Authorized Development under the NBHCP, TNBC shall establish a 200 acre cushion of Mitigation Lands prior to the approval of any Authorized Development by CITY or SUTTER under the Plan and shall maintain the 200 Acre Mitigation Land cushion until the approval of the last 400 acres of Authorized Development under the Plan. CITY, SUTTER and TNBC shall implement this requirement in accordance with the NBHCP, as follows.

(a) No Urban Development Permits for Authorized Development shall be issued by CITY or SUTTER after September 30 of each calendar year until TNBC notifies CITY and SUTTER that it has Acquired Mitigation Lands which equal the number of acres necessary to meet the Mitigation Requirement attached to all prior Urban Development Permits issued by CITY and SUTTER plus an additional 200 acres of Mitigation Land.

(b) Because TNBC is responsible for Acquiring Mitigation Lands for Planned Development, TNBC will credit mitigation fees collected under the Metro Air Park HCP (MAP HCP) along with all Mitigation Fees collected by CITY and SUTTER for Authorized Development. The collection of Mitigation Fees for Planned Development will be credited against the Mitigation Lands Acquired by TNBC, in chronological order, with priority given to the oldest project among those approved under the MAP HCP and the CITY's or SUTTER's Permits to have paid Mitigation Fees.

5.6 Acquisition of 400 and 2,500-Acre Blocks. TNBC shall comply with those provisions of the NBHCP relating to Acquisition of Mitigation Lands to ensure that the Mitigation Lands are consolidated in minimum 400-acre habitat blocks and at least one 2,500 acre habitat block prior to the expiration of the Permits. The 400 acre minimum block requirement and the 2,500 acre minimum block requirement shall be applied in the aggregate to all Permittees and to all other approved HCPs in the Natomas Basin that are based on the NBHCP, so that the plans as a whole must achieve the identified habitat block consolidation requirements set forth in the NBHCP upon Plan completion. Notwithstanding the above, CITY and SUTTER each retain the independent obligation to provide 400 acre minimum blocks and one 2,500 acre minimum block prior to the date their respective Permits expire in the event the other Permittees cease participation in the NBHCP, or in the event the Potential Permittees choose not to participate in the NBHCP. None of the provisions contained herein shall be construed to prohibit the USFWS or CDFG from authorizing Mitigation Land acquisitions that do not comply with the minimum 400-acre minimum block size in the event that TNBC identifies potential Mitigation Lands which otherwise provide opportunities for the preservation of important biological resources.

5.7 Accounting for Mitigation Lands

5.7.1 Managed Marsh. Mitigation Lands acquired and converted to and managed as seasonal or perennial marsh, and existing marsh lands acquired by TNBC and managed as seasonal or perennial marsh, will count fully toward the 0.5:1 Mitigation Ratio described in Section 4.4 of this Agreement.

5.7.2 Rice Land. Mitigation Lands in current rice production as Rice Lands will count fully toward the 0.5:1 Mitigation Ratio described in Section 4.4 of this Agreement.

5.7.3 Uplands. Mitigation lands providing upland habitats will count fully towards the 0.5:1 Mitigation Ratio described in Section 4.4 of this Agreement.

5.7.4 Proportion of Mitigation Lands as Marsh. Within three years of the approval of a Site Specific Management Plan a minimum of 25 percent of the Mitigation Lands must be in managed marsh as specified in the NBHCP. Thereafter, a minimum of 25 percent of the Mitigation Lands shall be in managed marsh until and unless that amount is increased up to a maximum of 75 percent of the Mitigation Lands in accordance with Section 4.9.3 of this Agreement and Chapter VI

of the NBHCP. Pursuant to Section 4.9.3 of this Agreement and Chapter VI of the NBHCP, any increase in the amount of Mitigation Lands required to be in managed marsh shall apply only to Mitigation Lands Acquired to satisfy the Mitigation Requirement for Authorized Development which are acquired after the USFWS or CDFG provide written notice and its accompanying documentation of Recovery Plan adoption, the availability of monitoring results from the Plan Area, or the availability of credible scientific information collected in the Plan Area. Provided the Wildlife Agency's requested increase in managed marsh complies with Chapter VI of the NBHCP, the failure of TNBC to adopt the increase in managed marsh as requested by either Wildlife Agency shall trigger a reevaluation of the Plan and possible suspension or revocation of the CITY and SUTTER's Permits as set forth under Section 7.6 of this Agreement.

5.8 Conservation Measures. CITY and SUTTER shall include in each Urban Development Permit the Conservation Measures provided in Chapter V of the NBHCP.

6 ASSURANCES

6.1 USFWS

6.1.1 No Surprises Assurances.

(a) Unforeseen Circumstances. As provided in 50 C.F.R. 17.3, the term "Unforeseen Circumstances" shall mean changes in circumstances affecting a species or geographic area covered by the NBHCP that could not reasonably have been anticipated by the plan developers and USFWS at the time of the Plan's negotiation and development, and that results in a substantial and adverse change in the status of a Covered Species.

(1) "No Surprises" Assurances. Pursuant to the No Surprises Rule at 50 C.F.R. Sections 17.3, 17.22(b)(5) and 17.32(b)(5), and provided that CITY, SUTTER and TNBC are properly implementing the NBHCP, USFWS shall not require CITY, SUTTER or TNBC to provide additional land, water or other natural resources, or financial compensation or additional restrictions on the use of land, water, or other natural resources beyond the level provided for under the NBHCP, this Agreement and the Permits with respect to Covered Activities under the Permits without the consent of CITY or SUTTER. However, nothing in this Section or in the Assurances Rule shall be interpreted: (1) to restrict the authority of USFWS to take appropriate action under the ESA or applicable regulations to ensure that the NBHCP is properly implemented in accordance with this Agreement; (2) to apply to future Adaptive Management modifications for Mitigation Lands that are deemed necessary or appropriate by the USFWS or CDFG as determined in accordance with Chapter VI of the NBHCP and in consultation with CITY, SUTTER and TNBC, to respond to the results of monitoring in the Plan Area, or to new scientific information relevant to the NBHCP, (3) to apply to future modifications to the NBHCP as a result of future recovery plans as determined in accordance with Chapter VI of the NBHCP, (4) to apply to the NBHCP responses to Changed Circumstances identified in Chapter VI of the NBHCP, or (5) to apply to changes anticipated to occur as a result of the Urban Development activities anticipated by the Section 10(a)(1)(B) Permit, Section 2081(b) Permit, or as otherwise approved by the USFWS, provided that such actions, modifications and changes comply with the limitations and restrictions set forth in Chapter VI of the NBHCP. If USFWS makes a finding of unforeseen circumstances, during the period necessary to determine the nature and location of additional or modified mitigation, CITY, SUTTER and TNBC will avoid contributing to appreciably reducing the likelihood of the survival and recovery of the affected species and ensure that third persons under their control that are carrying out Covered Activities avoid contributing to appreciably reducing the likelihood of the survival and recovery of the affected species.

(2) Unforeseen Circumstances Finding. In the event that USFWS believes that Unforeseen Circumstances may exist in accordance with the "No Surprises" rule, it shall notify CDFG, CITY, SUTTER and TNBC in writing of the applicable specific facts described in Section 6.1.1 above. In the notification, USFWS shall clearly document the basis for

the proposed finding regarding the existence of Unforeseen Circumstances in accordance with the requirements of 50 C.F.R. § 17.22(b)(5)(iii)(C) and 17.32(b)(5)(iii)(C). Within fifteen (15) days of receiving such notice, CITY, SUTTER and TNBC, USFWS and CDFG shall meet to consider the facts cited in the notice and potential changes to the NBHCP's Operating Conservation Program or management and operation of the Mitigation Lands. Pursuant to 50 C.F.R. § 17.22(b)(5)(iii)(C) and 17.32(b)(5)(iii)(C), USFWS shall make an Unforeseen Circumstances finding based on the best scientific evidence available, after considering any responses submitted by any other Parties pursuant to this section, and USFWS shall have the burden of demonstrating that Unforeseen Circumstances exist.

(3) Effect of Unforeseen Circumstances Finding. Pursuant to 50 C.F.R. 17.22(b)(5) and 17.32(b)(5), in the event that USFWS makes a finding of Unforeseen Circumstances and additional conservation and mitigation measures are deemed necessary to respond to such Unforeseen Circumstances, USFWS may require additional measures from CITY, SUTTER or TNBC where the NBHCP is being properly implemented, but only if such measures are limited to modifications within the Mitigation Lands and the NBHCP's Operating Conservation Program for the affected species and maintain the original terms of the NBHCP to the maximum extent possible. Additional conservation and mitigation measures shall not involve the commitment of additional land, water or other natural resources without the consent of CITY and SUTTER.

(b) Changed Circumstances.

(1) Changed Circumstances Defined. As provided in 50 C.F.R. 17.3, the term "Changed Circumstances" means changes in circumstances affecting a species or geographic area covered by the NBHCP that can reasonably be anticipated by CITY, SUTTER or TNBC and that can be planned for in the NBHCP (e.g. the listing of a new species, or a fire or other natural catastrophic event in areas prone to such events.) Changed circumstances and planned responses to those circumstances are described in Chapter VI of the NBHCP.

(2) Permittee-Initiated Response to Changed Circumstances. CITY, SUTTER or TNBC, as appropriate, will immediately notify USFWS and all other Permittees upon learning that any of the Changed Circumstances listed in Chapter VI of the NBHCP has occurred, and shall provide written notice within seven (7) days**.** Permittees shall modify their activities and shall require third persons under the Permittees' control to modify their activities, as appropriate, in accordance with Chapter VI of the NBHCP, to the extent necessary and feasible to minimize and mitigate the effects of the Changed Circumstances. CITY, SUTTER and TNBC and will report to USFWS on their actions. Such modifications will be initiated without awaiting notice from USFWS. Such changes are provided for in the NBHCP, and hence do not constitute unforeseen circumstances or require amendment of Permits or the NBHCP.

(3) USFWS-Initiated Response to Changed Circumstances. If USFWS determines that Changed Circumstances have occurred and that CITY, SUTTER or TNBC have not responded in accordance with Chapter VI of the NBHCP, the USFWS in coordination with CDFG will so notify CITY, SUTTER and TNBC and, as appropriate, direct them to make the required changes. Within thirty (30) days after receiving such notice, CITY, SUTTER or TNBC, as appropriate, will make the required changes and report to USFWS on their action. Such changes are provided for in the NBHCP, and hence do not constitute unforeseen circumstances or require amendment of Permits or of the NBHCP.

6.1.2 Migratory Bird Treaty Act (MBTA). If during the term of the Section 10(a)(1)(B) Permits, an avian Covered Species which is protected under the MBTA is listed under the ESA, the Section 10(a)(1)(B) Permits will also constitute Special Purpose Permits under 50 C.F.R. Section 21.27 for the "take" (for purposes of this Section, as that term is understood under the MBTA) of those Covered avian Species which are listed as threatened or endangered under the ESA and which are also protected by the MBTA. The take of such species in conjunction with any Authorized Development Project, in accordance with the terms of this Agreement, the NBHCP and

CITY's, SUTTER's or TNBC's Section 10(a)(1)(B) Permits, will not be in violation of the MBTA. Such Special Purpose permits shall be valid for a period of three years from the date the species is listed under the ESA provided that City's, Sutter's, or TNBC's Section 10(a)(1)(B) Permit, as applicable, remains in effect for that period. Such Special Purpose Permit will authorize take of any avian Covered Species listed under the ESA during the three year Special Purpose Permit term. Such Special Purpose Permit shall be renewed as to each Permittee, provided that each Permittee continues to fulfill its obligations under this Agreement. Each such renewal shall be valid for the maximum period of time allowed by 50 C.F.R. Section 21.27 or its successor at the time of renewal.

6.1.3 Beneficial Effects With Respect to Future Listings. To the extent permitted by the ESA and consistent with the provisions of the NBHCP, the USFWS shall consider the NBHCP and this Agreement in any future determination by the USFWS with regard to the listing of one or more of the currently unlisted Covered Species as an endangered species or threatened species pursuant to the ESA.

6.1.4 Critical Habitat. The USFWS further agrees that it will consider the NBHCP in its preparation of any proposed designation of critical habitat concerning any Covered Species and agrees that, consistent with 50 C.F.R. 424.12, the NBHCP incorporates those special management considerations necessary to manage the Covered Species and their habitats in a manner that will provide "for the conservation of the species involved" within the CITY, SUTTER's and TNBC's respective Permit Areas in the Natomas Basin. Consistent with the No Surprises Rule set forth in Section 6.1.2(a), in the event that a critical habitat designation is made for any Covered Species and upon a determination that CITY, SUTTER and TNBC are properly implementing the NBHCP, no additional mitigation in the form of land, land restrictions or financial compensation, beyond that required by the NBHCP, shall be required of any Permittee in connection with Urban Development in its Permit Area as a result of such critical habitat designation without the consent of that Permittee.

6.1.5 ESA Listing of Currently Unlisted Covered Species. In the event that one or more of the Covered animal Species that are not currently listed as an endangered species or threatened species are so listed pursuant to the ESA, the Section 10(a)(1)(B) Permit shall become effective to permit the Incidental Take of such species in connection with Urban Development within each Permittee's Permit Area as of the date the species is listed provided the CITY, SUTTER and TNBC are properly implementing the NBHCP. The Parties expressly acknowledge that it is the intent of this Agreement that the Mitigation Lands will be administered so as to conserve and enhance the habitat values for all listed and unlisted Covered Species reasonably expected to be found in Natomas Basin , to the extent provided for in the NBHCP.

6.2 CDFG

6.2.1 CESA Compliance. CDFG shall consider adherence to the terms of this Agreement to be compliance with the CESA and the California Native Plant Protection Act for the impacts of Authorized Development on State Protected Species in the Permit Area. Take of Fully Protected Species is not authorized by this Agreement.

6.2.2 Adequate Mitigation Under CESA. CDFG shall consider adherence to the terms of the Section 2081 Permit, the NBHCP and this Agreement to minimize and fully mitigate the impacts associated with the Incidental Take of State Protected Species in the Permit Areas as authorized by the Section 2081 Permit and this Agreement pursuant to CESA.

6.2.3 Assurances. Except as otherwise required by law, no further mitigation from Urban Development Permittees and/or CITY and SUTTER consisting of land, additional land restrictions, or financial compensation beyond that described herein and provided for in the NBHCP, will be required by CDFG to address the impacts of Authorized Development within the respective Permit Areas on the State Protected Species, Covered Species which become listed in the future as State-protected species, or their habitats pursuant to the CESA.

6.2.4 CESA Listing of Currently Unlisted Covered Species. In the event that one or more of the Covered Species that are not State Protected Species are listed as an endangered species or threatened species or candidate species pursuant to the CESA ("Additional State Protected Species"), the Section 2081 Permit shall become effective to permit the Incidental Take of such species in connection with Authorized Development within each Permittee's Permit Area as of the date the species is accepted and designated as a candidate species pursuant to California Fish and Game Code section 2074.2, upon confirmation by CDFG that substantial evidence demonstrates that the Section 2081 Permit will continue to meet the standards in California Fish and Game Code Section 2081(b) and Title 14 of the California Code of Regulations, Section 783,4 for the Additional State Protected Species. In the event CDFG determines that such standards will not be met, and the Section 2081 Permit does not become effective upon the designation of an Additional State Protected Species as a candidate, threatened, or endangered species under CESA, CDFG shall accept and give due consideration to the minimization and mitigation measures in the NBHCP and this Agreement in support of an application for a permit amendment or for a separate Section 2081 Permit authorizing Incidental Take of any such Additional State Protected Species. CDFG shall make reasonable efforts to review and process the application for an amendment to the Section 2081 Permit or a new Section 2081 Permit to authorize Incidental Take of an Additional State Protected Species to ensure, to the extent consistent with CESA, that the Incidental Take authorization is effective at the time the Covered Species is accepted and designated as a candidate species under CESA.

(a) The Parties expressly acknowledge that it is the intent of this Agreement that the Mitigation Lands will be administered so as to enhance their Habitat Values for all the Covered Species reasonably expected to be found in the Permit Areas.

(b) To the extent permitted by the CESA, the CDFG shall consider the NBHCP and this Agreement in any future determination by the CDFG with regard to the listing of one or more of the currently unlisted Covered Species as an endangered species or threatened species pursuant to the CESA.

6.2.5 Changed Conditions. For the purposes of this Agreement, the term "Changed Conditions" shall have the same meaning as expressed in CESA and its related implementing regulations in Title 14 of the California Code of Regulations, commencing with section 783.0. Prior to making a finding of Changed Conditions, CDFG shall provide notice to CITY, SUTTER, TNBC and other Parties hereto of any proposed amendments to this Agreement which CDFG proposes to remedy the Changed Condition. CDFG shall, to the extent feasible, meet with CITY, SUTTER, TNBC, and other Parties hereto at least ninety (90) days prior to making a finding of Changed Conditions to provide such parties with an opportunity to submit their comments and suggested revisions to the proposed amendment.

6.3 Limits on Future Revisions to NBHCP. The Parties acknowledge that the NBHCP expressly provides for revisions to the Plan's Operating Conservation Program and Mitigation Lands as a result of monitoring results collected from the Plan Area, peer-reviewed new scientific information, or future recovery plans for the Covered Species, as part of the Adaptive Management program, in response to Changed Circumstances and for any other cause identified in Chapter VI of the NBHCP, provided that such revisions comply with Chapter VI of the NBHCP. Such revisions are provided for under the Plan and are therefore not subject to the restrictions on additional Mitigation contained in USFWS's No Surprises Rule or agreed to by CDFG, nor do such revisions require amendment of the Plan or the Permits. Notwithstanding the above, such revisions shall be subject to the following limitations unless such limitations are waived in writing by CITY, SUTTER and TNBC.

(a) The modifications shall not require more than 75 percent of the Mitigation Lands to be converted to or maintained as managed marsh; and

(b) The modifications shall not require the Mitigation Ratio to be greater than 0.5 acre mitigation to 1.0 acre development.

(c) The modifications shall comply with the requirements, limitations and restrictions specified in Chapter VI of the NBHCP.

6.4 Reservation of Rights Re: Subsequent Listing of Species. This Agreement shall not be construed as a waiver of any rights or objections that any of the Parties hereto or Urban Development Permittees may have with respect to the proposed listing of any Candidate Species under the ESA or CESA or of any of the other Covered Species described in this Agreement. The Permittee and the Urban Development Permittees reserve their right to oppose any formal listing of any Candidate Species or other Covered Species pursuant to the ESA or CESA. Likewise, nothing in this Agreement is intended, nor shall be construed to limit the authority of USFWS or CDFG to enforce or otherwise carry out their respective responsibilities under the federal or state Endangered Species Acts and other applicable federal and state laws.

6.5 Land Use Authority. Nothing in the NBHCP or in this Agreement shall be interpreted or operate in a manner that expressly or impliedly diminishes or restricts the local land use authority of CITY and SUTTER. Notwithstanding the foregoing sentence, CITY and SUTTER acknowledge that they have chosen to implement several of the commitments made by them under the NBHCP through the exercise of their respective land use authorities. Therefore, a failure of CITY or SUTTER to exercise their land use authorities in a manner consistent with their obligations under the NBHCP could compromise the effectiveness of the Plan, would trigger a reevaluation of the Plan and their respective Permits and could result in suspension or revocation of such Permits as set forth in Section 7.6 of this Agreement.

6.6 No Liability. All Parties hereto agree that under no circumstances shall CITY, SUTTER and TNBC have any liability whatsoever for any debts, liabilities or financial obligations incurred by another Permittee under the NBHCP. Notwithstanding the foregoing sentence CITY and SUTTER acknowledge that they are obligated under their Permits to fully implement the NBHCP, including funding each of the obligations assigned to TNBC as the Plan Operator under the NBHCP. Therefore, a failure of CITY or SUTTER to fully fund TNBC's obligation under the Plan could compromise the effectiveness of the Plan, would trigger a reevaluation of the Plan and CITY, SUTTER and TNBC's respective Permits and could result in suspension of revocation of such permits pursuant to Section 7.6 of this Agreement.

7 AMENDMENTS AND REMEDIES

7.1 Revisions and Amendments to the NBHCP. Revisions to the NBHCP shall be implemented in accordance with Chapter VI of the Plan. Revisions shall not require Amendment of the Plan or Permits. Amendments to the NBHCP shall require amendment of the Permits and shall be processed in accordance with the amendment provisions of Chapter VI of the Plan and all applicable laws and regulations.

7.2 Amendments to Agreement. This Agreement may be amended only by written document signed by all of the Parties.

7.3 Land Use Changes. The Parties to this Agreement agree that the adoption and amendment of General Plans, Specific Plans, Community Plans, zoning ordinances and similar ordinances, and the granting of implementing land use entitlement by CITY or SUTTER pertaining to land in their respective Permit Areas, shall be matters within the sole discretion of CITY and SUTTER, and shall not require amendments to this Agreement or the approval of the other Parties to this Agreement. No such action by CITY or SUTTER shall in any way alter or diminish its obligations under this Agreement and the NBHCP. Notwithstanding the foregoing sentences, CITY and SUTTER acknowledge that they have chosen to implement several of the commitments made

by them under the NBHCP through the exercise of their respective land use authorities. Therefore, a failure of CITY or SUTTER to exercise their land use authorities in a manner consistent with their obligations under the NBHCP could compromise the effectiveness of the Plan, would trigger a reevaluation of the Plan and their respective Permits and could result in suspension or revocation of such Permits as set forth in Section 7.6 of this Agreement.

7.4 Remedies in General. The Parties acknowledge that each of the Covered Species is unique and that the loss of any of the Covered Species would be irreparable and that therefore injunctive and/or temporary relief may be appropriate in certain circumstances involving a breach of this Agreement. Notwithstanding any other provision of this Agreement, the Parties shall not be liable in monetary damages to any Party or any person for any breach of this Agreement, in the performance or failure to perform a mandatory or discretionary obligation imposed by this Agreement, or any other cause of action arising from this Agreement. Subject to the foregoing, the Parties shall have all of the remedies available in equity (including specific performance and injunctive relief) and at law to enforce the terms of this Agreement and the Section 10(a)(1)(B) Permit and Section 2081 Permit and to seek remedies for any breach thereof, consistent with and subject to the terms of this Agreement. It is expressly understood by the Parties that monetary damages will not provide an adequate remedy for material breach of this Agreement.

7.5 Third Party Enforcement. This Agreement shall not create in the public, any member of the public, or any other person or entity, including any Urban Development Permittee, any rights under this Agreement, nor shall it authorize anyone not a signatory to this Agreement to maintain a suit (1) in equity or law to enforce the terms of this Agreement and/or the NBHCP, Section 10(a)(1)(B) Permit or Section 2081 Permit, or (2) for compensation or damages under the provisions of the Agreement, NBHCP, or Permits.

7.6 Suspension or Revocation.

7.6.1 Suspension or Revocation by USFWS. The Parties acknowledge that the USFWS has the authority to suspend or revoke any of the Section 10(a)(1)(B) Permits, in whole or in part, in the event of a material violation of the Section 10(a)(1)(B) Permit and pursuant to any applicable federal laws or regulations that govern the permitted activity. The regulations found at 50 C.F.R. §§13.27 - 13.29 and 17.22(b)(8), or any successor regulations, shall govern the suspension or revocation of the Section 10(a)(1)(B) Permit issued by the USFWS.

7.6.2 Suspension or Revocation by CDFG. The Parties acknowledge that CDFG shall have the authority to suspend or revoke the Section 2081 Permit in the event of a material breach or violation of the Section 2081 Permit or any applicable California laws or regulations governing the permitted activity.

7.6.3 Status of Urban Development Permittees after Suspension or Revocation. Notwithstanding the suspension or revocation of a Permittee's Permit, CITY and SUTTER shall remain liable under this Agreement to carry out all of their responsibilities under the Permits and this Agreement arising from any Authorized Development approved, authorized, or carried out by CITY or SUTTER, within their respective Permit Areas between the Effective Date of the Agreement and the date a Permittee's Permit is suspended or revoked. As to any Authorized Development project approved or authorized by CITY or SUTTER prior to the Permit suspension or revocation and that is in compliance with the Permit, but as to which construction activity has not commenced as of the suspension or revocation, so long as CITY or SUTTER and the Urban Development Permittee, if any, continue to fulfill their obligations under the Permit, the Permit shall continue in effect for that Authorized Development project until that project is completed.

7.6.4 No Further Approvals by Permittees. Subject to the provisions of section 7.6.3 above, if a Permit is suspended or revoked, CITY and SUTTER shall not have the authority to rely upon the Permit to approve or carry out any actions that would violate the ESA or CESA in the absence of such Permit. Notwithstanding the suspension or revocation, CITY and SUTTER shall remain fully liable under the Permits and this Agreement to carry out all of their responsibilities,

including the Mitigation Requirement, under the NBHCP, the Permits and this Agreement arising from Authorized Development approved, authorized or carried out by an Urban Development Permittee within the respective Permit Areas between the Effective Date and the date the Permit is suspended or revoked.

7.6.5 Severability. The violation by CITY or SUTTER of their respective Permits shall not adversely affect or be attributed to, nor shall it result in the loss or diminution of any right, privilege or benefit under a Permit held by a non-responsible Permittee. Nor shall CITY and SUTTER be deemed to have violated the Permits solely as a consequence of the actions of an Urban Development Permittee or other third person subject to CITY's or SUTTER's jurisdiction and control, so long as CITY or SUTTER takes all necessary and appropriate steps, if any are available, to halt and correct the violation in accordance with this Agreement and consistent with their police powers and local land use authority. However, the violation by TNBC of its Permits shall be considered a failure by CITY and SUTTER to implement their obligations of the Operating Conservation Program under the NBHCP. In such event, CITY and SUTTER's Permits shall not be revoked or suspended, if CITY and/or SUTTER implement corrective measures in accordance with Section 3.1.11 of this Agreement. Notwithstanding the above, to the extent that action or inaction by a Permittee, an Urban Development Permittee or other third party subject to CITY's or SUTTER's jurisdiction and control, or TNBC prevents proper implementation of the NBHCP or compliance by one or more of the remaining Permittees with their Permits or results in a determination by the USFWS or CDFG that continuation of the Permits would appreciably reduce the likelihood of the survival and recovery of a Covered Species in the wild, such Permits may be suspended or revoked in accordance with applicable USFWS and CDFG regulations.

7.6.6 Validity of Permits. In the event a court of competent jurisdiction invalidates either City, County's or TNBC's Section 10(a)(1)(B) or Section 2081 Permits with regard to one or more Covered Species, other than the Giant garter snake or Swainson's hawk, such action shall not be construed to invalidate the permits with regard to the remaining Covered Species. The requirements of the State and Federal Incidental Take Permits and the NBHCP shall continue to be implemented by each Permittee with regard to the remaining Covered Species.

8 MISCELLANEOUS

8.1 Term of Agreement. This Agreement shall remain in effect for a period of fifty (50) years from the Effective Date.

8.2 Termination

8.2.1 Termination by Mutual Consent. CITY or SUTTER may, by mutual agreement with the Wildlife Agencies, terminate this Agreement as to itself. In the event that such mutually agreed-upon termination occurs, a written termination agreement shall be executed to ensure that the mitigation required under the NBHCP and this Agreement for all Authorized Development approved, authorized or carried out prior to termination is carried out. Upon execution of such agreement and surrender of the Permits to the Wildlife Agencies, no further take shall be authorized under the terms of the surrendered Permits.

8.2.2 Termination by USFWS or CDFG. The USFWS or CDFG may terminate this Agreement upon revocation of the Section 10(a)(1)(B) Permit or the Section 2081 Permit in accordance with Section 7.6.

8.2.3 Termination by the TNBC. The TNBC may terminate voluntarily its participation under this Agreement only if it has an agreement to do so with the CITY, SUTTER, USFWS and CDFG. Any agreement allowing TNBC to terminate its participation and its status as Plan Operator, shall contain provisions for assuring that the provisions of the NBHCP will be implemented.

8.2.4 Effect of Termination. In the event this Agreement is terminated by the USFWS or CDFG with respect to a Permittee, that Permittee's Section 10(a)(1)(B) Permit or

Section 2081 Permit, as applicable, shall, subject to Section 8.2.1 above, be void. CITY and SUTTER acknowledge that, although the NBHCP Operating Conservation Program would mitigate for effects resulting from the Land Use Agencies' Covered Activities, because the percentage of uplands to wetlands differs between their respective Permit Areas, the NBHCP allows for the Operating Conservation Program provided for under the NBHCP to be reevaluated and revised in the event either CITY's or SUTTER's Permits are terminated or revoked to ensure that the configuration of Mitigation Lands provided for under the NBHCP continues to adequately mitigate for the impacts of Authorized Development in the remaining jurisdiction.

8.2.5 Status of Mitigation Lands Upon Termination. The Mitigation Lands are to be established in perpetuity. Management of the Mitigation Lands by TNBC in accordance with the NBHCP shall continue in perpetuity, notwithstanding termination, suspension or revocation of CITY's or SUTTER's Section 10(a)(1)(B) Permit or Section 2081 Permit for any reason, unless the suspension or revocation of CITY's or SUTTER's Permits is due to a violation by TNBC of its Permits. TNBC's management activities shall be funded from the Mitigation Fees collected on account of past Authorized Development under the Permits which includes endowment components to fund permanent management. None of the assets of the TNBC, including lands or interests in land may be transferred, conveyed, or assigned to any person or entity, except as specified in Sections 3.2.11 and Section 3.2.12 of this Agreement. However, take previously authorized through Urban Development Permits or for public or private projects for which the Mitigation Requirement was been completed or is otherwise assured shall continue to be authorized. In the case of the federal Permit, upon notification from the Service that implementation of all minimization and mitigation measures identified in the termination agreement have been implemented, the permit shall be deemed canceled.

8.3 Binding Effect. The terms, provisions and conditions of this Agreement shall be binding upon and inure to the benefit of the Parties hereto and their respective successors and assigns.

8.4 Notices. Any notice required or permitted to be given hereunder shall be in writing, shall be deemed made upon receipt, and shall be given by personal delivery or by certified mail/return receipt requested, addressed to the Parties as follows:

City of Sacramento
915 I Street, Room 109
Sacramento, CA 95814
Attn: City Manager

County Administrative Officer
County of Sutter
1160 Civic Center Blvd., Ste. A
Yuba City, CA 95993

United States Fish and Wildlife Service
Office of the Regional Director
Portland, OR 97232

with a copy to:

Field Supervisor
U.S. Fish and Wildlife Service
3310 El Camino Avenue, Suite 130
Sacramento, CA 95821-6340

California Department of Fish and Game Office of the Director
1416 9th Street, 12th floor
Sacramento, CA 95814

with copies to:

General Counsel
California Department of Fish and Game
1416 9th Street, 12th floor
Sacramento, CA 95814

and to:

Regional Manager
California Department of Fish and Game
1701 Nimbus Road, Suite A
Rancho Cordova, CA 95670

The Natomas Basin Conservancy
1750 Creekside Oaks Dr., Suite 290
Sacramento, CA 95833
Attn: Executive Manager

Any Party may give notice to the others specifying a different address for notice purposes.

8.5 Captions. The headings of the various sections hereof are for convenience only, and shall not affect the meaning of any provisions of this Agreement.

8.6 Counterparts. This Agreement may be executed in multiple counterparts, all of which shall constitute but one and the same instrument.

8.7 Governing Law. This Agreement shall be governed by and construed in accordance with the ESA, the CESA, and other applicable state and federal laws. In particular, nothing in this Agreement is intended to limit the authority of USFWS to fulfill its responsibilities under the ESA or CDFG under CESA or other applicable law, including but not limited to seeking penalties against CITY, SUTTER or TNBC. Moreover nothing in this agreement is intended to limit the legal responsibilities of USFWS as an agency of the federal government or CDFG as an agency of the State of California.

8.8 Complete Agreement. This Agreement, together with the NBHCP, constitutes the full and complete agreement between the Parties concerning the subject matter hereof and supersedes any prior or contemporaneous agreements or understandings, whether oral or written, all of which shall be deemed to have been merged herein, it being the intention of the Parties that this be a completely integrated agreement. Specifically, this Agreement shall supercede the Implementation Agreement executed in December, 1997.

8.9 Federal Section 7 Consultations. Nothing in this Agreement is intended to eliminate or modify the obligation of a federal agency to consult with the USFWS pursuant to section 7(a) of the ESA (16 U.S.C. Section 1536(a)). To the maximum extent appropriate, in any consultation

under said provision involving CITY or SUTTER or a prospective or other Urban Development Permittee with regard to Covered Species, the USFWS shall ensure that the biological opinion issued in connection with the proposed public or private Project which is the subject of the consultation is consistent with the biological opinion issued in connection with the NBHCP, provided that the proposed public or private Project is consistent with the NBHCP. Any biological measures included under the terms and conditions of the Section 7 biological opinion shall, to the maximum extent appropriate, be consistent with the Mitigation Requirement imposed by CITY or SUTTER under the NBHCP as implemented by this Agreement, provided that, unless otherwise required by law, the USFWS shall not impose additional mitigation measures on the project proponent in excess of those that have been or will be required by the CITY or SUTTER pursuant to the NBHCP, this Agreement and the Permits.

8.10 Conflict with NBHCP. The NBHCP and each of its terms are intended to be, and by this reference are, incorporated herein. In the event of any contradiction, conflict or inconsistency between the terms of this Agreement and the NBHCP, the terms of this Agreement shall control. In all other cases, the terms of this Agreement and of the NBHCP shall be interpreted to be supplementary to each other. Where interpretation is required, this Agreement shall be interpreted as a vehicle for implementation of the NBHCP.

8.11 Other Permittees. The failure of other Potential Permittees identified in the NBHCP to obtain Permits shall not preclude this Agreement from going into effect within the geographical boundaries of each Permittee , or on lands Acquired by the NBC, nor preclude the issuance of the Permits to such other Potential Permittees or to subsequent signatories of this Agreement.

8.12 Federal Appropriations. USFWS's commitment to provide technical assistance under the NBHCP and to implement this Agreement, including the assurances provided herein, are subject to the requirements of the Anti-Deficiency Act and the availability of appropriated funds. Nothing in this agreement will be construed by the parties to require the obligation, appropriation, or expenditure of any money from the U.S. Treasury. The parties acknowledge that the USFWS will not be required under this Agreement to expend any federal agency's appropriated funds unless and until an authorized official of that agency affirmatively acts to commit to such expenditures as evidenced in writing.

8.13 State Appropriations. Implementation of this Agreement and the NBHCP and the assurances provided herein, is subject to the availability of appropriated funds. Nothing in this agreement will be construed by the parties to require the obligation, appropriation, or expenditure of any money from the Treasury of the State of California. The parties acknowledge that CDFG will not be required under this Agreement to expend any State of California agency's appropriated funds unless and until an authorized official of that agency affirmatively acts to commit to such expenditures as evidenced in writing.

8.14 References to Regulations. Any reference in this Agreement, the NBHCP, or the Permits to any regulation or rule of USFWS or CDFG shall be deemed to be a reference to such regulation or rule in existence at the time the action is taken.

8.15 Applicable Laws. All activities undertaken pursuant to this Agreement, the NBHCP or the Permit must be in compliance with all applicable state and federal laws and regulations.

8.16 No Partnership. Neither this Agreement nor the NBHCP shall make or be deemed to make any party to this Agreement the agent for or the partner of any other party.

8.17 Elected Officials Not to Benefit. No member of or delegate to Congress shall be entitled to any share or part of this Agreement, or to any benefit that may arise from it.

IN WITNESS WHEREOF, the Parties have executed this Agreement to be effective as of the date first set forth above.

U.S. FISH AND WILDLIFE SERVICE,
An Agency of the Department of the Interior
of the United States of America

By: David G. Paullin JUN 27 2003

Name: DAVID G. PAULLIN

Title: Acting DEPUTY MANAGER
CALIFORNIA/NEVADA OPERATIONS OFFICE

CALIFORNIA DEPARTMENT OF FISH AND GAME,
A Subdivision of the Resources Agency
of the State of California

By: Sandra Morey

Name: Sandra Morey

Title: Chief, Habitat Conservation Planning Branch

CITY OF SACRAMENTO,
A Municipal Corporation

By: _____
Robert P. Thomas
City Manager

Approved as to Form:

_____
City Attorney

COUNTY OF SUTTER,
A Political Subdivision of the State of California

By: _____

County Administrative Officer

Approved as to Form: _____
County Counsel

NATOMAS BASIN CONSERVANCY,
A Non-Profit Corporation

By: _____

Name: JOHN R. ROBERTS

Title: EXECUTIVE DIRECTOR

[add signatories]

EXHIBIT A: DEFINITIONS

NBHCP Definitions

Terms used in the NBHCP and Implementation Agreement shall have the same meaning as those same terms have under the ESA and CESA, except as set forth below. Capitalized terms used but not defined herein, but which are defined in the Plan, shall have the meanings specified in the Plan.

1. Adaptive Management. The term "Adaptive Management" means a method for examining alternative strategies for meeting measurable goals and objectives, and then, if necessary adjusting future conservation management actions according to what is learned to achieve those goals and objectives.

2. Amendment. The term "Amendment" shall refer to significant changes to the NBHCP, Implementation Agreement and/or Incidental Take Permit for circumstances as described in Chapter VI, Section 3(b) of the NBHCP. Amendments include activities which are more significant than and different from revisions (see also "Revisions").

3. Area B (Out of Basin Mitigation Area). Area B shall refer to lands identified on Figure 20 of the HCP in which TNBC may pursue acquisition of Mitigation Lands under the specific terms described in Chapter IV, Section 2.b of the HCP, with approval of USFWS and CDFG. TNBC shall account for all acreage acquired in Area B to ensure that the total amount of such lands does not exceed 20 percent of the total Mitigation Lands. The additional requirements for acquisition of mitigation lands in Area B (out of basin) apply only to Area B and do not apply to any acquisitions of mitigation lands located within the Natomas Basin or the outer "ring" of the Natomas Basin defined as the land bounding the Natomas Basin and extending to the edge of the water immediately outside the Natomas Basin levees.

   (Note: During the final NBHCP approval process by the City Council of the City of Sacramento and the Board of Supervisors of Sutter County, authorization to purchase Mitigation Lands to offset the impacts of development was limited to the Natomas Basin and the "outer" ring around the levees of the Natomas Basin. No authorization to purchase lands to mitigate impacts of Authorized Development in Area B (out of basin) was granted by the City Council and the Board of Supervisors.)

4. Authorized Development. The term "Authorized Development" means that development for which incidental take is authorized for the City of Sacramento and Sutter County under this NBHCP. Authorized Development is limited to a total of 15,517 acres of Planned Development (as further defined below in Section III.A) under the NBHCP. Included within the City's 8,050 acre portion of the Authorized Development are 28 acres of infrastructure development associated with the Metro Air Park (MAP) project in Sacramento County. Included within Sutter County's 7,467 acres of Authorized Development is 16.5 acres of proposed drainage channel improvements located within Sacramento County. Incidental take resulting from the 1,983 acre MAP project, including the 28 acres located in the City of Sacramento, is covered by separate incidental take permits issued by the Wildlife Agencies. The 15,517 acres of Authorized Development related incidental take within the City and Sutter County combined with the 1,983 acres of development related take within Sacramento County for the MAP project represent a total of 17,500 acres of potential urban development in the Natomas Basin which has been analyzed in the NBHCP as Planned Development, as further defined below. Any development within the City of Sacramento

beyond the 8,050 acres to be covered under its incidental take permits, within Sutter County, beyond the 7,467 acres to be covered under its incidental take permits, or within Sacramento County beyond the MAP project, will not be covered under the respective incidental take permits and will trigger a reevaluation of impacts to and mitigation for biological and other resources in the Natomas Basin and amendment of the NBHCP and the incidental take permits or development of a new HCP and issuance of new incidental take permits to address such impacts and mitigation as appropriate.

5. Biological Monitoring. The term "Biological Monitoring" means the mandatory element of all HCPs that is designed and implemented to provide the information necessary to assess compliance and project impacts, and verify progress toward the biological goals and objectives for the Plan's Covered Species and habitats.

6. Biological Monitoring Plan. Refers to specific monitoring requirements to be conducted in the Natomas Basin as specified in Chapter VI, Section E, Subsection 2, and includes both the overall NBHCP Biological Effectiveness Monitoring Program and the Site Specific Biological Monitoring Programs.

7. Changed Circumstances. This term "Changed circumstances" is defined in Title 50 of the Code of Federal Regulations, Section 17.3 as changes in circumstances affecting a species or geographic area covered by the NBHCP that can reasonably be anticipated by Plan Participants and the USFWS, and that can be planned for (e.g., the listing of a new species, or a fire or other natural catastrophic event in areas prone to such events.)" Changed circumstances addressed in NBHCP are outlined in Chapter VI, Section K of the HCP.

8. Compliance Monitoring. The term "Compliance Monitoring" means an itemized, task specific method of verifying that the Permittee is carrying out the terms of the NBHCP, Permit and IA.

9. Conservation Measures. The term "Conservation Measures" means that accepting and conveying developer mitigation fees, and possibly land dedications, as required under the NBHCP, the Land Use Agencies shall implement a variety of measures that will avoid, minimize or mitigate the take of Covered Species.

10. Covered Activities. The term "Covered Activities" means the Land Use Agencies Covered Activities and the TNBC Covered Activities.

11. Covered Activities, Land Use Agencies. The term "Land Use Agencies Covered Activities" refers to those specific activities identified at Chapter I, Section N.(1) of the NBHCP for which each Land Use Permittee shall be provided coverage under the federal Section 10(a)(1)(B) permits, and the State Section 2081 Permits. Covered Activities generally means the conversion from vacant land or agricultural uses to residential, commercial, and industrial uses, including related public and private infrastructure development and improvements by the City or Sutter County.

12. Covered Activities, TNBC. The term "TNBC Covered Activities" means those activities conducted by TNBC on behalf of the City, Sutter County and other Permittees who may obtain take authorization pursuant to the NBHCP or an HCP based on the NBHCP, within TNBC's Permit Area. These activities include acquisition, habitat creation, restoration,

preservation, enhancement, management and monitoring activities within Conserved Habitat Areas. TNBC's Covered Activities are described at Chapter I, Section N (3) of the NBHCP.

13. Covered Activities, Water Agencies. The term "Water Agencies Covered Activity" refers to those specific activities identified in Chapter I, Section N (2) of the NBHCP for which each Water Agency Permittee shall be provided coverage under the federal Section 10(a)(1)(B) permits, and the State Section 2081 Permits. Such Covered Activities generally include physical maintenance and operation of the Water Agencies' existing facilities located within the Plan Area, including channel maintenance, vegetation control (where no herbicides are utilized), and construction or improvement of facilities where there is no increase to the footprint of the existing facility.

14. Covered Species. The term "Covered Species" means the Federally Protected Species, State Protected Species and the Other Species identified within Table I-1 hereto.

15. ESA and CESA. The term "ESA" means the Federal Endangered Species Act of 1973, as amended. The term "CESA" means the California Endangered Species Act, as amended.

16. Exempt Area. The term refers to areas within the Natomas Basin, within the City of Sacramento which are already approved for development or already developed and as shown on Exhibit B of the Implementation Agreement.

17. Federally Protected Species. The term "Federally Protected Species" means those plants and animals listed by the United States ("U.S.") under the provisions of ESA and shown as Covered Species on Table I-1 hereto that are found, or may be found, in the Permit Areas, as well as those other Covered Species listed on Table I-1 that the USFWS may list in the future.

18. Five Point Policy. The term "Five Point Policy" refers to an addendum to the HCP Handbook published by the Fish and Wildlife Service and the National Marine Service on June 1, 2000. The five point policy addendum provides clarifying guidance for conducting the incidental take permit program and for those applying for an incidental take permit under section 10(a)(1)(B) of the Endangered Species Act (ESA).

19. Habitat Values. The term "Habitat Values" means the capability of a land or water area or associated areas, where indigenous plant(s) or animal(s), individually or collectively, may occur and upon which the Covered Species are dependent, in whole or in part, to provide for some or all of their maintenance, growth and reproduction.

20. Implementation Annual Meeting. The term refers to the annual public meeting held jointly with TNBC, other Permittees, USFWS and CDFG to report on the progress of the HCP Conservation Strategy as described in Chapter VI. G of the NBHCP.

21. Implementation Annual Report. The term refers to the annual report prepared by the TNBC describing the compliance and effectiveness monitoring processes and findings and the status of the progress in implementing the NBHCP in accordance with the requirements of Chapter VI, Section G of the NBHCP.

22. Incidental Take. The term "Incidental Take" means any taking of Covered Species that is incidental to, and not the purpose of, the carrying out of otherwise lawful activity.

23. Incidental Take Permits. The terms “Incidental Take Permits,” “ITPs” and “Permits” mean the individual permits issued to each Permittee subject to Section 10(a)(1)(B) of the Endangered Species Act and Section 2081 of the California Endangered Species Act.

24. Independent Mid-Point Review. This term refers to the required review and evaluation of the effectiveness of the HCP by each of the land use agencies at a defined mid-point in the approval of Authorized Development and as more specifically defined in Chapter VI, Section J of the NBHCP.

25. Land Use Agencies. The term “Land Use Agencies” means the City of Sacramento and Sutter County. If and when Sacramento County submits and receives approval of its own ITP, Sacramento County would be considered a Land Use Agency as defined herein.

26. MAP (Metro Air Park) Habitat Conservation Plan (MAP HCP). This term refers to the approved Habitat Conservation Plan for the Metro Air Park Project located in the unincorporated portion of the Natomas Basin within Sacramento County, specifically, “Habitat Conservation Plan for the Metro Air Park Project in the Natomas Basin, Sacramento County, California, Prepared by Metro Air Park Property Owner’s Association, Dated 2001.”

27. Mitigation Fees. As defined in Chapter VI, the term "Mitigation Fees" means the one time, up-front fees levied upon an Authorized Development site (in gross acres) that is used to pay for the Mitigation Land acquisition, enhancement, management, monitoring, and other activities required under the NBHCP. The Mitigation Fees must be paid prior to the issuance of an Urban Development Permit by the Land Use Permittee. The components of the Mitigation Fee include: Land Acquisition, Restoration/Enhancement/Monitoring, Administration O&M, O&M Endowment Fund, Supplemental Endowment Fund, and Fee Collection Administration as defined in Chapter VI.

28. Mitigation Lands. The term “Mitigation Lands” means the reserve lands acquired through collection and use of Mitigation Fees from Authorized Development, and in some cases land which has been accepted for dedication from Authorized Development, which will be set aside and managed at a ratio of one-half (½) acre of land protected or preserved for every one (1) acre of land converted to Authorized Development. The NBHCP Operating Conservation Program will result in 8,750 acres of Mitigation Lands to be established and managed by TNBC.

29. Mitigation Ratio. The term “Mitigation Ratio” means mitigation for the conversion of land in the respective Permit Areas to Authorized Development at a ratio of one-half (½) acre of land protected or preserved for every one (1) acre of land converted to Authorized Development.

30. Mitigation Requirement. The term “Mitigation Requirement” means the mitigation requirement for each public and private project is determined by applying the Mitigation Ratio to the land area converted to Authorized Development as calculated in accordance with the requirements set forth in Chapter VI, Section 1.

31. Natomas Basin. "Natomas Basin" or "Basin" means that geographical area depicted in Figure 2, Natomas Basin and Affected Jurisdictions.

32. Natomas Basin Habitat Conservation Plan. The terms “Natomas Basin Habitat Conservation Plan,” “NBHCP” and “the Plan” mean the year 2002 version of the Natomas Basin Habitat Conservation Plan prepared for the City of Sacramento, Sutter County, The Natomas Basin Conservancy (TNBC), RD 1000 and Natomas Mutual.

33. Natomas Basin Habitat Conservation Plan, 1997. The terms “1997 NBHCP” and “1997 Plan” mean the previously approved City of Sacramento Natomas Basin HCP that was the original basis for this 2002 NBHCP.

34. No Surprises Rule. The term “No Surprises Rule” refers the terms and conditions specified in the February 28, 1998, the U.S. Fish and Wildlife final rule codifying its “No Surprises” policy into federal regulation (63 FR 8859). The “No Surprises” rule states, in part, that: “In negotiating unforeseen circumstances, the [Service] will not require the commitment of additional land, water or financial compensation or other natural resources beyond the level otherwise agreed upon for the species covered by the conservation plan without the consent of the Permittee. If additional conservation and mitigation measures are deemed necessary to respond to unforeseen circumstances, the [Service] may require additional measures of the Permittee where the conservation plan is being properly implemented, but only if such measures are limited to modifications within conserved habitat areas, if any, or to the Conservation Plan’s Operating Conservation Program for the affected species, and maintain the original terms of the Conservation Plan to the maximum extent possible. Additional conservation and mitigation measures will not involve the commitment of additional land, water or financial compensation or restrictions on the use of land, water, or other natural resources otherwise available for development or use under the original terms of the conservation plan, without the consent of the Permittee.” (50 C.F.R. Sections 17.22(b)(5)(iii) and 17.32(b)(5)(iii).) The No Surprises Rules is discussed in Chapter VI, Section K of the NBHCP.

35. Operating Conservation Program. The term “Operating Conservation Program” means the totality of the conservation and management measures provided for under the NBHCP to avoid, minimize, mitigate and monitor the impacts of take of the Covered Species as described in Chapters IV through VI of the Plan. The Operating Conservation Program includes totals the Permittees reporting obligations under the Permits and responses to Changed Circumstances described in Chapter VI.

36. Overall Program Review. This term refers to a required program review of the effectiveness of the Operating Conservation Program to be initiated at the point Urban Development Permits covering a total of 9,000 acres of development in the Natomas Basin have been issued by the Land Use Permittees and by Sacramento County for the Metro Air Park. The areas to be covered by the Overall Program Review are specified and described in Chapter VI, Section I of the NBHCP.

37. Permit Area, City of Sacramento. The term “Permit Area” as applied to the City of Sacramento means that area designated on Figure 2 of the NBHCP Implementation Agreement that totals 8,050 acres located within the City of Sacramento city limits and in

certain locations (i.e., the Panhandle Annexation Area) within the unincorporated areas of Sacramento County. Incidental take authority for the City of Sacramento is limited to this Permit Area.

38. Permit Area, County of Sutter. The term “Permit Area” as applied to Sutter County means that area designated on Figure 2 of the NBHCP Implementation Agreement that totals 7,467 acres located within the unincorporated areas of Sutter County, and approximately 16.5 acres located within unincorporated Sacramento County. Incidental take authority for Sutter County is limited to this Permit Area.

39. Permit Area, Natomas Mutual. The term “Permit Area” as applied to Natomas Mutual means canals, ditches, waterways, ponds and open water areas, as well as roads, right-of-ways, facilities, maintenance yards, pumps, pipelines, and water detention facilities, under the direct jurisdiction of Natomas Mutual and inside the inner toe of levees surrounding the Natomas Basin, but not including the Sacramento River levees. Incidental take authority for Natomas Mutual is limited to this Permit Area.

40. Permit Area, RD 1000. The term “Permit Area” as applied to RD 1000 means canals, ditches, waterways, ponds and open water areas, as well as roads, right-of-ways, facilities, maintenance yards, pumps, pipelines, and water detention facilities, under the direct jurisdiction of RD 1000 and inside the inner toe of levees surrounding the Natomas Basin, but not including the Sacramento River levees. Incidental take authority for RD 1000 is limited to this Permit Area.

41. Permit Area, TNBC. The term “Permit Area” as applied to The Natomas Basin Conservancy (TNBC) consists of all lands within the Natomas Basin (the Plan Area), as well as the land bounding the Natomas Basin and extending to the edge of water immediately outside the Natomas Basin levees and Area B as depicted on Figure 20, Out of Basin Mitigation Areas.

42. Permittees. The term "Permittees" means the City of Sacramento, Sutter County, RD 1000, Natomas Mutual and The Natomas Basin Conservancy.

43. Plan Area. The term “Plan Area” means the entire 53,537 acres of land within the inside toe of levee of the Natomas Basin levees. The Plan Area refers to the portion of the Natomas Basin that is bounded on the west by the Sacramento River, on the north by the Natomas Cross Canal, on the east by Steelhead Creek (formerly known as Natomas East Main Drain Canal), and on the south by the Garden Highway.

44. Planned Development. The term “Planned Development” means the Authorized Development plus the development of the 1,983 acre Metro Air Park, which is subject to the Metro Air Park Habitat Conservation Plan (“MAP Authorized Development”)

45. Plan Operator. The term “Plan Operator” means The Natomas Basin Conservancy, the entity responsible for implementing the NBHCP.

46. Plan Participants. The term “Plan Participants” means parties actively involved in implementing the NBHCP, including the Wildlife Agencies (USFWS and CDFG), the Permittees (City of Sacramento, Sutter County, Natomas Mutual and RD 1000), and the Plan Operator (TNBC).

47. Potential Permittees. The term “Potential Permittees” refers to additional entities within the Natomas Basin that may decide to commit to the terms of the NBHCP and the Implementation Agreement and, through the issuance of Permits by the Wildlife Agencies, join as full Permittees at a future date.

48. Protected Species. The term "Protected Species" means those plants and animals listed under the State CESA and the Federal ESA.

49. Qualified Biologist. The term “qualified biologist” shall refer to a biologist which meets the training and experience requirements necessary to conduct assessments or surveys for specific species, and who has been approved by the Wildlife Agencies to conduct those assessments or surveys.

50. Reintroduction. The term “reintroduction” as used in the NBHCP refers to relocating individuals (or seeds or cysts, etc) of a Covered Species: (1). Either from one TNBC Reserve Site to another TNBC Reserve Site or from one location on a TNBC Reserve Site to a new location within the same TNBC Reserve Site; or (2) the relocation of an individual of a Covered Species from a site which will be impacted by Authorized Development to a TNBC Reserve Site to avoid, minimize or mitigate the impacts to Covered Species. The term “reintroduction” as used in the Natomas Basin HCP refers to the movement of animals or plants within the Basin and does not refer to the intentional introduction or recolonization of Covered Species from outside the Basin to inside the Basin.

51. Revisions. Refers to minor changes to the NBHCP as specified in Chapter VI, Section 3.a of the NBHCP. Revisions to the NBHCP are changes to the Plan provided for under the Operating Conservation Program, including Adaptive Management changes and Mitigation Fee adjustments. These revisions would not result in operations under the NBHCP that are significantly different from those analyzed in connection with the NBHCP as approved, result in adverse impacts on the environment that are new or significantly different from those analyzed in connection with the NBHCP as approved.

52. Section 10(a)(1)(B) Permits. The terms "Section 10(a)(1)(B) Permits" or "Permits" as used in this Plan means the permits issued by the USFWS under Section 10 (a)(1)(B) of the ESA which authorize the incidental take of a Covered Species which may occur as a result of urban development activities, including public facilities projects, within the City of Sacramento and Sutter County, or as a result of the operation and/or maintenance, including the construction and improvements with no significant increase to the existing footprint, of flood control or water supply activities, water ditches, canals, pumphouses, maintenance facilities, or other ancillary facilities within the Natomas Basin, or as a result of habitat management, enhancement, or restoration activities on reserve lands. "Permit" may also be used in this Plan to collectively refer to the Section 10(a)(1)(B) Permits, and the Section 2081 Permits.

53. Section 2081 Permits. The terms "Section 2081 Permits” or “Permits” means the permits for the incidental take of threatened and endangered species, listed under the CESA, issued by the CDFG under Section 2081(b) and/or 2081.1 of the California Fish and Game Code, or any successor section to authorize the incidental take of a Covered Species which may occur as a result of urban development activities, including public facilities projects, within

the City of Sacramento and Sutter County, or as a result of the operation and/or maintenance, including the construction and improvements with no significant increase to the existing footprint, of flood control or water supply activities, water ditches, canals, pumphouses, maintenance facilities, or other ancillary facilities within the Natomas Basin, or as a result of habitat management, enhancement, or restoration activities on reserve lands. "Permits" may also be used in this Agreement to refer collectively to the Section 10(a)(1)(B) Permits and/or the Section 2081(b) or 2081.1 Permits.

54. Site Specific Management Plan. The terms “Site Specific Management Plan” and “SSMP” mean those plans that TNBC is required to complete for each reserve unit that it acquires. SSMP’s shall include operations plans that address on-site habitat restoration, enhancement, maintenance and management activities that will be presented to the NBHCP TAC for approval on a three year basis.

55. State Protected Species. The term ‘State Protected Species” means those plants and animals listed by the State of California (“State”) under the provisions of CESA and shown as Covered Species on Table I-1 hereto that are found, or may found, in the permit areas.

56. Swainson’s Hawk Zone. This zone is defined as the lands which are not currently developed (excluding the 250 acres of land designated “Urban” on the City of Sacramento General Plan and the North Natomas Community Plan located within the City of Sacramento) and which are located within the Natomas Basin and within one mile east of the toe of the inside levee of the Sacramento River and extending from the Natomas Cross Canal on the north and Interstate 80 on the south. See also Figure 13 of the NBHCP.

57. System of Reserves. The term “system of reserves” means Mitigation Lands generally and includes all habitat conserved and managed for the Covered Species, including rice fields by TNBC.

58. Take or Taking. With regard to any activities subject to ESA, the terms “Take” or “Taking” shall have the same meaning as provided in the ESA. With regard to any activities subject to CESA, the terms “Take” or “Taking” shall have the same meaning as provided in CESA.

59. Technical Advisory Committee. The terms “Technical Advisory Committee” and “TAC” mean the advisory group of technical experts selected by the Permittees and the Wildlife Agencies to assist TNBC Board with directing the implementation of the NBHCP.

60. The Natomas Basin Conservancy. The terms “The Natomas Basin Conservancy,” “the Conservancy” or “TNBC” shall mean the independent entity established for the purpose of implementing the Natomas Basin Habitat Conservation Plan on behalf of the City, Sutter County and other Potential Permittees. The TNBC is also a Permittee for purposes of implementation of the reserve system.

61. TNBC Mitigation Land or Reserve Area. The term “TNBC Reserve Area” or “TNBC Mitigation Land” shall mean those areas where TNBC is authorized to acquire and manage wildlife reserves subject to the provisions of the NBHCP. Such areas shall include all lands within the Natomas Basin, as well as the land bounding the Natomas Basin and extending to the edge of water immediately outside the Natomas Basin levees and Area B as depicted

on Figure 20, Out of Basin Mitigation Areas. The TNBC Reserve Area and the TNBC Permit Area are coterminous.

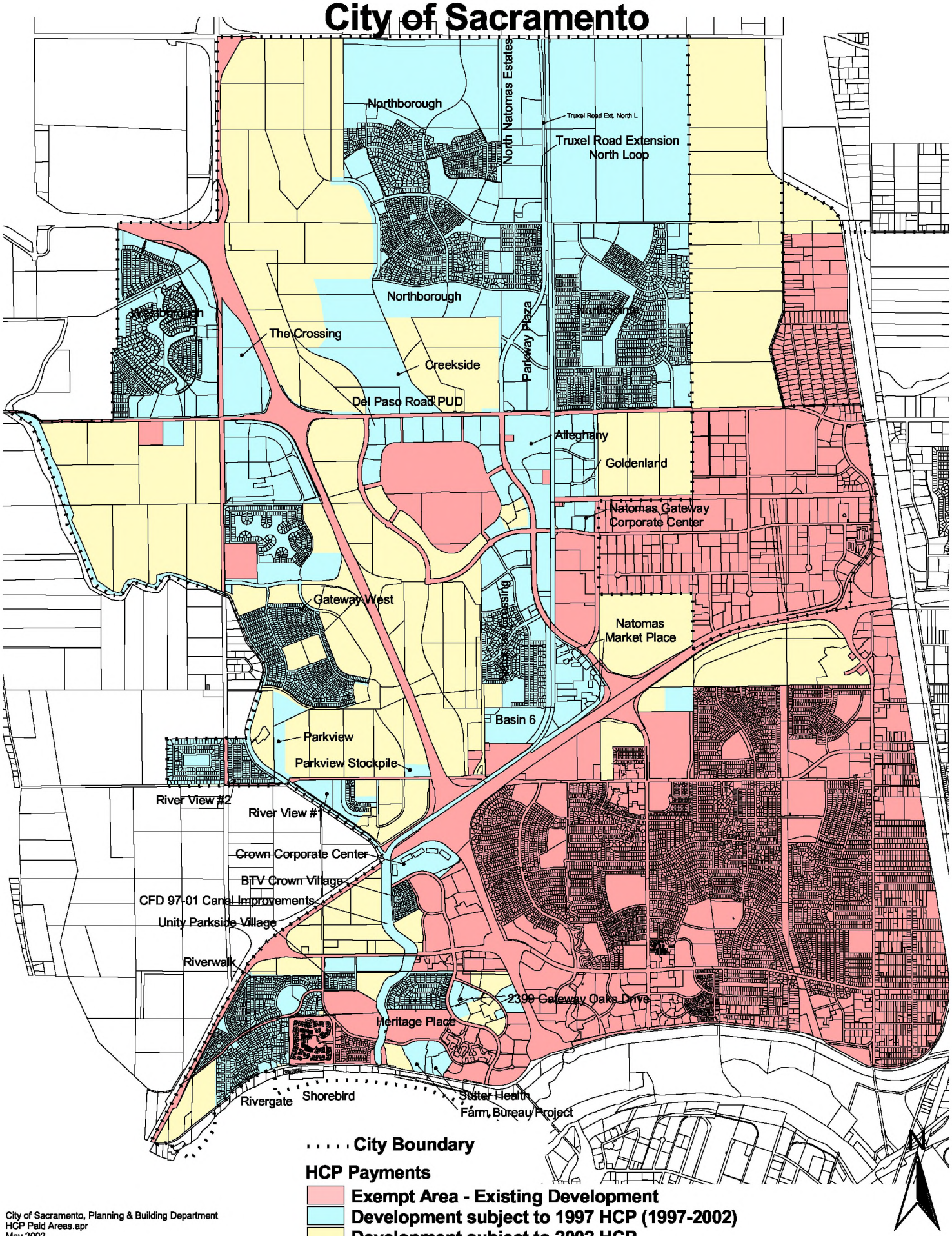
62. Unforeseen Circumstances. The term "Unforeseen circumstances" is defined at 50 C.F.R. 17.3 as changes in circumstances affecting a species or geographic area covered by a conservation plan that could not reasonably have been anticipated by plan developers and the USFWS at the time of the NBHCP's negotiation and development, and that result in a substantial and adverse change in the status of the Covered Species. Unforeseen circumstances are discussed in Chapter VI, Section K of the NBHCP.

63. Urban Development Permit and Urban Development Permittee. The term "Urban Development Permit" shall mean the final authorization granted by the Land Use Agencies prior to disturbance of undeveloped land in conjunction with a public or private development project. An Urban Development Permit may also be used to refer to a grading permit or notice to proceed. An "Urban Development Permittee" refers to the individual, agency or company applying for approval, or receiving approval of an Urban Development Permit from the Land Use Agencies.

64. Water Agencies. The term "Water Agencies" means RD 1000 and Natomas Mutual. Natomas Mutual is a private company and not a governmental agency.

65. Wildlife Agencies. The term "Wildlife Agencies" means the U.S. Fish and Wildlife Service and the California Department of Fish and Game.

Baseline Map - Exhibit B
City of Sacramento



City of Sacramento, Planning & Building Department
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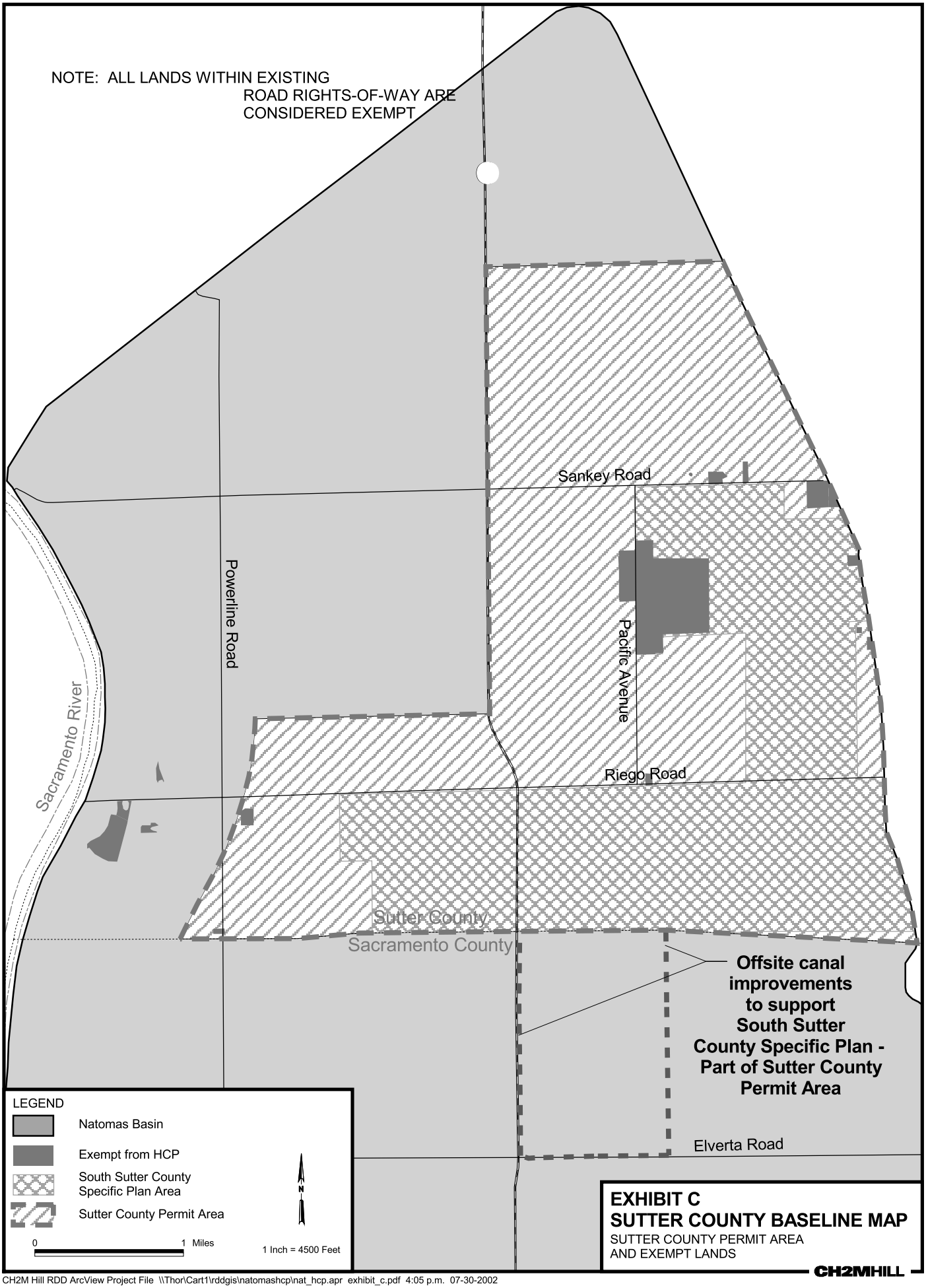

CH2M Hill RDD ArcView Project File \\Thor\Cart1\rddgis\natomashcp\nat_hcp.apr exhibit_c.pdf 4:05 p.m. 07-30-2002

Exhibit D -List of Covered Species in Permit Area

TABLE I - 1
LISTED, CANDIDATE, AND OTHER SPECIES ADDRESSED IN THE NBHCP AND/OR COVERED BY ITS ASSOCIATED PERMITS

#	Species	Federal Status	State Status	Habitat Notes
1	Aleutian Canada goose *Branta canadensis leucopareia*	SC		Grazes in marshes and stubble fields, roosts on the water
2	bank swallow *Riparia riparia*		T	Nests in river banks, forages for insects over open water, croplands, and grasslands
3	burrowing owl *Athene cunicularia*		SSC	Prefers open, dry grassland and desert habitats
4	loggerhead shrike *Lanius ludovicianus*	SC	SSC	Prefers open habitats with scattered shrubs, trees, fences, and posts. Will use cropland.
5	Swainson's hawk *Buteo swainsoni*		T	Breeds in riparian forest; known nesting sites in trees along Sacramento River in Natomas Basin. Forages for small mammals in grasslands and croplands.
6	tricolored blackbird *Agelaius tricolor*	SC	SSC	Nests in marshes with bulrush, blackberry or cattails; three known occurrences in Natomas Basin. Forages on the ground in grasslands and croplands.
7	white-faced ibis *Plegadis chihi*	SC	SSC	Forages in flooded rice fields
8	giant garter snake *Thamnophis gigas*	T	T	Forages in marshes, low gradient open waterways and flooded rice fields, hibernates in canal berms and other uplands; several known occurrences in Natomas Basin
9	northwestern pond turtle *Clemmys marmorata marmorata*	SC	SSC	Lives in permanent bodies of water; requires floating vegetation, logs, rocks or banks for basking. Hibernates and lays eggs is uplands.
10	California tiger salamander *Ambystoma californiense*	C	SSC	Winters in ground squirrel burrows or other holes; breeds in vernal pools, stockponds , and other seasonal wetlands.
11	western spadefoot toad *Scaphiopus hammondii*	SC	SSC	Primary habitat is grasslands; breeds in shallow temporary pools
12	valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T		Lives and reproduces on elderberry shrubs found along rivers and canals.
13	midvalley fairy shrimp *Branchinecta mesovallensis n. sp.*			Vernal pool obligate often found in small pools; likely to occur in Plan Area
14	vernal pool fairy shrimp *Branchinecta lynchi*	T		Vernal pool obligate; widely distributed in Sacramento County
15	vernal pool tadpole shrimp *Lepidurus packardi*	E		Vernal pool obligate; widely distributed in Sacramento County
16	Boggs Lake hedge-hyssop *Gratiaola heterosepala*		E	Low-terrace species found in shallow water margins of vernal pools
17	Colusa Grass *Neostapfia colusana*	T		Occurs in large deep pools with substrates of adobe mud but also in smaller pools; known in Yolo County

#	Species	Federal Status	State Status	Habitat Notes
18	delta tule pea *Lathyrus jepsonii* ssp.*jepsonii*	SC		Perennial twining vine occurs in both riparian and marsh habitats
19	legenere *Legenere limosa*	SC		Found in wet places or vernal pools below 400 feet in elevation
20	Sacramento Orcutt grass Orcuttia viscida	E	E	Found in relatively large, deep vernal pools in eastern Sacramento County
21	Sanford's arrowhead Sagittaria sanfordii	SC		Tuberose perennial likely to occur in drainage or irrigation ditches
22	slender Orcutt grass *Orcuttia tenuis*	T	E	Found in relatively large, deep vernal pools in eastern Sacramento County

Key to Abbreviations

Federal

E = Listed as endangered
T = Listed as threatened
C = Candidate for federal listing, data sufficient
SC = Species of Concern--informal category, formerly called candidate 2 species (data for listing insufficient)

State

E = Listed as Endangered
T = Listed as Threatened
R = Listed as Rare
SSC = Species of Special Concern

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W2605
Sacramento, California 95825-1846

IN REPLY REFER TO:
1-1-03-F-0225

June 24, 2003

Memorandum

To: Regional Director, Fish and Wildlife Service, Region 1, Portland Oregon

From: Field Office Supervisor, Sacramento Fish and Wildlife Office, Sacramento, California

Subject: Intra-Service Biological and Conference Opinion on Issuance of a Section 10(a)(1)(B) Incidental Take Permit to the City of Sacramento and Sutter County for Urban Development in the Natomas Basin, Sacramento and Sutter Counties, California.

This document transmits the biological/conference opinion of the U.S. Fish and Wildlife Service (Service), Sacramento Fish and Wildlife Office (SFWO), regarding the issuance of incidental take permits (ITP) to the City of Sacramento (City)(Applicant), Sutter County (Sutter) (Applicants or Proposed Permittees), and the Natomas Basin Conservancy (Conservancy) (Applicant) for implementation of the Natomas Basin Habitat Conservation Plan (NBHCP) pursuant to section 10(a)(1)(B) and section 10(a)(2) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq*.)(Act), and in accordance with section 7 of the Act and their implementing regulations (50 CFR §402). The Service proposes to issue the ITPs to the City, Sutter, and the Conservancy for a period of 50 years.

The Applicants are requesting coverage under the ITPs for a total of twenty-two species (Covered Species). The ITPs would cover incidental take for one endangered animal species [vernal pool tadpole shrimp (*Lepidurus packardi*)], and three threatened animal species [giant garter snake (*Thamnophis gigas*)(snake), valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*)(beetle), and vernal pool fairy shrimp (*Branchinecta lynchi*)]. The ITPs would also authorize the incidental take of one animal species formerly listed as threatened [Aleutian Canada goose (*Branta canadensis leucopareia*)(goose)], which was de-listed on March 20, 2001, one proposed species [California tiger salamander (*Ambystoma californiense*)(salamander)], and nine currently unlisted animal species - Swainson's hawk (*Buteo swainsoni*)(hawk), white-faced ibis (*Plegadis chihi*)(ibis), bank swallow (*Riparia*

riparia)(swallow), tricolored blackbird (*Agelaius tricolor*)(blackbird), northwestern pond turtle (*Clemmys marmorata marmorata*) (turtle), loggerhead shrike (*Lanius ludovicianus*)(shrike), burrowing owl (*Athene cunicularia*)(owl), western spadefoot toad (*Spea hammondii*)(toad), and midvalley fairy shrimp (*Branchinecta mesovallensis*)-, should they become listed in the future during the term of the permits. The permits would become effective to authorize take of the currently unlisted Covered animal Species concurrent with their listing under the Act. One endangered plant species [Sacramento Orcutt grass (*Orcuttia viscida*)], two threatened plant species [Colusa grass (*Neostapfia colusana*) and slender Orcutt grass (*Orcuttia tenuis*)] and four currently unlisted plants [Boggs Lake hedge-hyssop (*Gratiola heterosepala*), delta tule pea (*Lathyrus jepsonii* var. *jepsonii*), legenere (*Legenere limosa*), and Sanford's arrowhead (*Sagittaria sanfordii*)] would also be considered Covered Species and included on the Permits. Although take of plant species is not prohibited under the Act and therefore cannot be authorized under an incidental take permit, the plant species would be included on the permits in recognition of the conservation benefits provided to the species under the NBHCP. Assurances provided under the "No Surprises" rule at 50 C.F.R. 17.3, 17.22(b)(5) and 17.32(b)(5) would extend to all Covered Species.

The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, or possessing of migratory birds. The MBTA identifies a variety of prohibited actions including the taking of individual birds, young, feathers, eggs, nests, etc. Actions conducted under the NBHCP and NBHCP Implementation Agreement (NBHCP IA) will comply with the provisions of the MBTA with strict avoidance measures for actions affecting MBTA-Covered Species such as the goose, hawk, ibis, swallow, blackbird, shrike, and owl. There are currently no MBTA Covered Species that are listed under the Act and subject to a special purpose permit at this time. Should any of the MBTA Covered Species become listed under the Act during the life of the Permits, the incidental take permits would also constitute an MBTA special purpose permit for that species for a three year term as specified under 50 C.F.R. 13 and 50 C.F.R. 21 for MBTA special purpose permits subject to renewal by the City and Sutter County.

This biological opinion is based on information provided in the following documents: (1) the July 2002, draft NBHCP; (2) the August 2002, draft Environmental Impact Report/ Environmental Impact Statement (EIR/EIS) and supporting technical analyses and reports; (3) the July 2002, draft NBHCP IA; (4) the *Site Specific Management Plans for the Natomas Basin Conservancy's Mitigation Lands*; (5) the April 2003, Final NBHCP, NBHCP IA, and EIR/EIS; (6) the November 1997, NBHCP; (7) the Natomas Basin Conservancy's Implementation Annual Reports; (8) the February 2000, lawsuit *(National Wildlife Federation, et al. v. Babbitt,* S-99-274 (E.D.Cal.) [*NWF v. Babbitt*]) filed against the Service's issuance of an Incidental Take Permit to the City for the 1997 NBHCP; (9) the August 15, 2000, Memorandum of Opinion and Order for *NWF v. Babbitt*; (10) the January 26, 2001, judgement declaring the City's ITP for the 1997 NBHCP invalid; (11) the May 10, 2001, Settlement Agreement for *NWF v. Babbitt*; (12) the May 13, 2003, resolutions adopted by the City (Resolution Numbers 2003- 289 and 290) and Sutter (Resolution Number 03-30) approving the NBHCP; (13) the June 10, 2003, resolution (Resolution Number 03-039) approved by Sutter making three changes to the NBHCP; (14) the

June 2003, Errata to the NBHCP; and (15) various other published and unpublished agency and academic literature and information in the Service's files.

CONSULTATION HISTORY

In 1994, the Sacramento Area Flood Control Agency (SAFCA) proposed a flood control project for the Natomas Basin (Basin) that required a Section 404 Clean Water Act permit from the U.S. Army Corps of Engineers (Corps). In order to comply with its responsibilities under the Act, the Corps consulted with the Service. In its March 11, 1994, biological opinion (Service File # 1-1-94-F-0013) for the project, the Service determined that the project would remove an obstacle to urbanization in the Basin and that such development would result in the take of federally-listed species. The Corps issued a Section 404 Permit for SAFCA's flood control project, conditional on the preparation of a habitat conservation plan (HCP) for the Basin. Following the Corps' action, the local land use agencies (City, Sutter, and Sacramento County), with additional participation by the water agencies (Reclamation District Number 1000 [RD 1000] and Natomas Central Mutual Water Company [Natomas Mutual]), began preparing an HCP. In 1997, the City submitted its application to the Service for an incidental take permit to authorize take of 26 Covered Species within its portion of the Natomas Basin based on the 1997 basin-wide Natomas Basin HCP. The other land use agencies did not apply for incidental take permits based on the NBHCP at that time.

The Service issued an ITP to the City in December 1997 based on the final NBHCP. Environmental review of the City's 1997 HCP under the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) consisted of an Environmental Assessment/Finding of No Significant Impact prepared by the Service (Service, 1997a) and an Initial Study/Negative Declaration prepared by the City (City of Sacramento, 1996), respectively. In April 1998, the City began collecting habitat mitigation fees and issuing urban development permits under the 1997 NBHCP. These fees were transferred to the Conservancy, which was created by the City in October 1994 to serve as the Plan Operator.

The Conservancy is a private, not-for-profit public benefit corporation that acquires and manages the system of habitat reserves created under the 1997 NBHCP. In addition, it will acquire and manage the system of habitat reserves created under the proposed NBHCP, if approved. The Conservancy's efforts are guided by a Board of Directors, with members of the Board appointed by agencies receiving Permits under the NBHCP. The Conservancy's Board of Directors was appointed by the City's City Council in December 1998. The Board is assisted in its efforts by the Technical Advisory Committee (TAC), a group of experts representing the Service, California Department of Fish and Game (CDFG), and the Permittees. Habitat mitigation fees and mitigation lands have been/will be collected by the Permittee(s) and transferred to the Conservancy.

Sutter and Sacramento County informally submitted separate HCPs to the Service in October 1998. The Service suspended review of their HCPs because a lawsuit, discussed below, was

filed challenging the City's HCP and ITP. As of June 2003, Sacramento County has not submitted an HCP for unincorporated lands in the Basin.

Although Sacramento County is not one of the NBHCP's applicants, the Metro Air Park Property Owners Association (MAPPOA), a group of landowners, submitted a separate HCP designed to be compatible with the 1997 NBHCP for the Metro Air Park (MAP) in July 1999. MAP is a special planning area adjacent to Sacramento International Airport (Airport) in Sacramento County which has been approved by the County for industrial and commercial development. Metro Air Park comprises 1,983 acres of the 17,500 acres of planned urban development described in the NBHCP. The Service issued an ITP to MAPPOA on February 21, 2002.

RD 1000 and Natomas Mutual (Water Agencies) also participated in basin-wide habitat conservation planning efforts. On September 8, 1998, the Water Agencies submitted an incidental take permit application and draft implementation agreement based on the 1997 City of Sacramento implementation agreement. They also proposed to use the November 1997 NBHCP with additional revisions suggested by the Water Agencies. In November 2000, the Water Agencies submitted a revised HCP and IA to the Service and CDFG. In early 2001, they re-joined the City, Sutter, and the Conservancy in developing the draft revised NBHCP. The Water Agencies identified general conservation measures for operations, maintenance, and minor construction activities. A revised NOP/NOI noticing the involvement of the Water Agencies in the HCP process was published in local newspapers and in the *Federal Register* on August 18, 2001. Discussions among the Water Agencies, the other permit applicants and the Wildlife Agencies continued throughout 2001 and early 2002 regarding Water Agencies proposed conservation measures.

The Water Agencies provided additional detail regarding their covered activities, including a request for coverage for use of pesticides (e.g., aquatic herbicides, rodenticides) in accordance with label instructions, to the Service and CDFG. In late January and February 2002, the Service determined that it would take a substantial length of time to prepare and process adequate scientific information necessary to analyze the biological effects of each chemical on the Covered Species. Thus, the Land Use Agencies recommended that the NBHCP exclude chemical coverage for the Water Agencies but that the Water Agencies continue to be included in the NBHCP for the other covered activities (e.g., mechanical activities such as mowing and nonchemical channel maintenance activities). In February 2002, the Boards of Directors of both Water Agencies directed their staff and counsel to remain involved in the NBHCP and to seek 100 percent pesticide coverage within the NBHCP. The Water Agencies continue to be represented in the NBHCP as potential permittees in the event they chose at a future date to apply for ITPs for the activities (excluding pesticides) covered by the 2003 NBHCP and evaluated in its associated EIR/EIS.

In late May 2002, the Land Use Agencies contacted the Water Agencies to determine if RD 1000 would continue to serve as a lead agency for the EIR. On May 31, 2002, the Water Agencies

stated that they would not serve as a co-lead agency on the EIR because pesticide coverage was not addressed in the NBHCP and its associated EIR/EIS.

On June 5, 2002, the Water Agencies presented information to the Service on nine pesticides for which they had requested coverage. Given the Water Agencies decision in March 2002 to pursue 100 percent pesticide coverage, and because of the substantial period of time that would be required to analyze the impacts of various pesticides and rodenticides on the Covered Species proposed by the Water Agencies in their June 5, 2002, letter, these activities are not analyzed in the EIR/EIS for the proposed project. The EIR/EIS does analyze other covered activities requested by the Water Agencies prior to December 2001 (i.e., the activities presented in the NBHCP). Applications for incidental take permits were filed by the City, Sutter, and the Conservancy on August 1, 2002.

On August 26, 2002, the Service published a notice in the **Federal Register** (67 FR 54819) announcing the agency's receipt of applications for ITPs from the City, Sutter, and the Conservancy based on the NBHCP and the availability of a draft EIR/EIS for the applications. Comments were received from the public through December 5, 2002. On April 28, 2003, the Service announced the availability of the Final EIR/EIS and NBHCP in the **Federal Register** (68 FR 22410). The U.S. Environmental Protection Agency followed suit on May 2, 2003 (68 FR 23457).

On May 13, 2003, the City approved the Final NBHCP (Resolution Number 2003-290) and Final EIR (Resolution Number 2003-289), with three changes to the NBHCP and associated documents that will improve protections for Covered Species. Changes include:

1. No mitigation lands will be acquired in Area B. All NBHCP mitigation lands must be acquired in the Natomas Basin;

2. The City may exercise its discretion to require developer/land owners to dedicate mitigation land in lieu of the land acquisition component of the mitigation fees prior to issuance of an Urban Development Permit; and

3. Land owners within the Sutter's Permit Area will be notified annually if they have a Swainson's nest tree on their property. The notice will identify the nest tree and alert the owner to the specific mitigation measures prohibiting the owner from removing the nest tree. This measure requires the City to inform land owners of the NBHCP's avoidance, minimization, and mitigation measures regarding the removal of Swainson's Hawk nest trees (see Section V.A.5.b of the NBHCP).

Sutter approved the Final NBHCP (Resolution Number 03-030) on May 13, 2003. On June 10, 2003, Sutter approved a second resolution (Resolution Number 03-039) to modify the NBHCP and associated documents in order to establish consistency between Sutter's obligations and those of the City. Changes included in the second ordinance include:

1. No mitigation lands will be acquired in Area B. All NBHCP mitigation lands must be acquired in the Natomas Basin;

2. Sutter may exercise its discretion to require developer/land owners to dedicate mitigation land in lieu of the land acquisition component of the mitigation fees prior to issuance of an Urban Development Permit; and

3. Land owners within the Sutter's Permit Area will be notified annually if they have a Swainson's nest tree on their property. The notice will identify the nest tree and alert the owner to the specific mitigation measures prohibiting the owner from removing the nest tree. This measure requires Sutter to inform land owners of the NBHCP's avoidance, minimization, and mitigation measures regarding the removal of Swainson's Hawk nest trees (see Section V.A.5.b of the NBHCP).

Court Opinion

As mentioned above, the City received incidental take authorization from the Service in December 1997 based on the 1997 NBHCP. In February 2000, the National Wildlife Federation and other plaintiffs filed suit against the Service's issuance of the ITP to the City (*National Wildlife Federation, et al. v. Babbitt,* S-99-274 (E.D.Cal.) (*NWF v. Babbitt*). The lawsuit alleged issuance of the ITP violated Sections 7 and 10 of the Act. In addition, the plaintiffs asserted that the Service violated NEPA by preparing an Environmental Assessment rather than an EIS and had violated the Administrative Procedures Act.

On August 15, 2000, Judge David F. Levi issued a Memorandum of Opinion and Order. The Court held that the 1997 NBHCP in most respects satisfied the substantive requirements of the Act as set forth in Section 10(a)(2)(a). The Court also held that, with one exception, relative to whether the Plan "minimizes and mitigates" expected impacts to the maximum extent, the Findings and the Biological Opinion were adequate with respect to the 1997 NBHCP as a whole. The Court also rejected the plaintiff's claims that biological uncertainties associated with, among other things, the NBHCP's adaptive management provisions undermined the legal adequacy of the Plan as a whole and found that the Service's decisions were based upon the best available scientific and commercial evidence.

The Judge's Order found four deficiencies with respect to issuance of the City's Section 10(a)(1)(B) Incidental Take Permit: (1) the record did not support the Service's findings in support of the NBHCP and the Section 10(a)(1)(B) ITP that the NBHCP would minimize and mitigate impacts on Covered Species to the "maximum extent practicable"; (2) the record did not support the "No Jeopardy" findings contained in the Biological Opinion as it applied to issuance of the Section 10(a)(1)(B) ITP to the City; (3) the record did not support the Service's finding that the City would ensure adequate funding for the NBHCP as it applied to issuance of the Section 10(a)(1)(B) ITP; and (4) the Service's decision to not prepare an EIS for the NBHCP and Section 10(a)(1)(B) ITP was arbitrary and capricious.

Pursuant to a Settlement Agreement executed by the parties in the lawsuit (effective May 10, 2001), the Order was modified to allow incidental take protection for limited land development within the City, with the provision of specific mitigation requirements. Following the court's decision, the City, Sutter County and the Conservancy, initiated preparation of a revised NBHCP. That effort culminated in the 2003 NBHCP.

The issuance of ITPs to the City, Sutter, and the Conservancy, in conjunction with implementation of the revised NBHCP, is the subject of this biological opinion.

BIOLOGICAL OPINION

Description of the Proposed Action

Introduction

The NBHCP is a multi-jurisdictional, multi-species, 50-year plan intended to protect and conserve 22 "Covered Species" and other biological resources within the Natomas Basin in Sacramento and Sutter Counties. It is the conservation plan designed to support applications for federal ITPs under Section 10(a)(1)(B) of the Act, as well as applications for ITPs under State law pursuant to Section 2081(b) of the California Fish and Game Code. The NBHCP relies on total development in the Basin being limited to 17,500 acres (including the Metro Air Park development in Sacramento County ("MAP")). Its basic mitigation strategy is to protect and manage in perpetuity 0.5 acre of habitat for every one acre of development in the Natomas Basin allowed under adopted land use plans (Authorized Development). This is accomplished through payment of a mitigation fee by developers and land owners prior to issuance of urban development permits from the City, Sutter, or Sacramento County. Fees are required for development, regardless of the habitat quality of the land being developed. The NBHCP is described in greater detail below.

This NBHCP builds on the 1997 NBHCP, which was the basis for issuance of an ITP to the City of Sacramento. The 1997 NBHCP was updated and modified to address the deficiencies cited by the court in *NWF v. Babbitt*. The revised NBHCP also reflects participation by Sutter and the Conservancy, with possible participation by Natomas Mutual and RD 1000.

The purpose of the NBHCP is to promote biological conservation in conjunction with economic and urban development within the areas covered by the ITPs (Permit Areas). The NBHCP establishes a multi-species conservation program to minimize and mitigate the expected loss of habitat values and incidental take[1] of Covered Species that could result from urban development

[1]"Incidental take" as used in this opinion in reference to the Covered Species refers solely to covered animal species. Plant species are "covered" by the permits in recognition of the conservation measures incorporated into the NBHCP for them and, like covered animal species, receive assurances under the Service's "No Surprises" rule.

and certain activities associated with the Conservancy's management of its system of reserves established under the NBHCP. The intent of the NBHCP is to minimize incidental take of the Covered Species in the Permit Areas and to provide avoidance, minimization, and mitigation measures for the impacts of Covered Activities on the Covered Species and their habitat.

The NBHCP applies to the 53,537-acre area interior to the toes of the levees surrounding the Natomas Basin, located in the northern portion of Sacramento County and the southern portion of Sutter County (Figure 1). The Basin is bounded on the west by the Sacramento River levee, on the north by the Natomas Cross canal, on the east by the Natomas East Main Drainage Canal, and on the south by the American River levee (Figure 2). The Basin contains incorporated and unincorporated areas within the jurisdictions of the City, Sacramento County, and Sutter. The Sacramento International Airport is located in the Basin. The southern portion of the Basin is urbanized, but most of the Basin is used for agriculture. Certain conservation measures proposed by the applicants would apply outside the Basin. For example, measures proposed to minimize Swainson's hawk nest disturbance include all hawk nests within ½ mile of development; not just those nests located interior to the toes of the levees of the Basin.

The NBHCP serves as the operating conservation plan (OCP) for three proposed ITPs from the Service, pursuant to Section 10(a)(1)(B) of the Act. The three proposed permittees are: (1) the City; (2) Sutter; and (3) the Conservancy. The ITPs would cover 22 species. Such authorization is needed because the City and Sutter have approved land use plans which designate areas of the Basin which may provide for urban development. Urban development will impact Covered Species and the habitat which supports those species. Additionally, the Conservancy is seeking take authorization related to the acquisition, restoration, and management of a system of habitat reserves on behalf of the City and Sutter.

Overall biological goals and objectives of the NBHCP include:

1. Establish and manage in perpetuity a biologically sound and interconnected habitat reserve system that mitigates impacts on Covered Species resulting from Covered Activities and provides habitat for existing, and new viable populations of Covered Species.

2. Implement an adaptive management program that responds to changing circumstances affecting Covered Species and their habitats.

3. Maintain and operate flood control, irrigation and drainage facilities in a manner that minimizes take of Covered Species and promotes vegetative cover that enhances habitat values for Covered Species, consistent with the Water Agencies' legal obligations.

4. Preserve open space and habitat that may also benefit local, non-listed and transitory wildlife species not identified within the NBHCP.

5. Ensure that direct impacts of Authorized Development upon Covered Species are avoided or minimized to the maximum extent practicable.

6. Minimize conflicts between wildlife and human activities, including conflicts resulting from airplane traffic, roads and automobile traffic, predation by domestic animals, and harassment by people.

7. Ensure connectivity between Conservancy reserves to minimize habitat fragmentation and species isolation. Connections between reserves will generally take the form of common property boundaries between reserves, waterways (primarily irrigation and drainage channels) passing between reserves and/or an interlinking network of water supply channels or canals.

8. Within individual Conservancy reserves, provide a mosaic of habitats that support both wetland and upland species, and that are configured to support species that utilize both types of habitat. The Conservancy will develop each monitoring plan and will submit the plan for review by NBHCP TAC and approval by the Wildlife Agencies prior to implementation.

9. Implement monitoring programs with qualitative and/or quantitative monitoring methods to evaluate management objectives and strategies for the reserve system.

10. Increase the diversity and abundance of Covered Species on reserve lands.

11. Revise the reserve design and management based on the most current biological data.

In addition to the overall biological goals and objectives, the following wetland species habitat goals and objectives have been proposed:

1. Acquire, enhance and create a mosaic of wetland habitats with adjacent uplands and connecting corridors to provide breeding, wintering, foraging, and cover areas for wetland species in the Plan Area.

2. Provide habitat to maintain, attract and sustain viable populations of the Covered Species. The habitat areas should be configured to encompass natural species migration areas, minimize species isolation, and prevent future habitat fragmentation.

3. Document population trends of Covered Species through monitoring.

In addition to the overall biological goals and objectives, the following upland species habitat goals and objectives have been proposed:

1. Acquire, enhance and create a mosaic of upland habitat types for breeding, foraging, and cover for species dependent on upland habitats.

2. Ensure reserve land connectivity with travel corridors for upland-dependent species. The habitat areas should encompass grasslands, agricultural croplands, riparian habitats, and shelter and nesting habitat areas (fence rows, clusters of shrubs and small trees), as well as wetland areas to provide a year-round source of water for upland species. The upland areas should be configured to enhance natural species migration, minimize species isolation, and prevent future habitat fragmentation.

The City is seeking take coverage for impacts to Covered Species associated with a total of 8,050 acres of authorized development located within the City's proposed Permit Area (Figure 2). Approximately ten acres of the total 8,050 acres covered by the City's ITP are for drainage improvements to widen the West Drain outside of the City limits, in Sacramento County. The ten-acre area has already been disturbed in compliance with the 1997 HCP. The proposed ITP would extend take coverage for Covered Species within the City's Permit Area and would cover urban development, public projects and associated infrastructure.

Sutter's proposed ITP would authorize incidental take of Covered Species associated with urban development, public projects and associated infrastructure on 7,467 acres of land within Sutter's Industrial/Commercial Reserve area, which is located in the southeast portion of Sutter County within the Basin (Figure 2). Sutter County's authorized development would be located within the proposed Sutter Permit Area, except for infrastructure improvements in northern Sacramento County. There is currently one proposed Sutter County public facility project: drainage channel improvements to support the South Sutter County Specific Plan area. The proposed drainage improvements are located on land in Sacramento County outside the Sutter County Industrial/Commercial Reserve and involve expanding two existing RD 1000 drainage channels (East Drainage Canal and the Montna Drain) to accommodate additional storm water flows. These channels are located within Sacramento County immediately south of the Sutter-Sacramento County boundary (Figures 2 and 3). To the extent that these channels and their associated levees and access roads are expanded beyond the footprint of the existing facilities, Sutter will consider the expansion of these facilities as urban development subject to the provisions of the NBHCP. Such increases in the footprint of the drainage channels are considered part of Sutter's 7,467 acres of authorized development.

The ITP that the Conservancy is seeking is to cover activities related to the acquisition, establishment and management of the system of habitat reserves that will be created throughout the Natomas Basin, including the land bounding the Natomas Basin and extending to the edge of the water (i.e., Natomas Cross Canal, Natomas East Main Drain, and American River) immediately outside the Natomas Basin levees, and Area B (Figure 4). However, because the City and Sutter will not acquire NBHCP mitigation lands in Area B, the Conservancy will not acquire NBHCP mitigation lands in Area B and any permit issued to the Conservancy would be restricted to lands within the Natomas Basin. Within its Permit Area, the Conservancy is seeking incidental take coverage for managing reserves; preservation, creation, restoration, and enhancement activities; and monitoring the HCP's success in meeting its biological goals.

The City and Sutter will each be required to mitigate the impacts of their own Covered Activities. Therefore, because they have separate permits and are mitigating their impacts separately, if either one of the permits is revoked, other than the Permit issued to the Conservancy, the other Permits would remain in effect. This is consistent with the design of the NBHCP as a mitigation tool which can be used by the various Permittees to obtain the necessary ITPs needed to conduct otherwise lawful activities within each entity's respective jurisdictional boundaries. Although the mitigation strategy provided for under the NBHCP would mitigate for effects resulting from the Land Use Agencies' Covered Activities, because the percentage of uplands to wetlands differs between their respective Permit Areas, the NBHCP allows for the mitigation strategy provided for under the NBHCP to be reevaluated in the event either the City's or Sutter's Permits are terminated or revoked. The mitigation strategy would be reevaluated to ensure that the configuration of Conservancy reserves provided for under the NBHCP continues to adequately mitigate for the impacts of authorized development in the remaining jurisdiction(s) participating in the NBHCP. In the event that the Service determines pursuant to Section 7.6.1 of the NBHCP IA that the Conservancy has violated the terms of the NBHCP, the Permits or the NBHCP IA, such violation would be considered a failure by City and Sutter to implement their obligations of the Operating Conservation Program under the NBHCP. In the event the Service or CDFG make the determination set forth in Section 3.1.11(a) of the NBHCP IA, the City and Sutter's Permits would not be revoked or suspended, provided the City and/or Sutter implement corrective measures, within the period specified by the Service and/or CDFG, to remedy Conservancy's violation. Among the corrective measures the Service may require are: (1) replacing the Conservancy with another conservation entity qualified to serve as a Plan Operator; (2) transferring the Mitigation Lands to CDFG in accordance with Section 3.2.12 of this NBHCP IA; (3) implementation by the Conservancy of measures specified by the Service and/or CDFG as necessary to remediate the violation unless the Service or CDFG determine that continuation of the Permits would appreciably reduce the likelihood of the survival and recovery of a Covered Species in the wild or the Service or CDFG determine that the violation renders the City or Sutter unable to implement successfully the NBHCP; or (4) implementation by the City and/or Sutter of measures necessary to remediate the violation. Should the Service or CDFG determine that the City or Sutter has violated their separate obligations under the NBHCP, the Permits or this Agreement, such violation would not be attributed to the Conservancy nor would the Conservancy's Permits be affected, so long as the Conservancy continues to properly implement its obligations under the NBHCP with respect to the Mitigation Lands, including its obligations as the Plan Operator.

The effectiveness of the NBHCP's OCP to adequately minimize and mitigate the effects of take of the Covered Species due to authorized development depends on the City and Sutter confining development to their respective permit areas and limiting their combined total development to 15,517 acres. The OCP and the NBHCP's effects analysis account for a combined total of 17,500 acres of Planned Development occurring in the Basin (i.e., 15,517 acres within the City and Sutter County's Permit Areas and 1,983 acres of Metro Air Park development in Sacramento County). Because the NBHCP's OCP is based upon the City limiting total development to 8,050 acres within the City's Permit Area, approval by the City of future urban development beyond the 8,050 acres or outside of its Permit Area would constitute a significant departure from the

NBHCP's OCP and would trigger a reevaluation of the NBHCP, a new effects analysis, potential amendments and/or revisions to the NBHCP and ITPs, a separate conservation strategy and the need to obtain a new ITP by the Permittee for that additional development, and/or possible suspension or revocation of the City's ITP in the event the City were to violate such limitations without having completed the required reevaluation, amendments or revisions, or obtained a new permit. Similarly, approval by Sutter of development within the Basin beyond the authorized 7,467 acres or outside of the Sutter Permit Area would constitute a significant departure from the NBHCP's OCP and would trigger a reevaluation of the NBHCP, a new effects analysis, potential amendments and/or revisions to the NBHCP and ITP, a separate conservation strategy and the need to obtain a new ITP by the permittee for that additional development, and/or possible suspension or revocation of the Sutter's ITP in the event Sutter were to violate such limitations without having completed the required reevaluation, amendments or revisions, or obtained a new permit. Any additional urban development within the Basin that occurs outside of the City's and Sutter's Permit Areas, with the exception of the MAP development, also would constitute a significant departure from the NBHCP's OCP and would trigger a new effects analysis, a new conservation strategy, and require the issuance of a new ITP to the party proposing that additional urban development. So long as the City and Sutter limit urban development to their respective Permit Areas and continue to meet their respective obligations under the NBHCP, the OCP and associated Permits would remain valid for each Permittee's Covered Activities.

In February 2002, the Service and CDFG issued ITPs to MAPPOA for the MAP project. The MAP Permit covers 1,983 acres[2] of development in Sacramento County within the NBHCP Area. The effects of that biological opinion are incorporated into the effects analysis of this biological opinion. The MAP HCP and its IA provide for automatic revision of the MAP HCP to incorporate applicable provisions of the revised NBHCP upon approval of the NBHCP by Wildlife Agencies. Extension of applicable NBHCP provisions to MAP will be treated as a revision of the Plan and will not require a permit amendment.

Covered Species

Twenty-two species of plants and animals are addressed by the NBHCP (Table 1). Of those, seven are currently federally-listed as either threatened or endangered. They are: (1) vernal pool tadpole shrimp (endangered); (2) giant garter snake (threatened); (3) valley elderberry longhorn beetle (threatened); (4) vernal pool fairy shrimp (threatened); (5) Sacramento Orcutt grass (endangered); (6) Colusa grass (threatened); and (7) slender Orcutt grass (threatened). The Aleutian Canada goose was formerly listed as a federally-threatened species. Species addressed by the NBHCP that are not or have not been previously federally-listed include: (1) bank swallow; (2) burrowing owl; (3) loggerhead shrike; (4) Swainson's hawk; (5) tricolored blackbird; (6) white-faced ibis; (7) northwestern pond turtle; (8) California tiger salamander;

[2]The MAP Permit covers a total of 2,011 acres of development, including offsite improvements. Twenty-eight acres are located within the City's proposed Permit Area. Therefore, the net impacts attributed to MAP include 1,983 acres.

(9) western spadefoot toad; (10) midvalley fairy shrimp; (11) Boggs Lake hedge-hyssop; (12) delta tule pea; (13) legenere; and (14) Sanford's arrowhead.

Action Area Description

Action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate areas involved in the action (50 CFR 402.02). The proposed action's action area is located in the southern portion of the American Basin and covers the 53,537-acre Natomas Basin (Sacramento County = 36,656 acres, Sutter County = 16,881 acres). It is bounded on the north by the Natomas Cross Canal, on the west by the Sacramento River, on the south by the American River, and on the east by the Natomas East Main Drainage Canal (Figure 2). The Natomas Basin comprises the action area because it encompasses the proposed Permit Areas where the proposed action's effects on Covered Species will occur.

The Natomas Basin is currently divided into three major areas relative to the movement of obligate wetland and aquatic species: a northwestern zone situated north of Interstate 5 and west of Highways 70 and 99, a southwestern zone situated south of Interstate 5 and west of Highways 70 and 99, and an eastern zone located east of the Highways 70 and 99 (Brode and Hansen 1992) (see Figure 5). These roadways are effective barriers to the movements of aquatic species such as the snake. Hydrologic connections are incomplete at best, often consisting of lengthy culverts with little freeboard. These culverts, although not ideal, likely provide the only hydrologic connectivity between the Basin's three geographic areas. The western edge of the northwestern and southwestern zones is bordered by the Sacramento River, likely itself a barrier to the snake and other wetland dependent terrestrial species. The eastern zone is bordered on the east by the Natomas East Main Drainage Canal (a.k.a. Steelhead Creek) and further east, by increasingly less-suitable (upland and higher-gradient stream) habitat for the snake.

Prior to modern reclamation efforts, drainage off the western slopes of the Sierra Nevada Range produced regular flooding and created the Basin as an area of highly fertile, alluvial soils. This early condition was in the form of the large American Lakes, a large expanse of riparian scrub-shrub, and a large expanse of dry farmed open plain. Since, 1914 land reclamation and reclamation facilities, canals, levees, and pumping stations have caused over 80 percent of the Basin to be converted to agricultural production. A high proportion of the Natomas Basin's soils are underlain by impervious clay, which creates poor drainage conditions. These poor drainage conditions favor irrigated rice farming, which became prevalent in the 1900s.

The predominant crops presently produced in the Natomas Basin are rice, corn, sugar beets, grain, tomatoes, and pasture lands. The drainage pattern of the Basin has been altered so that runoff is pumped into the surrounding canals and the Sacramento River at several places. Even with pumping, portions of the Basin are subject to shallow flooding from rainfall that cannot be conveyed quickly enough to external drainage systems.

Natural and uncultivated vegetation types are interspersed throughout the agricultural areas of the Natomas Basin. Natural vegetation is found primarily along irrigation canals, drainage

ditches, pastures, and uncultivated fields. Borders of canals and ditches often have narrow strips of emergent vegetation or wooded riparian areas. Operated by Natomas Mutual and RD 1000, the presence of these water conveyance systems among the mosaic of agricultural fields and riparian areas provide nesting and feeding habitat and migration corridors for a variety of wildlife species inhabiting the Basin.

Implementation of the Proposed NBHCP

Funding

Funding for the acquisition, restoration and management of habitat reserves in perpetuity will be financed through the collection of mitigation fees for authorized development (in acres), as described in Chapter VI of the NBHCP. The number of acres of the authorized development site will be described in the Urban development permit (i.e., a grading permit, notice to proceed, or authorization to commence grading). The Urban development permit will delineate the boundary identifying the parcels or portions thereof to be disturbed by the authorized development project. A mitigation fee will be paid the developer of a particular development project to fund a half acre of mitigation land acquisition and associated habitat enhancement, management, endowment, administration, monitoring, etc. for each gross acre of authorized development. Lands developed prior to the 1997 NBHCP are not covered by the proposed permits or subject to the mitigation fee. The NBHCP Implementation Agreement (IA) for the City and Sutter include detailed maps (see section 4.3 and Exhibits B and C of the NBHCP IA) showing which land parcels are subject to the fee and which parcels are exempt from the fee due to prior development.

Open space remaining within the City's Permit Area such as schools, parks, etc. will count as areas requiring mitigation, unless the Service and CDFG approve the use of such areas as suitable for mitigation and such land is transferred in fee to the Conservancy or is encumbered by a conservation easement in favor of the Conservancy. Any open space land within the developed areas that is counted as mitigation land because the Service and CDFG approved it as mitigation land would be purchased for the Conservancy through the North Natomas Financing Plan - Land Acquisition Program (i.e., development impact fees will be increased to fund acquisition of the buffer area)(Land Acquisition Program). Fees in the Land Acquisition Program are separate from the NBHCP mitigation fee. The Land Acquisition Program funds public land (i.e., community centers, fire station sites, agricultural buffers, freeway buffer land, etc.) in the community plan area. The remaining components of the NBHCP mitigation fee (minus the land acquisition component) will be paid by the party (land owner, developer, etc.) proposing the land as mitigation. The Conservancy is not responsible for paying mitigation fees for enhancement and restoration activities on any of its reserve lands. Sutter has not designated any open space within its Permit Area and therefore, has not established a mechanism for acquiring open space as areas as mitigation.

Individual landowners may donate land to the Conservancy in lieu of payment of some or all of the acquisition component of the mitigation fee. Additionally, the City and Sutter may exercise

their discretion through resolutions approved by City Council (May 13, 2003, resolution number 2003-290) and Sutter Board of Supervisors (June 10, 2003, resolution number 03-039) to require developer/landowners to dedicate Mitigation Land in lieu of payment of the Land Acquisition Component of the Mitigation Fee prior to issuance of an Urban Development Permit. In such cases, the Conservancy, Service and CDFG will determine which lands are acceptable, considering location, proximity to urban uses and roads, and current condition. All land proposed to be transferred in lieu of payment of the land acquisition component of the mitigation fee must be approved by the Wildlife Agencies prior to acceptance by the Conservancy. The project proponent would be responsible for payment of the other components of the mitigation fee.

The Mitigation Fee is composed of the Land Acquisition Fee, Restoration and Enhancement Fee, Administration and Operations & Maintenance, Operations and Maintenance Endowment Fund, and Supplemental Endowment fund. The Land Acquisition Fee Component provides funding for habitat Mitigation Lands acquired by the Conservancy. The costs associated with land acquisition are the costs to acquire the land and transaction costs including legal costs. The fund also provides for a contingency in case land costs spike in any given year prior to updating the fee. Once all land is acquired in order to meet mitigation requirements, this fund will no longer be necessary. The Restoration and Enhancement Fee Component provides funding for restoring and enhancing Mitigation Lands acquired by the Conservancy. For example, the creation of managed marsh would be provided for by the revenues generated in the Restoration and Enhancement Fund. Once all land is acquired and subsequent restoration and enhancement occurs, this fund will no longer be necessary. The Administration and Operations & Maintenance Fund provides for the on-going operation and maintenance of the Mitigation Lands, including the costs to administer the funds collected from the Mitigation Fees. Revenues for this fund are comprised of Mitigation Fees (until all grading permits are issued), farming income, and hunting revenues. This fund is projected to exist in perpetuity. After year 45, as the finance model is currently structured, the Administration and Operations & Maintenance revenues are supplemented by interest earnings from the Operations & Maintenance Endowment Fund. The Operations & Maintenance Endowment Fund is structured as an endowment, such that fee revenue is accumulated as principal that will earn interest income over time. Under the most recent finance model, interest income would be utilized to subsidize funding for the Administration and Operations and Maintenance account after year 45. The Supplemental Endowment Fund was established to accumulate revenue to allow the Conservancy to purchase up to 200 acres of land in advance of all fees being paid or to supplement annual purchases in the case that land prices spike dramatically in any given year. A catch-up fee ordinance enacted by the City on April 3, 2001, (Ord. No. 2001-013) and to be enacted by Sutter will include this fee component. Additional information regarding funding for the NBHCP's conservation strategy is located in Chapter VI of the NBHCP.

The mitigation fee will be reviewed at least annually on or before March 1 of each calendar year the NBHCP is in effect. The mitigation fee shall be adjusted as necessary by the Land Use Agency Permittees to account for inflation or deflation using the Consumer Price Index (CPI) or another suitable index. The mitigation fee also will be reviewed at least annually on or before

March 1 of each calendar year the NBHCP is in effect and adjusted as necessary to reflect actual operation and land costs in the Basin. Fee adjustments will typically originate with a recommendation from the Conservancy to the Land Use Permittees, although any party may recommend such an adjustment. All adjustments to the mitigation fee within a particular local jurisdiction or jurisdictions must be approved by that affected jurisdiction or jurisdictions. Adjustments to the mitigation fee to account for inflation or deflation, or as necessary to maintain the 0.5-to-1 mitigation ratio and to meet ongoing management and monitoring costs, are provided for as part of the Plan's OCP and therefore, do not require amendment of the NBHCP or Permits.

The Conservancy will acquire and manage mitigation lands using the fees collected based on the number of acres approved for authorized development by both Land Use Agency Permittees. The failure of either jurisdiction to raise the mitigation fee in a timely manner and in an amount sufficient to fully implement the NBHCP could potentially compromise the ability of the Conservancy to carry out its responsibilities under the NBHCP. In that event, any shortfall in acquisition of mitigation lands or shortfall in funds available to cover the management and other plan implementation costs, shall be attributed solely to the Land Use Agency Permittee which has failed to adjust its mitigation fee as necessary to fully implement the NBHCP and may result in suspension or revocation of that jurisdiction's permits. However, because the NBHCP requires that a 200 acre cushion of mitigation lands be maintained prior to issuance of urban development permits by the City or Sutter for new authorized development, failure of either the City or Sutter to raise fees to a level adequate to fully fund the plan should never result in a deficit of mitigation lands (see "Phasing of Mitigation Land with Respect to Development" below). Should either the City's or Sutter's permits be terminated or revoked for failure to meet its funding or other obligations under the permits, each would remain obligated pursuant to 50 C.F.R. 17.22(b)(8) and 17.32(b)(8) to complete its mitigation obligations with respect to all authorized development approved by the jurisdiction prior to the revocation or other termination of its permits.

The mitigation fee is based, in part, on the funds necessary to assure the establishment of reserve blocks with 25 percent managed marsh habitat (described below). The Mitigation Fee may also be adjusted periodically at the request of the Service, CDFG or the Conservancy to account for NBHCP revisions, including revisions that: (1) increase up to a total of 75 percent, the percentage of Mitigation Lands converted to managed marsh, or (2) result from ongoing monitoring program results in the Plan Area, determined at the Mid-Point and Overall Program Reviews, or any future Service Giant Garter Snake Recovery Plan or CDFG Swainson's Hawk Recovery Plan (see Section VI.H of the NBHCP), or (3) based upon peer-reviewed scientific information provided such adjustments meet the requirements of Sections VI.E., Section VI.F. and Section VI.H of the NBHCP. The fee may also be increased as necessary to maintain land acquisitions at the 0.5-to-1 mitigation ratio and implement associated management (including restoration and enhancement), including changes identified through the Plan's adaptive management program, as appropriate to ensure the effectiveness of the OCP. Because the mitigation fee consists of individual components (e.g., land acquisition, restoration/ enhancement/monitoring, etc.), the fee may need to be raised with respect to specific fee

components periodically found to be deficient over the term of the permits. In other words, all components of the mitigation fee are subject to fee increases as necessary to ensure that the requirements of each individual component of the NBHCP are met. The Land Use Agencies have committed to adjust the fee as necessary for all additional monetary obligations that may be required to fully implement the land acquisition, ongoing or permanent management (including restoration and enhancement), monitoring, database maintenance, adaptive management, recovery plans, changed circumstances and any other requirements of the NBHCP and NBHCP IA, subject to the limitations described in Sections VI.E, VI.F, VI.H, and VI.K.1 of the NBHCP. Such fee increases are provided for under the Plan's OCP and therefore, do not trigger amendment of the Plan or Permits.

Phasing of Mitigation with Respect to Development

In order to help assure that adequate funding exists for implementation of the NBHCP, the Conservancy will establish and maintain a 200-acre cushion of mitigation lands prior to the approval of any new authorized development by the City of Sutter County. In order to accomplish this, no Urban Development Permits for Authorized Development shall be issued by the City or Sutter after September 30 of each calendar year until the Conservancy notifies the City and Sutter that it has acquired Mitigation Lands which equal the number of acres necessary to meet the mitigation requirement attached to all prior Urban Development Permits issued by the City and Sutter plus an additional 200 acres of Mitigation Land. Furthermore, no new Urban Development Permits will be issued the next calendar year until after the Conservancy notifies the City and Sutter that it has acquired Mitigation Lands which equal the number of acres necessary to meet the mitigation requirement attached to all prior Urban Development Permits issued by the City and Sutter plus an additional 200 acres of Mitigation Land.

Accounting of Mitigation Land

Each Land Use Agency shall collect the mitigation fee prior to issuance of an urban development permit (i.e., grading permit or notice to proceed) and promptly transfer the fees to the Conservancy, identifying by name, location and acreage, each project for which fees have been collected. The Conservancy shall record collection of fees from Land Use Agencies in chronological order, crediting the oldest project to have paid all required components of the mitigation fee with the mitigation lands the Conservancy acquired. Compliance with phasing of mitigation with respect to development must be satisfied with respect to the entire NBHCP Plan Area and not for individual Land Use Agency's Permit Areas. No Urban Development Permits for Authorized Development shall be issued after September 30 of each calendar year until the Conservancy has acquired Mitigation Lands which equal the number of acres necessary to cover the mitigation obligation attached to all prior Authorized Development under the NBHCP plus an additional 200 acres of Mitigation Lands. If the Conservancy falls behind on acquiring mitigation land (i.e., does not maintain the required 200-acre cushion, see above), then the Conservancy must notify all Land Use Agencies and the Conservancy may not accept additional mitigation fees until acquisition of mitigation land is in compliance with Section VI.C of the NBHCP. In addition, the Land Use Agencies shall not allow any development project to proceed

under the ITPs where the Conservancy has not accepted mitigation fees or mitigation lands for that development project. Development of lands for which mitigation fees have been accepted by the Conservancy, and which has met all other requirements of the NBHCP would be allowed to proceed under the ITPs.

The NBHCP requires that at least 25 percent of habitat mitigation lands be established as managed marsh. Therefore, the Conservancy will specify the acreage, location, and type of reserve land (i.e., rice land versus marsh), and the percentage of each with respect to the total lands acquired to date in its annual report. The 25% managed marsh requirement applies to the entire Natomas Basin collectively (i.e., to all Land Use Agency jurisdictions and Permit Areas), not to each Permit Area individually.

The Final NBHCP has been revised to eliminate a provision which would have allowed up to 20% of the mitigation lands to be acquired in Area B under certain conditions. However, as stated earlier, both the City and Sutter have decided (Sutter Resolution Number 03-039, City Resolution Number 2003-289) to not allow mitigation lands to be acquired in Area B; therefore, no mitigation lands may be acquired in Area B, and the NBHCP has been updated to reflect that modification.

The MAPHCP states that MAP will utilize the Conservancy for acquisition and management of habitat reserves. MAP will rely on the County of Sacramento to collect mitigation fees, and the County of Sacramento will convey these fees to the Conservancy. Additionally, the Conservancy will include information on MAP's urban development and associated habitat mitigation within its annual report. Fees collected by the Conservancy on behalf of Planned Development in the MAPHCP Permit Area shall be credited along with fees collected by both Land Use Permittees in chronological order, with the first project among MAP or either Land Use Permittee to have paid the mitigation fee credited with the habitat mitigation lands acquired by the Conservancy and credited to MAP's mitigation obligation.

As stated above, project proponents may elect to transfer mitigation lands in lieu of the mitigation land acquisition fee component of the mitigation fee or may be required to do so by the City and Sutter. In such cases, once the Conservancy, Service, and CDFG have approved transfer of the lands, and the other non-land acquisition portion of the mitigation fee has been paid by the project proponent, the project may proceed. The Conservancy will keep a record of the name, location, and acreage of the project and the mitigation lands transferred to the Conservancy on behalf of the project and include the information in its annual report.

Monitoring under the NBHCP

Two related but separate types of monitoring programs will be required under the NBHCP. First, Compliance Monitoring will document Permittee activities and ensure that NBHCP Permittees complete obligations as specified within the NBHCP. These obligations vary between Permittees, based upon their specific obligations. Second, a Biological Effectiveness Monitoring Plan will be implemented to measure the biological success of the NBHCP

Operating Conservation Program. The Biological Effectiveness Monitoring Plan will provide the biological data necessary to guide and direct the NBHCP OCP. Monitoring shall be performed for the duration of the Permit and in perpetuity per the terms of the Plan.

Compliance Monitoring

Compliance monitoring is verifying that the Permittees are carrying out the terms of the NBHCP, the NBHCP IA and the associated ITPs. The Conservancy will be the primary entity responsible for compiling, retaining, and making available to the Wildlife Agencies data on compliance with the provisions and obligations contained within the NBHCP and the associated NBHCP IA. The Land Use Agencies shall conduct compliance monitoring and report to the Conservancy on their compliance and the compliance of third parties operating under their control and their Permits with regard to their obligations under the NBHCP, including implementation of the NBHCP take avoidance, minimization, and mitigation measures. Compliance Monitoring will include the status of the implementation of the NBHCP terms and conditions (e.g., financial responsibilities and obligations, management responsibilities, and other aspects of the ITPs, NBHCP and NBHCP IA). At each Implementation Annual Meeting, the Conservancy will report to the other Permittees and Wildlife Agencies on the progress of the HCP conservation strategy. The Permittees' compliance with the NBHCP obligations will be reported within the Conservancy's annual report. Additional detail regarding Compliance Monitoring is located in Chapter VI of the NBHCP.

Biological Effectiveness Monitoring

Biological Effectiveness Monitoring will evaluate the effects of authorized development and other Covered Activities and will determine whether the effectiveness of the NBHCP's OCP is consistent with the assumptions and predictions made when the NBHCP was developed and approved. In other words, Biological Effectiveness Monitoring will evaluate if the NBHCP is achieving its biological goals and objectives. The Conservancy will be responsible for completing the Biological Effectiveness Monitoring and will publish the results in its annual report. In order to ensure consistent application of monitoring techniques both upon Conservancy reserves and throughout the Natomas Basin, the Conservancy shall prepare a comprehensive Biological Effectiveness Monitoring Plan (see Section VI.E.2 of the NBHCP for detailed information regarding the Biological Effectiveness Monitoring Plan).

In order to measure the effectiveness of meeting the biological goals and objectives, the Biological Effectiveness Monitoring Plan shall be designed to track population trends of the Covered Species and to evaluate the effectiveness of the mitigation land design, restoration and management in providing habitat and supporting the Covered Species. The monitoring plan shall track population trends on Conservancy reserves as well as at selected non-reserve sites within the Natomas Basin. Non-reserve sites will serve as controls to determine success of mitigation land design and management in supporting and increasing the abundance of Covered Species. Monitoring of non-reserve sites also may provide information to guide future acquisitions and to determine presence and/or use of corridors between reserves. Selection of

non-reserve sites to be monitored will be determined during preparation of the monitoring plan and may differ for the various Covered Species, depending on the management and information needs for those species.
The Biological Effectiveness Monitoring Plan is divided into two primary components: (1) a Basin-wide Biological Effectiveness Monitoring Program designed to evaluate the overall success of Covered Species within the Natomas Basin; and (2) Site Specific Biological Monitoring Programs designed to evaluate the success of Covered Species within Conservancy reserves. The Basin-wide Biological Effectiveness Monitoring Program will include limited monitoring of Covered Species at locations outside of Conservancy reserves, as well as periodic evaluations of Covered Species within the reserves. Site Specific Biological Monitoring Programs will be developed for each block of contiguous Conservancy reserves. The Site Specific Biological Monitoring Programs will be developed in conjunction with, and included within, the Site Specific Management Plans (SSMP) (discussed below) developed for each reserve. In combination, the Basin-wide Biological Effectiveness Monitoring Program and the Site Specific Biological Monitoring Programs constitute the Biological Effectiveness Monitoring Plan. Additional detail regarding Biological Effectiveness Monitoring is located in Chapter VI of the NBHCP.

The Conservancy, in consultation with the Technical Advisory Committee (TAC) and qualified species experts, will design or coordinate the design of Biological Effectiveness Monitoring Programs, both Basin-wide and Site Specific. The TAC is a group of experts representing the Wild life Agencies (CDFG and Service) and Permittees who provides advice and guidance to the Conservancy.

Management objectives for the reserve system, as described in detail in Sections I.C and VI.E.2-VI.E.4 of the NBHCP, will be used to determine whether qualitative or quantitative monitoring methods will be employed and what level of confidence in the results is required. All Biological Effectiveness Monitoring Programs will include thresholds, at which mitigation land management must be modified through the adaptive management process to assure success of the OCP. Preliminary management thresholds are provided in Section VI.F.1 of the NBHCP. Revised management thresholds will be incorporated within two years of issuance of the proposed Permits as part of the Biological Monitoring Programs. The NBHCP does not identify the specific activities to be conducted within the Biological Effectiveness Monitoring Programs. However, it does provide detailed direction for developing suitable Biological Effectiveness Monitoring Programs (see Section VI.E of the NBHCP). For example, the NBHCP Biological Effectiveness Monitoring Program shall include, but is not limited to, the following components and guidelines for monitoring activities:

1. Annual surveys of the Conservancy Permit Area (including Conservancy reserves and selected nonreserve area accessible to the Conservancy) to determine the status of the Swainson's hawk, including presence, density, and reproductive success.

2. Annual assessment of the status of giant garter snake populations within the Natomas Basin. Annual updates of information of locations of giant garter snakes within the Basin as well as other Covered Species.

3. Density and distribution sampling of Covered Species on Conservancy reserve lands every five years. The first five year sampling of Covered Species shall be completed within one year of issuance of Permits under the NBHCP, and subsequently every five years thereafter. Once a Covered Species is found to occupy a Conservancy reserve, yearly monitoring of that Covered Species on the reserve it occupies and any adjacent reserves, as appropriate, will be implemented.

4. The NBHCP Biological Monitoring Program shall specify the number of control locations within the Basin but outside of NBHCP Mitigation Lands that shall be monitored. These sites shall be monitored every year for Swainson's hawk and giant garter snake, and every five years to satisfy monitoring of species throughout the Conservancy's Permit Area other than Swainson's hawk and giant garter snake. Such sites shall be limited to a set of locations that, to the extent that such sites exist in the Basin and are physically accessible, collectively provide suitable habitat to support all Covered Species and shall allow the following:

    a. Determination of the comparative success of Covered Species on non-reserve sites versus on reserve sites.

    b. General documentation of Covered Species presence.

    c. Determination of whether the Mitigation Lands are supporting the general populations of Covered Species found within the Basin.

5. Annual assessment and identification of canals and ditches which provide snake habitat connectivity within and between reserves. This assessment shall be coordinated with the Water Agencies and the Wildlife Agencies. Additionally, the Wildlife Agencies and the Land Use Agencies will notify the Conservancy of any known applications under the Act or Section 404 of the Clean Water Act affecting canals.

6. Evaluations of the Operating Conservation Program and its progress toward its intended biological goals.

7. The Monitoring Program shall provide specific details on the following subjects:

    a. Monitoring methodologies and protocols to be implemented.

    b. Timing of monitoring efforts, including frequency and duration of monitoring efforts.

c. Locations of monitoring, and methodology used to select locations.

d. Personnel required.

e. Effort required and methods of documenting and determining monitoring effort.

f. Methods of analyses of monitoring data.

g. Information expected to be gained from monitoring.

h. Thresholds at which management must be modified to assure success of the conservation plan.

8. The Biological Effectiveness Monitoring Program shall establish a standardized format for annual monitoring and five-year monitoring conducted on behalf of the Conservancy.

Additional detail is provided for the formulation of site-specific management plans.

The Biological Effectiveness Monitoring Programs may require periodic revisions as new methods become available or if monitoring methods are not yielding the expected information. Therefore, the Biological Effectiveness Monitoring Programs and their effectiveness in measuring the success of the NBHCP's OCP will be reviewed at each Midpoint Review (discussed below). In addition, the Biological Effectiveness Monitoring Programs may be reviewed and changed in accordance with the NBHCP's Adaptive Management provisions (see Section VI.F of the NBHCP). In summary, the Conservancy will revise the Biological Effectiveness Monitoring Programs whenever review indicates revision is necessary to effectively monitor success in achieving the NBHCP's biological goals and objectives.

Adaptive Management

Adaptive management is a process that allows the NBHCP's OCP to be adjusted during the life of the Plan to ensure that the most up-to-date information is being utilized, and that the Plan's biological goals and objectives are being achieved. The strategy will define the feedback process and incorporate feedback loops that link implementation and monitoring to a decision-making process. Incorporating new monitoring information is necessary to effect changes in management to achieve the Plan's biological goals and objectives. As identified in the NBHCP, and as is common for a regional plan of long duration and covering multiple species, uncertainties regarding the NBHCP's OCP exist. Adaptive management will allow the OCP to respond to these uncertainties. For the purposes of the NBHCP, the following three adaptive management approaches will be used:

1. Regularly scheduled periodic evaluations of the NBHCP monitoring data, other new scientific information or future recovery plan recommendations by the Conservancy and/or the TAC and a determination linking the information to the Plan's success in implementation and achieving the biological goals and objectives

2. Identifying significant measurable threshold limits (discussed above) for each of the adaptive management objectives that will trigger proposals and solutions requiring a management change. And

3. Conducting a review at the Independent Mid-Point Reviews for Land Use Agencies (discussed below) and the Overall Program Review at 9,000 acres of development (discussed below).

These approaches will be used to evaluate the effectiveness of the established habitats on reserve lands and to implement adjustments to the OCP, as necessary, in order to achieve the biological goals and objectives of the Plan.

The Conservancy will use the annual reporting process to review the compliance and effectiveness monitoring in the adaptive management process. The Conservancy's report will include a summary of findings with specific management recommendations and direction, if applicable.

Adaptive management revisions will be made consistent with the NBHCP's *Amendments and Revision* section (see Section VI.F of the NBHCP). Changes to the NBHCP that are substantial in scope, and are beyond the scope of the adaptive management Program will require the amendment of the ITPs, and additional review and approval under the Act, California Endangered Species Act (CESA), CEQA and NEPA. A more thorough discussion is provided in the "Enforcement, Amendments and HCP Requirements" section below. The Conservancy shall keep a complete administrative record of all NBHCP revisions resulting from the Plan's adaptive management program.

The Conservancy will serve as the database manager for the NBHCP and shall be the central data repository of all scientific data collected through the NBHCP for the life of the permits. In this role, the Conservancy will be responsible for maintenance, management, analysis and distribution of data collected through NBHCP monitoring efforts, as well as serving as a repository for related work conducted by other entities within the Basin. In addition to monitoring data collected by the Conservancy and the other NBHCP Permittees, the database will include documents and reports on new species occurrence records from environmental documents, California Natural Diversity Database (CNDDB) entries and other sources as provided to the Conservancy. The Conservancy shall maintain the database in a form that allows the determination of success of the NBHCP in achieving the biological goals and objectives of the OCP. At a minimum, the database will document in tabular form in a standard spreadsheet program the following data: the numbers and specific locations of each species occurrence within each contiguous block of mitigation land; basinwide data documented on Swainson's hawk and giant garter snake such as population densities, reproductive successes, etc. collected through annual surveys, 5-year surveys, and other observational data; and, Covered Species data for each identified monitoring control site located outside of the mitigation lands. Exact data needs of the Biological Effectiveness Monitoring Program required to evaluate the success of the operating conservation plan in meeting the NBHCP biological goals and objectives will be decided by the Conservancy in consultation with the Service, CDFG, and the TAC. Maps identifying monitoring sites and the specific locations of species occurrences shall be maintained to document the locations of monitoring efforts and the locations for data collected through the NBHCP monitoring efforts. Mapping of monitoring data shall be of adequate detail to evaluate the success of restoration efforts within Conservancy reserves and shall allow comparison of year-to-year monitoring results and five-year monitoring results. Additionally, the Conservancy shall retain mapped information identifying the locations of all mitigation lands and all data reported by the Land Use Agency Permittees related to the location of development authorized under the NBHCP, thereby documenting development lands for which NBHCP fees and other mitigation measures have been satisfied.

Annual Report

The Conservancy shall compile and submit an annual report to the Service and CDFG detailing authorized development activities, habitat acquisition, management, and compliance and effectiveness monitoring activities throughout the Plan Area for the preceding year. The report will be due 120 calendar days from the last day of each calendar year, or portion of a calendar year, during which the Permit is in effect. Each Permittee will be responsible for providing the Conservancy with information in their possession necessary for compiling the annual report.

Program Adaptation for Recovery Plans

The NBHCP's adaptive management provisions allow for revisions to management strategies to incorporate new or modified management strategies, such as those which may be included in recovery plans or in response to monitoring results in the Plan Area or to new scientific information. The NBHCP will incorporate recommendations made pursuant to future recovery

plans where such changes are supported by monitoring results from the Plan Area or new scientific information and when such recommendations:

1. Relate to the physical management of mitigation lands.

2. Would improve the effectiveness of the NBHCP's OCP by identifying relevant new information, approaches, techniques, or species protection needs.

3. Can be implemented within the NBHCP Plan Area.

4. Fit within the overall intent, framework, are consistent with the NBHCP's biological goals and objectives and would not exceed the established mitigation ratio of the Plan. And

5. Will not substantially sacrifice habitat values for Covered Species that are not addressed by the Recovery Plan.

The greatest potential shift in conservation strategies anticipated to result from a future snake recovery plan is a transition from rice cultivation to managed marsh. The NBHCP establishes an initial habitat enhancement obligation for the snake (see snake conservation measures below) and allows adjustments to be made based on the adopted final snake recovery plan, monitoring conducted in the Plan Area, or in response to new scientific information. Any modifications to the NBHCP necessitated by a future snake recovery plan or by other future recovery plans approved for listed Covered Species, are considered a part of the Plan's adaptive management program and will not trigger an amendment to the Permits.

Results of any future CDFG Swainson's Hawk Recovery Plan may also suggest or result in the need for NBHCP modifications to management practices upon mitigation lands. Any changes to the NBHCP resulting from a Swainson's Hawk Recovery Plan are considered a part of the Plan's adaptive management program and will not trigger an amendment to the Permits.

NBHCP Overall Program Review at 9,000 acres of Development

The NBHCP establishes a comprehensive overall program review designed to evaluate the performance and effectiveness of the Plan, to be conducted when and if authorized development within the Basin allowed by the ITPs for the City, Sutter and MAP reaches a total of 9,000 acres (the "Overall Program Review"). This Overall Program Review will be triggered at the point urban development permits covering a total of 9,000 acres of development in the Natomas Basin have been issued by the Land Use Permittees and by Sacramento County for the Metro Air Park. During the review, up to, but not more than, an additional 3,000 acres of additional urban development may be approved. In other words, no more than a total of 12,000 acres of urban development shall be approved prior to completion of the Overall Program Review.

The Overall Program Review shall specifically address the following factors: (1) status and

population trends of the snake, hawk, and all other Covered Species within the NBHCP area, especially with respect to those biological factors that are directly affected by Covered Activities under the Plan; (2) status and effectiveness of the Plan's habitat reserve system, including its buffer and setback requirements; (3) the Plan's success in meeting the 2,500-acre and 400-acre minimum habitat block size requirements; (4) the status and effectiveness of the Plan's funding mechanisms; (5) the relative status and distribution of developed lands and reserve lands within each of the Land Use Agency jurisdictions (the City, Sutter, and MAP); (6) the success of the 25% managed marsh/50% rice/25% upland reserve system for supporting the Covered Species, and (7) compliance of the Water Agencies (RD1000 and Natomas Mutual) with approved canal and ditch maintenance practices (not covered under the ITPs).

The review shall be conducted through consultation among all affected Permittees, the Conservancy, the Service, and the CDFG, which shall be known collectively as the NBHCP Review Board. The Conservancy shall inform the other parties, in writing, when the 9,000-acre trigger for the overall program review has been reached and shall initiate and coordinate the review.

Results of the review shall consist of a written report presenting the conclusions of the Review Board. These conclusions shall address each of the factors described above. The report shall also present recommendations consisting of the following or of a combination thereof: (1) a recommendation that the NBHCP is functioning as intended and that no revisions to the Plan's measures, in addition to those originally set forth, are necessary; (2) a recommendation that the NBHCP is significantly in need of correction and the specific corrective measures that are needed; and (3) a recommendation as to whether such corrections should be treated as an NBHCP revision under the Plan's adaptive management provisions, or whether the corrections exceed the scope or intent of the adaptive management process and should be treated as an amendment of the Plan's associated Section 10(a)(1)(B) and Section 2081 Permits. Upon completion of the review, the Service and CDFG shall, depending on the results, either document in writing that the NBHCP is functioning as intended and that no Plan revisions or Permit amendments are necessary, or assist the Permittees in revising the NBHCP and, if necessary, amending their respective Permits, as needed. The Review Board's report shall be made available to the public for review and comment before written findings are made by the Service and CDFG. If it is determined that substantial revisions to the NBHCP need to be made through amendment of the Permits, all statutory and regulatory requirements including those regarding public notice and review under the Act, NEPA and CEQA shall be completed.

If the findings of an adopted final snake recovery plan and Overall Program Review, monitoring results from the Plan Area, or new scientific data indicate, the managed marsh component of mitigation lands may be increased to 75% within sites acquired subsequent to such review, results, determination or Recovery Plan adoption. Such increase would only be made following written notice from the Service, supported by documentation and technical analysis, demonstrating the need for an increased percentage of managed marsh.

Independent Mid-Point Reviews for Land Use Agencies

In addition to the NBHCP Overall Program Review, both the City and Sutter will conduct Independent Mid-Point Reviews as development occurs within each Land Use Agency's Permit Area. Thus, up to three program reviews (one overall and two independent reviews) may be completed, depending on the timing of development within the City and Sutter. The Independent Mid-Point Reviews conducted by the City of Sacramento and Sutter County shall address each of the factors noted for the 9,000 acre overall program review above, as well as the expanded evaluation of progress on the 2,500 acre preserve, and minimum preserve size (discussed below).

If the findings of any of the Independent Mid-Point Reviews, ongoing monitoring results from the Plan Area, new scientific data or an adopted final snake recovery plan so dictate, the managed marsh component of mitigation lands may be increased to 75% within sites acquired subsequent to such review, results, determination or Recovery Plan adoption. Such an increase would only be made following written notice from the Service, supported by documentation and technical analysis, documenting the need for an increased percentage of managed marsh.

The City's independent Mid-Point Review will begin once urban development permits for 4,000 acres of authorized development have been approved within the City's Permit Area and the review will be completed before the City has approved urban development permits for 5,500 acres of development under the NBHCP. As of December 31, 2003 the City had approved 4,324.1 acres of development within their Permit Area (City 2003a). On June 19, 2003, the City notified the Service that it would commence its Independent Mid-Point Review upon approval of the proposed ITP by the Service (if approved) and that it would complete the review before it issues a total of 5,500 acres of Urban Development Permits (City 2003b). Sutter will begin its Independent Mid-Point Review once Sutter has approved urban development permits for 3,500 acres of authorized development permits and will complete the Independent Mid-Point Review before Sutter approves urban development permits for 5,000 acres of development under the NBHCP.

Should the timing of the City of Sacramento's Independent Mid-Point Review, Sutter's Independent Mid-Point Review and/or the overall 9,000 acre program review coincide, then the affected Land Use Permittee(s) may request the program reviews be combined under a single evaluation. Such request shall be made to the Service and CDFG and may be granted at the discretion of the Service and CDFG. Any revisions to the NBHCP made as a result of either Independent Mid-Point Review shall apply to both Land Use Agencies (and MAPPOA), unless the change affects only a particular Permittee.

Unforeseen Circumstances/"No Surprises"/Changed Circumstances

"Unforeseen circumstances" is defined as changes in circumstances affecting a species or geographic area covered by a conservation plan that could not reasonably have been anticipated by plan developers and the Service at the time of the NBHCP's negotiation and development, and that result in a substantial and adverse change in the status of the Covered Species (50 C.F.R. 17.3).

The “No Surprises” Rule states, in part, that when negotiating unforeseen circumstances, the Service will not require the commitment of additional land, water or financial compensation or other natural resources beyond the level otherwise agreed upon for the species covered by the conservation plan without the consent of the Permittee (63 FR 8859).

The assurances contained in the No Surprises rule apply only “where the conservation plan is being properly implemented, and apply only with respect to species adequately covered by the conservation plan.” For purposes of the No Surprises assurances, the term “operating conservation program” shall mean the specific conservation, mitigation, and management measures provided under the NBHCP to minimize and mitigate the impacts of incidental take of the Covered Species.

The NBHCP’s adaptive management provisions allow the NBHCP to be revised as a result of new recovery plans, new research into the Covered Species, and ongoing monitoring programs in the Plan Area. As a result, revisions may be made to the NBHCP's OCP, including reserve land management and enhancement, and monitoring of the Covered Species pursuant to the Plan’s adaptive management provisions, that may result in additional mitigation and costs, provided such revisions meet the requirements of Sections VI.E and VI.F of the NBHCP. Because such revisions and changes are provided for under the Plan, they are not subject to the restrictions on additional mitigation contained in the No Surprises Rule. The following elements of the plan are not subject to revision as part of the NBHCP’s adaptive management provisions or as a result of the overall or individual jurisdiction reviews: (1) the 0.5-to-1 mitigation ratio; (2) the 75% limit on the amount of reserve lands to be converted to managed marsh; and (3) any other change not currently described in or provided for under the adaptive management program, changed circumstances, or other elements of the NBHCP’s OCP that would increase the Plan's costs or restrictions on land otherwise available, including any such changes resulting from the 9,000-acre review Overall Review process or Independent Mid-Point Reviews.

Another category of circumstances under the federal "No Surprises" rule is "changed circumstances." This term is defined under the rule as "changes in circumstances affecting a species or geographic area covered by a conservation plan that can reasonably be anticipated by plan developers and the Service and that can be planned for (e.g., the listing of a new species, or a fire or other natural catastrophic event in areas prone to such events)" (50 C.F.R. 17.3). A number of possible changed circumstances are addressed in Chapter VI of the NBHCP. Examples include, but are not limited to: (1) listing of new species; (2) availability of new scientific information; (3) approval of new recovery plans; (4) problems in implementing the NBHCP; (5) fire or flood; (6) invasive species; (7) changes in water availability; and (8) non-participation by a Land Use Agency in the NBHCP.

Enforcement, Amendments, and HCP Requirements

The Service may suspend the ITP of a Permittee if that Permittee fails to implement the NBHCP in accordance with the terms and conditions of the ITP and as provided for under applicable regulations. Suspension or revocation of a Section 10(a)(1)(B) permit, in whole or in part, by the Service shall be in accordance with 50 CFR 13.27-29 and the NBHCP IA.

If one of the Land Use Agencies fails to obtain its Permits or has its Permits revoked for failure to comply with the NBHCP, the essential effect to the implementation of the NBHCP is that less authorized development is covered by the NBHCP. With regard to funding adequacy, the reduction in authorized development would result in a similar reduction in acres of mitigation land to be acquired, restored, managed, enhanced and administered as reserve lands in perpetuity. Therefore, the Conservancy would have to continue to implement the NBHCP as it applies to the reduced authorized development and the Covered Activities within the participating Land Use Permittees' Permit Areas. The NBHCP provides for adjustments to the mitigation fee to fund the acquisition, restoration, creation, enhancement and management of reserves on a 0.5 to 1.0 mitigation basis.

There are two types of changes which may be made to the NBHCP and/or the NBHCP Permits and/or its associated documents: (1) revisions; and (2) amendments. Any revisions or amendments shall be in accordance with all applicable legal requirements, including but not limited to the Act, NEPA, CESA, CEQA, and any other applicable state and federal laws and regulations. The Conservancy shall process all amendments and revisions to the NBHCP, circulating proposed changes to all parties and, if appropriate, approving the amendment or revision by action of the Conservancy's Board.

Revisions to the NBHCP are changes to the Plan provided for under the OCP, including adaptive management changes and mitigation fee adjustments. These revisions would not result in operations under the NBHCP that are significantly different from those analyzed in connection with the NBHCP as approved, or result in adverse impacts on the environment that are new or significantly different from those analyzed in connection with the NBHCP as approved. Revisions to the NBHCP may include, but are not limited to: (1) updating construction "windows" for the NBHCP Covered Species; (2) correction of any maps or exhibits to correct errors in mapping or to reflect previously approved changes in the ITPs or NBHCP; (3) establishing and amending preconstruction survey methodologies, including modifying timing of NBHCP preconstruction survey methodologies; (4) modifying existing or establishing new incidental take avoidance measures; (5) modifying reporting protocols for annual report s; (6) minor changes to survey, monitoring or reporting protocols; (7) revising reserve enhancement and management techniques; (8) establishing new reserve design criteria; (9) revising reserve enhancement or management practices in conjunction with SSMPs; (10) approving recreational or income-generating uses for the NBHCP reserves that are consistent with the biological goals and objectives of the NBHCP's OCP; (11) making annual adjustments to the NBHCP mitigation fee to keep pace with inflation, or as necessary to fully implement the NBHCP's OCP, including its adaptive management provisions and responses to changed

circumstances; (12) changes to the membership of the TAC which retains representation from the Wildlife Agencies; and (13) any other modifications to the NBHCP that are consistent with the biological goals of the NBHCP that the Service and CDFG have analyzed and agreed to and will not result in operations under the NBHCP that are significantly different from those analyzed in connection with the NBHCP, will not result in adverse impacts on the environment that are new or significantly different from those analyzed in connection with the NBHCP, or result in take not analyzed in connection with the NBHCP.

The party proposing a revision to the NBHCP shall circulate to the Conservancy, and the members of the TAC, the proposed revision along with an explanation of why the revision is necessary or desirable; and a description of why the party believes the effects of the proposed revision are more beneficial than or are not significantly different from those described in the NBHCP as originally adopted. The Conservancy shall be responsible for circulating all proposed revisions to the other Permittees for review, as appropriate. If the Conservancy, and the Service and CDFG representatives to the TAC agree to the proposed revision, and no other Permittee objects within the period prescribed by the Conservancy, the Conservancy shall process the revisions to the NBHCP, including, if appropriate, approving the revision by action of the Conservancy's Board. All adjustments to the mitigation fee shall also require approval by the City and Sutter prior to becoming effective within their respective jurisdictions.

If the Service or CDFG representative to the TAC objects that the proposed revision should be processed as an amendment to the NBHCP, the Conservancy may choose to submit the proposed revision to the Service and CDFG for review. If this happens, the Service and CDFG shall each respond in writing to a proposed revision within 60 calendar days of receipt of the request, provided that sufficient supporting documentation is included with the request. The responses shall either concur with the proposed revision or require that the proposed revision by processed as an amendment to the Plan and ITPs. If either the Service or CDFG require the proposed revision to be processed as an amendment, the agency shall include in their written response an explanation for its determination. If approved by the Service and CDFG, the revision shall become effective upon the Conservancy's receipt of the Service's and/or CDFG's approval.

Amendments to the NBHCP will require amendment of Section 10(a)(1)(B) Permits and /or the Section 2081(b) Permits, and may require amendment of the Implementation Agreement. Amendments may include any of the following types of changes to the NBHCP:

1. Proposed revisions required to be treated as Amendments.

2. The listing of a new species within the Plan Area which is not an NBHCP Covered Species but which may be affected by NBHCP Covered Activities and for which a Permittee seeks coverage under the Plan and ITPs.

3. Significant changes to the NBHCP which were not addressed in the NBHCP including, but not limited to:

a. Changes to the method for calculating compensation for incidental take, which would increase the levels of incidental take permitted for the NBHCP.

b. Changes to the mitigation fee, except as otherwise provided for in the NBHCP.

4. Changes to the Covered Activities which were not addressed in the NBHCP as originally adopted, and which otherwise do not meet the Revision provisions above.

5. Extending the term of the NBHCP Permits past the 50-year term.

6. Extension of the NBHCP Permit Area boundaries to allow development under the NBHCP within the City's or Sutter's portion of the Swainson's Hawk Zone beyond the City's designated 252 acres.

7. A proposal to increase the total authorized development permitted under the NBHCP beyond 15,517 acres (17,500 acres including MAP).

Following receipt of a complete application package for a proposed amendment to a Section 10(a)(1)(B) Permit, the Service shall publish a notice of the proposed amendment to the Section 10 (a) Permit in the Federal Register as required by the Act. The Service shall use its reasonable efforts to process the proposed amendment within 180 calendar days of publication, except where longer periods are required by law. The amendment of a Section 10(a) Permit shall be treated as an original permit application. Such applications typically will require submittal of a revised habitat conservation plan, a completed permit application form with appropriate fees, a revised Implementation Agreement, and preparation of an environmental review document prepared in accordance with NEPA.

Conservation Program of the Proposed NBHCP

Introduction

The NBHCP includes several tiers of conservation measures including: (1) creation of a system of habitat reserves as mitigation for the impacts of take of the Covered Species; (2) reserve restoration, enhancement and management measures to support each habitat type and Covered Species; (3) take avoidance and minimization measures to be implemented by the Land Use Agencies and the Conservancy for each species; and (4) an extensive compliance and effectiveness monitoring program to evaluate whether the plan is being implemented as approved and its biological goals and objectives are being met.

Overview of the Habitat Reserve System

The NBHCP includes the acquisition and creation of habitat reserves at a ratio 0.5 to 1. For each acre of land developed within the Plan Area, 0.5 acres of habitat will be restored/enhanced, and protected and managed. The 0.5:1 ratio is constant, regardless of habitat value of the lands lost to development. Therefore, a total of 8,750 acres of habitat will be protected if all of the 17,500 acres of land described in the NBHCP are developed. In addition to mitigation lands provided from the 0.5:1 mitigation ratio, 200 acres of uplands to be managed exclusively for the Swainson's hawk are being provided to mitigate for the loss of Swainson's hawk nest tree and foraging habitat as a result of the MAP project.

The NBHCP requires that habitat reserves include a variety of habitat types to support the various needs of the Covered Species. The initial requirement is for the reserve system to be comprised of 50% managed rice, 25% managed marsh habitat, and 25% upland habitat (Table 2). The NBHCP includes adaptive management provisions. If the Service determines that the 50% rice / 25% managed marsh habitat /25% upland habitat ratio does not adequately protect the snake, then the Service may require that the ratio be changed up to a total of 75% managed marsh habitat / 25% upland habitat in specific circumstances. In order to change the ratio, the Service must provide justification in the form of a written analysis based upon scientific evidence, monitoring results, or a snake recovery plan (when adopted) and meet the NBHCP's requirements. The analysis must illustrate that additional managed marsh is required to support the continuation of the snake in the Basin. The revised ratio would apply to reserves acquired and developed following issuance of the revised ratio. In other words, the revised ratio would not be retroactive.

The NBHCP also allows changing the habitat ratios (i.e., 25% marsh, 50% rice, 25% uplands) if it is determined insufficient Swainson's' foraging habitat is available. Such modifications would be applied prospectively to future Conservancy acquisitions and would not affect existing, improved Conservancy reserves (see NBHCP, Section IV.C.1.e).

As of December 4, 2002, the Conservancy had acquired approximately 2,803 acres. Of that acreage, the Conservancy planned to manage approximately 716 acres (25.5 percent) as marsh, 1,404 acres (50.0 percent) as rice, and 682.8 acres (24.4 percent) as uplands.

General Reserve System Policies

Buffers within the reserve lands. Buffers shall be established so that they are inside the reserve system (i.e., the buffers shall be part of, not outside of reserve lands) and shall count as mitigation land. Buffers between improved wetlands and surrounding land uses will extend from the outside edge of the reserve (i.e., levee toe or maintenance road) to the boundary edge of the improved wetland area. The width of the buffer and the management/uses of the buffer area shall be established at the time a Site Specific Management Plan (SSMP) is prepared for the particular reserve site. Typically, buffers will consist of native or ruderal vegetation and will vary between 9 and 23 m (30 and 75 ft.) in width, based on the compatibility of adjacent land uses. When

agricultural uses are incorporated within a reserve site, such agricultural uses (with appropriate production practices to protect wildlife) may serve as the buffer area. Other uses that may be appropriate within the buffer area include Conservancy access roads. Most buffer areas will provide suitable upland for species. For example, uplands bordering managed marsh reserves would serve as upland habitat for the snake, turtle, or other aquatic species whose habitat requirements include associated uplands. These uplands will also provide value to upland species such as the hawk.

The Conservancy may include buffers measuring less than 9.1 m (30 ft.) in width on reserve lands. In these instances, the decreased buffer widths must be specified in SSMPs, reviewed by the TAC, and approved by the Service and CDFG. Reduction of buffers may occur only where: (1) there is clear evidence that the buffer is unnecessary (e.g., the reserve site is adjacent to another reserve or similar natural habitat); (2) it is determined that buffers are not the best use of reserve land; and (3) the lack of buffers will not create conflicts with adjacent property owners (e.g., issues of vector control or other nuisance). Decisions about the need for buffers and buffer widths shall be included in the SSMPs for habitat reserves.

Connectivity. One of the primary goals of the NBHCP is to ensure connectivity between individual reserves, and connectivity between reserves and surrounding agricultural lands. Connections can be provided along land, through water and through air to enable the necessary mobility of species within their ranges. One primary means of connection between water areas will be the drainage/irrigation canals within the Basin. The primary opportunity for connectivity between reserves is the system of channels maintained and operated by RD 1000 and Natomas Mutual.

The success of the snake in the Basin is dependent, in part, upon the maintenance of some of RD 1000's and Natomas Mutual's channels. Although the NBHCP anticipates that some of RD 1000's and Natomas Mutual's canals will be closed during the life of the ITPs, it also relies on the persistence of other canals to ensure the viability of some Covered Species in the Basin (see giant garter snake effects discussion below). Once Conservancy reserves have been acquired and key connectivity corridors identified, changes in water delivery and drainage operations affecting key channels must be considered by the Conservancy and appropriate actions taken to ensure connectivity is maintained between reserves. One of the mechanisms identified in the NBHCP to ensure viability of the reserve system is through moving reserve components. Other options, which may be used, if necessary, to maintain integrity of existing reserves, include memorandums of agreement, easements, and outright purchases of land, which would be designed to ensure connectivity for the snake between Conservancy reserves.

The NBHCP's Biological Monitoring Program (see NBHCP, Chapter VI) requires that an annual assessment be conducted to determine if connectivity exists within and between reserves. If it is determined that connectivity is being compromised, the Conservancy may use the above methods to reestablish connectivity. If this connectivity is not reestablished, the Wildlife Agencies may determine that the Conservancy is out of compliance with the terms and conditions of its Permits. Because the Conservancy is the Plan Operator, the consequence of this

may be that the City and/or Sutter are out of compliance with the terms and conditions of their Permits, which may lead to suspension or revocation of their Permits.

2,500-Acre/400-Acre minimum habitat block size requirements. The Conservancy will consolidate reserve acquisitions throughout the life of the Permits in order to build larger blocks of habitat reserve lands. Minimum requirements for reserve sizes are discussed below. The connectivity promoted through the required configurations of Conservancy acquisitions should reduce fragmentation and isolation of habitat reserves, thereby increasing the long-term viability of wildlife populations within the Basin.

In order to ensure adequately sized reserves that will support long-term viability of Covered Species, the NBHCP requires that by the end of the 50-year Permits, at least one habitat block within the reserve system will be a minimum of 2,500 acres. The remaining reserve lands must be in habitat blocks that are at least 400 acres in size. However, the Conservancy may acquire properties smaller than 400 acres in size in instances where the TAC determines that the biological resources merit such acquisitions. The basis for the 400-acre minimum block size and 2,500 acre reserve block size is: (1) large blocks minimize the "perimeter effect;" (2) large blocks promote biodiversity by allowing multiple species and niches to occupy the site; and (3) the 400 acre reserve size is considered in the NBHCP the minimum size necessary to allow the persistence of Covered Species.

Setbacks adjacent to reserve lands. Setback zones shall be considered by the Conservancy prior to the acquisition of reserve lands. The purpose of the setback requirement is to minimize the impacts between reserve lands and existing development or lands that are designated for urban development by one of the Land Use Agencies. The setback zone functions as a limitation on where reserve lands can be located. However, the reserve land setback zone does not affect the ability of each of the Land Use Agencies to approve development within the setback zone and adjacent to the boundaries of reserve lands. The setback criteria requires that mitigation lands acquired by the Conservancy or for which conservation easements are obtained shall, at the time of acquisition, be situated at least 244 m (800 ft.) from existing urban lands or lands that are designated for urban uses in an adopted general plan within the City or Sutter Permit Areas. Lands that are located within either the City or Sutter's Permit Area shall not be acquired or accepted as Conservancy Mitigation Lands without the prior review and approval by the decision making body of the Land Use Agency Permittee within which the proposed Mitigation Land is located, as well as Wildlife Agency approval. The NBHCP allows exceptions to the setback width requirement if: (1) the TAC, including its Service and CDFG representatives, concur unanimously in a decision to reduce the setback distance; or (2) if not unanimous, the Service and CDFG concur in writing that a reduction in the setback distance is necessary or appropriate.

Lands in the 800 foot setback zone between urban development and reserve areas will probably be in agriculture or another open-space or non-urban use. However, such lands will likely not be under the control of the Conservancy and will not count as mitigation land. The NBHCP specifically states that the setback standard is not intended to impose an obligation on the

Conservancy or the owners of the setback lands to manage those setback lands in any particular fashion.

Reserve Site Acquisition Criteria

Overall acquisition criteria. The Conservancy proposes to apply the following criteria when evaluating potential reserve acquisitions (see Section IV.C.2 of the NBHCP).

1. Habitat types within Conservancy reserves will generally be as follows: 25 percent managed marsh; 50 percent rice production; and, 25 percent upland habitat. These percentages apply on a Basin-wide basis and percentages within individual reserves may vary from the percentages described above.

2. Land must have legal water rights to an adequate water supply to serve the anticipated uses (wetland or upland) of the proposed reserve. This would normally mean rights to water from the Natomas Mutual (or its equivalent supplier if outside the Basin), but may solely include groundwater if a groundwater well or wells exist on the property and that such the well(s) can meet acceptable water quantity and quality needs.

3. Land must be capable of supporting appropriate agricultural cultivation in conjunction with either wetland or upland habitat reserve.

4. Land must be capable of either supporting or being improved to support various Covered Species associated with the anticipated type of habitat (wetland or upland) proposed for the potential reserve.

5. Upland- or wetland-specific criteria, as described in the following sections, must be applied as determined appropriate by the Conservancy and the TAC.

6. Land must be adequately removed from incompatible urban development or uses.

7. Habitat reserves will be established by the Conservancy in consultation with the TAC. Prior to purchase, all lands being considered for acquisition will be submitted to the Service and CDFG for review and concurrence. Such concurrence will be required before any land acquisitions are completed. However, formal Service and CDFG concurrence may be waived if: (a) the TAC, including the Service and CDFG representatives, unanimously concur with the proposed acquisition and if documentation of such concurrence is placed into the Conservancy's administrative record; or (b) the Conservancy's Board of Directors approves an action pursuant to this section in a regular, noticed meeting of the Board. In the latter example, following approval of the Conservancy's Board of Directors, the acquisition will be approved, unless the Service and CDFG deny the acquisition within 60 days of being notified in writing of the acquisition by the Conservancy.

Additional criteria for wetland and upland reserves are as follows:

Additional acquisition criteria specific to wetland habitat areas. The Conservancy proposes to use the following guidelines to identify lands for wetland reserve area (see Section IV.C.3 of the NBHCP):

1. Land has existing or potential wetland habitat values that currently support or can support, with necessary enhancement and restoration, the snake and other wetland associated Covered Species.

2. Land contains soils that can support rice farming or the type of managed marsh wetlands proposed in the NBHCP.

3. Blocks of reserve lands must be hydrologically connected to other blocks through irrigation and drainage systems or other systems to ensure connectivity and opportunity for travel by snakes between sections of the reserve system. To the extent practicable, reserve lands will also be near or adjacent to other protected habitat lands in order to increase the overall effectiveness and size of protected lands in the Basin for Covered Species.

4. Lands selected to provide for the NBHCP wetland habitat system shall be situated outside areas known to regularly receive deep flood waters (e.g., the Yolo and Sutter Bypasses). They shall also be situated so that they do not directly receive runoff from paved surfaces or inflow from urban storm water drainage systems.

Additional acquisition criteria specific to upland areas (see Section IV.C.4 of the NBHCP). The NBHCP's primary strategy to mitigate impacts to the hawk is to avoid development in the Swainson's Hawk Zone and to acquire upland habitat as mitigation lands inside the Swainson's Hawk Zone. The Swainson's Hawk Zone is an area of the Basin one mile in width that borders the Sacramento River. In order to maintain and promote hawk habitat values, Sutter will not obtain coverage under the NBHCP and ITPs, or grant urban development permit approvals for development on land within the Swainson's Hawk Zone. The City has limited its Permit Area within the Swainson's Hawk Zone to approximately 252 acres located within the North Natomas Community Plan that was designated for urban development in 1994 and will not grant development approvals within the Swainson's Hawk Zone beyond the previously designated 252 acres. Should either the City or Sutter seek to expand NBHCP coverage for development within the Swainson's Hawk Zone beyond that described above, granting of such coverage would require an amendment to the NBHCP and ITPs and would be subject to review and approval by the Service and CDFG in accordance with all applicable statutory and regulatory requirements.

In addition to lands located in the Swainson's Hawk Zone, land outside the zone can be made attractive for the hawk through appropriate habitat design, as specified in Sections IV.C.1.e, IV.C.4, and V.B.4 of the NBHCP and in consultation with the Conservancy's TAC. The goal of these strategies is to maintain optimum nesting and foraging habitat for the hawks nesting in the

zone by providing an abundant and available prey source. In order to optimize the use of the entire Basin by the hawk, the NBHCP also includes maintenance of nesting and foraging habitat for hawks nesting elsewhere in the Basin, as well as acquisition of reserve lands that benefit the other upland-associated species. Upland reserve acquisition criteria include (see Section IV.C.4 of the NBHCP):

1. The land contains known or potential hawk nest trees, or includes or is adjacent to suitable foraging habitat (e.g., agricultural croplands and grasslands).

2. The land is comprised of agricultural croplands or grasslands that, based on crop type or surveys, is expected to have a suitable hawk prey base and, preferably, have historically been used by hawks (as determined by the CNDDB or CDFG data and reports).

3. The land is or can be used to grow crops conducive to hawk foraging, including alfalfa and other hay crops, lightly grazed pasture, fallow fields, or summer harvested row crops. Cotton and other late harvest crops may not be grown.

4. If possible, the land contains appropriate areas for the establishment of riparian woodland habitat, or isolated groves in agricultural fields, for future use by the hawk. Trees which may be planted include valley oaks (*Quercus lobata*), cottonwoods (*Populus fremontii*), willows (*Salix goodingii*), sycamores (*Platanus* sp.), and California walnut (*Juglans californica*).

5. Contiguity of upland reserve sites will be maximized. The hawk conservation objectives in Chapter I of the NBHCP direct the Conservancy to focus acquisition of upland reserves in the Swainson's Hawk Zone. That objective, together with this provision, is intended to ensure that hawk habitat protected in reserves will not be excessively fragmented, either inside or outside of the Swainson's Hawk Zone, and that habitat contiguity will be a primary criteria under which upland reserve sites will be selected. However, the value of edge habitat with wetlands will be considered in reserve design.

6. The land supports or has the potential to support other Covered Species which utilize upland habitat.

Generally, priority for acquiring upland habitat is as follows (in descending priority order): (1) sites located within the Swainson's Hawk Zone; (2) sites that, in the judgement of the Conservancy and the TAC, would provide specific, important benefits to other upland-associated Covered Species (e.g., tricolored blackbird nesting colonies); (3) sites supporting hawk nests or foraging habitat outside the Swainson's Hawk Zone; (4) sites that would provide a good potential for enhancement of upland habitat values; and (5) any other site that would result in a benefit to any upland Covered Species.

Habitat Reserve Restoration and/or Enhancement Conservation Strategies

Preparation of Site Specific Management Plans for Each Reserve. The Conservancy will improve and manage reserves in a manner that will, to the maximum extent practicable, benefit all Covered Species. This shall be accomplished through preparation and implementation of SSMPs. The TAC will participate in the review of the management plans, and shall ensure that the management guidelines are incorporated into each management plan. The Wildlife Agencies (Service and CDFG) will approve all SSMPs. Each SSMP will specify: (1) management policies not otherwise prescribed by the NBHCP; (2) specific management activities, including establishment of suitable monitoring programs; (3) restoration and enhancement needs; and (4) reserve water management. The following design and management criteria shall be considered during the preparation, review and approval of SSMPs for Conservancy reserves:

1. Identification of Covered Species present/habitat requirements determination. An existing Conditions Biological Assessment of newly acquired Conservancy reserves will be conducted to determine the specific Covered Species the parcel currently supports or could potentially support. The results of this survey will be included in the SSMP for the subject Mitigation Land. The habitat type present or desired (e.g., wetlands or uplands) will also be a critical determination in establishing management policies. Management policies and activities will be oriented toward the species and habitats indicated or selected, and specific management policies established will be consistent with the needs of those species or habitats. Land parcels that are unsuitable for or are not expected to support any of the Covered Species will be eliminated from consideration through use of the mitigation site selection criteria described in Sections IV.C.2, C.3.b, and C.4.b of the NBHCP.

2. Access. The Conservancy will protect the Covered Species and their habitat by limiting and regulating public assess to Conservancy reserves. Reserves shall be patrolled to control prohibited and incompatible activities, including, but not limited to, dumping, off-road vehicle activity and trespass.

3. Appropriateness of hunting. Management plans will identify the level of hunting allowed, if any, and will include parcel-specific restrictions to protect the Covered Species during any hunting activities. No take of Covered Species as result of hunting will be covered under the permits.

4. Controlled/prohibited activities. Activities that would potentially conflict with mitigation goals or would endanger habitat resources will be described and controlled or prohibited as necessary. Examples of activities that will typically be prohibited include dumping, vandalism, unauthorized hunting and fishing, collection of plants or animals, and off-road vehicle use.

5. Avoidance of conflicts with the Sacramento International Airport. It is imperative that reserve lands in the vicinity of the Airport be managed to avoid the potential for aircraft/bird collisions and other potential conflicts with Airport operations. Reserve management plans will therefore be developed with these issues in mind. Draft

management plans for reserve lands in the vicinity of the Airport will be submitted to the Airport Facilities Manager to provide a reasonable opportunity for review and comment prior to approval by the Conservancy, Service, and CDFG.

6. Take avoidance. The Conservancy will implement take avoidance measures to minimize potential take that may occur during habitat creation, restoration, preservation, enhancement and management activities on reserve lands. To accomplish this, the Conservancy shall, where applicable, ensure that all take avoidance measures described in Chapter V of the NBHCP are implemented during preservation, restoration, creation, enhancement, management, and use of reserve lands. The Conservancy shall include all take avoidance and minimization measures it deems necessary and appropriate in SSMPs.

7. Habitat enhancements. Water bodies within habitat reserve units shall vary in size, depth and edge planting to provide varied habitat opportunities. Plantings of native trees, including valley oak, cottonwood, and willow shall generally be incorporated within each habitat reserve unit as determined feasible by the Conservancy and the TAC. Additional restoration activities that may be implemented on reserve lands include, but are not limited to, the following: (1) restoring natural drainage patterns/erosion control; (2) exotic/invasive plant control; and (3) domestic/feral animal control.

Habitat Management Conservation Strategies.

General Management Strategies: Consistent with the SSMP prepared for each reserve, management activities can include: (1) control of water supply and availability; (2) suitable agricultural practices (e.g., rice growing for the snake and production of other crops for the hawk); (3) grazing or mowing programs to eliminate weeds or control vegetation; (4) exotic species control; (5) erosion control; (6) enhancement of native plant communities; (7) habitat enhancement activities for the Covered Species (e.g., construction of artificial burrows for the owl; (8) predator control; (9) enhanced ditch and drain management for the ditches owned by the Conservancy on reserve lands; and (10) coordination of any research conducted within reserves with outside species experts and other individuals or groups. Management activities deemed beneficial for some Covered Species will be conducted so that they have a minimal adverse affect on other Covered Species.

Wetland Habitat Management Conservation Strategies: The following strategies are included in the NBHCP regarding conservation practices on wetland preserves:

1. Protection from flooding. The drainage regime for managed wetlands and rice fields in the reserve system will be designed to ensure that snake retreats are not inundated when water is drained from ditches, fields, canals or wetland areas. It is also desirable to locate upland habitats inside the wetland reserve system to avoid flooding of winter retreats.

2. Managed marsh design/management. Managed marsh wetlands, together with associated uplands, rice fields, and water conveyance ditches and canals, are expected to

form a mosaic of diverse wetland habitats in the wetland portion of the reserve system that will support giant garter snakes and other wetland associated species. Embedded within an agricultural landscape dominated by rice farming, managed marsh wetlands based on such biological principles should support the snake as well as many other Covered Species (e.g., white-faced ibis, tricolored blackbird, and northwestern pond turtle). Marsh design and management shall be developed by qualified restoration biologists as part of the SSMP development process. The SSMP will consider, but is not limited to: (1) summer dry-down of seasonal marsh; (2) availability of summer water either as pockets of deeper water that persist in the seasonal marsh or as permanent marsh, located near or adjacent to vegetated banks or suitable upland habitat; (3) open water channels in marsh habitat to provide movement corridors and foraging edge; (4) availability of abundant emergent vegetation and near shore habitat; (5) a good food supply; and (6) availability of diverse habitat elements.

3. Water regime. Seasonal managed marshes will be flooded by mid-April (if not flooded during the winter) so that water and prey are available when the snake emerges from winter retreats. Water will be maintained within the managed marsh through the period when rice fields dry down (approximately mid-August). This irrigation regime is intended to provide alternative habitat to the snake as rice fields are drained and concentrate prey species from rice fields into canals and managed marshes. It is considered advantageous to include within the NBHCP's wetland reserve system some areas of permanent marshes and sloughs interspersed with the seasonal marshes, rice fields, and uplands. This will increase the overall habitat diversity of the reserves for the snake as well as other Covered Species.

4. Upland component of managed marsh. While a portion of the terrestrial component of the managed marsh system will be designed to meet the buffer requirements of the NBHCP, the rest will be designed and managed to meet the needs of the snake and upland Covered Species. The typical proportion of upland habitats within the reserve system will be approximately 20 to 30 percent. Upland areas provide basking and resting sites, escape cover and winter retreats for the snake, as well as foraging and nesting areas for other Covered Species (e.g., loggerhead shrike, tricolored blackbird, burrowing owl, and hawk). Upland areas intended to provide upland habitat for the snake under the NBHCP may consist of dryland pasture, grasslands, levees, and any other land use approved by the TAC.

5. Water conveyance structures/edge. Marsh design should include edge habitat to provide foraging and movement corridors for the snake and other Covered Species. Edge can be created by providing open water channels within marsh to provide open water/emergent vegetation interface. Upland/aquatic habitat interface may also provide edge habitat where sufficient vegetation is present to provide cover for the snake.

6. Vegetation/cover. Vegetation in a managed marsh should support a diversity of wildlife. Plant species that currently occur in the emergent marsh habitat found in the Basin will

be included in the NBHCP's managed marsh wetlands. These include cattails (*Typha latifolia)*, tules (*Scirpus acutus),* rushes (*Juncus* sp.*)*, river bulrush (*S. fluvialtilis*), sedges (*Carex* spp.*, Cyperus* spp.*),* and vervain (*Verbena hastata).* Marsh edges and "islands" will be well-vegetated with plants that discourage the movement of the snake's predators (e.g., herons, egrets, rats, and domestic animals). Plant species such as wildrose (*Rosa* spp.) and thimbleberry (*Rubus parviflorus*) are relatively impenetrable to many predator species but not to the snake and serve as basking sites for the snake. The snake utilizes a variety of sites for escape cover and winter retreats, including small mammal burrows, thick vegetation such as wildrose and thimbleberry, and areas of jumbled rock such as rip rap, chunks of rock, or broken concrete. Management of wetland reserves under the NBHCP shall therefore include protection and/or construction of such types of snake cover and retreats as deemed appropriate by the TAC.

7. Access. Road kills are believed to be a significant snake mortality factor, especially for males (see Chapter II of the NBHCP). Consequently, new roads within reserve lands will be constructed to the minimum extent necessary to provide for the adequate maintenance of the marshes and other reserve lands. If roads already exist in an area acquired as a reserve, access to these roads will be restricted as necessary to protect the reserves from unnecessary disturbance, and as described in the SSMPs.

8. Water control structures. Managed marshes require a controlled source of good quality water at suitable depths, usually less than 0.9 m (3 ft.) (water depth is important to the establishment of appropriate vegetation). Management and enhancement of a managed marsh can be maximized through water control. A variety of water manipulation approaches will be utilized, including levees, stoplog and screwgate water control structures to regulate water flows and depths, and dewatering systems.

9. Mosquito control. Mosquito control programs operate throughout Natomas Basin. Generally, conventional mosquito control methods are compatible with garter snake habitat. Use of mosquito fish and low intensity pesticide applications would not directly threaten garter snakes or their habitat, and mosquito fish may actually serve as garter snake prey. However, mosquito control programs are more focused near urban areas, and the more intensive control methods there could harm giant garter snakes. If necessary, the Conservancy should work directly with Mosquito Abatement Districts to determine suitable methods to resolve mosquito problems near urban areas in a manner consistent with the management of giant garter snake wetland habitats established under the NBHCP. The Site Specific Management Plans prepared for each wetland site shall identify appropriate types of mosquito control and shall also be coordinated as necessary with the Mosquito Abatement Districts. Pesticide use is not a covered activity under the NBHCP and therefore, any mosquito control activities using pesticides would have to be constructed in a manner that does not result in take of Covered Species.

10. Other factors. Managed marshes must be kept clear of winter storm runoff coming directly from urban areas. In addition, preserves cannot be used for any additional

purposes such as flood control or directly receive storm water or other off-site drainage from urban development. Water quality must also be maintained in order to maintain wildlife productivity and preclude the outbreak of wildlife diseases.

Management of reserve rice lands for the snake. The NBHCP recognizes that continued rice farming in the Basin supports the snake and that maintaining rice farming on a significant portion of Conservancy reserve lands is an integral component of the overall conservation strategy. With respect to the selection of rice fields for inclusion in the reserve system and their subsequent management, the following criteria shall be applied:

1. Rice fields will generally be selected in areas that are either within or have connectivity to known snake populations or known occupied snake habitat.

2. Rice fields located in areas designated to receive winter flood waters will be avoided (e.g., the Yolo and Sutter Bypasses).

3. Rice fields in the reserve system will be managed to maximize snake compatibility. This includes maintenance of rice checks, berms, and other water control structures in as natural a state as practicable, maintenance of snake prey species (e.g., mosquito fish) in or near the rice fields through appropriate management, and other measures as appropriate. Management will also, to the extent compatible with snake conservation, be compatible with the needs of commercial rice production. Specific measures for managing rice fields will be determined by the Conservancy in consultation with the TAC and in the SSMPs.

Upland reserve management and conservation strategies. The upland habitat conservation strategy is intended to provide for the long-term protection of existing and potential upland habitat in the Basin that currently supports or could support the hawk and other upland Covered Species. In most cases, upland reserves established and managed for the hawk will also benefit other upland-associated Covered Species (e.g., the loggerhead shrike and burrowing owl). Consequently, selection of upland reserve sites will usually focus on the needs of the hawk, except in cases where, in the judgement of the Conservancy and the TAC, specific or important needs of other upland-associated species can be met at sites not selected primarily for hawks.

General Avoidance, Mitigation And Minimization Measures

Land Use Agencies' Conservation Measures. The Land Use Agencies have proposed to use the following conservation measures:

1. Pre-Construction Surveys. Not less than 30 days or more than six months prior to commencement of construction activities on a specific authorized development site in the NBHCP Area, a pre-construction survey of the site shall be conducted to determine the status and presence of, and likely impacts to, all Covered Species on the site. However, if the sole period for reliable detection of that species is between May 1 and December

31, pre-construction surveys for an individual species may be completed up to one year in advance. The applicant seeking to develop land will be responsible for contracting with Wildlife Agency-approved biological consultants to carry out the pre-construction surveys, and as necessary, to implement specific take minimization, and other conservation measures set forth in the NBHCP and approved by the Service and CDFG. The results of the pre-construction surveys and recommended take minimization measures shall be documented in a report and submitted to the Land Use Agency, Service, CDFG and the Conservancy. Based upon the survey results, the Land Use Agencies will identify applicable take avoidance and other site-specific conservation measures, consistent with the NBHCP, required to be carried out on the site. The approved pre-construction survey documents and list of conservation measures will be submitted by the developer of the authorized development project to the applicable Land Use Agency to demonstrate compliance with the NBHCP. Reconnaissance-level surveys should be conducted prior to species specific surveys to determine what habitats are present on a specific development site and what, if any, more intensive survey activities should be conducted to accurately determine the status of the Covered Species on the site. It shall be the obligation of the developer/landowner to complete such surveys and the Land Use Agency's responsibility to ensure the surveys are properly completed prior to disturbance of habitat. Surveys shall be conducted by Wildlife Agency-approved biologists (e.g., persons with suitable biological, botanical, or related expertise). Note: negative species-specific survey results generally do not obviate the requirement to implement minimization measures prescribed in the revised NBHCP where a pre-construction survey indicates that habitat for a particular listed species exists onsite.

2. Preservation of the area adjacent to Fisherman's Lake. According to the City's North Natomas Community Plan, there is a buffer area along Fisherman's Lake from Del Paso Road to El Centro Road on the City side of Fisherman's Lake, a portion of the West Drain. The exact width of the buffer area has not yet been determined but it will be at least 250 feet (from the City limits), based upon a June 2002, amendment to the North Natomas Financing Plan (C. Shearly, pers. Comm.). The east side of Fisherman's Lake is in the City and the west side is in the unincorporated portion of Sacramento County. Pursuant to the Settlement Agreement, the City has agreed to initiate a North Natomas Community Plan amendment to potentially widen the agricultural buffer along the City side of Fisherman's lake to 244 m (800 ft.).

   Fisherman's Lake, and the immediately adjacent areas are, and will continue to be, owned and managed by RD 1000. The City is creating a buffer along the east side of Fisherman's Lake and has amended the North Natomas Financing Plan to include the buffer area along Fisherman's Lake in the Land Acquisition Program. In the case of acquiring the buffer, the development impact fee is a public land acquisition program fee charged to all developers to fund the acquisition of public lands (i.e., land for community centers, fire stations, etc.). The Fisherman's Lake buffer is part of the public land acquisition program (C. Shearly, pers. comm.). The buffer area will likely be managed by the Conservancy.

3. General Measures to Minimize Take. In order to generally minimize the impacts of development on Covered Species, the City and Sutter shall impose the following requirements on authorized development when approving urban development permits within the Basin:

   a. Tree preservation. Valley oaks and other large trees should be preserved whenever possible. Stands of riparian trees used by hawks and other animals for nesting, particularly adjacent to Fisherman's Lake, will be preserved and restored.

   b. Native plants. The wildlife value of landscaped parks, buffers, and developed areas will be improved by planting trees and shrubs which are native to the Basin.

   c. Protect raptor nests. The raptor nesting season will be avoided when scheduling construction near nests. Specific avoidance criteria are set forth in the species-specific measures (discussed below).

   d. Protected plant/animal species, also referred to as "Special Status Species". Surveys for Covered Species will be conducted during the appropriate season.

Species-Specific Conservation Measures

Avoidance, Minimization, and Mitigation Measures for the Threatened Vernal Pool Fairy Shrimp, Endangered Vernal Pool Tadpole Shrimp, Threatened Colusa grass, Endangered Sacramento Orcutt grass, Threatened slender Orcutt grass, Midvalley Fairy Shrimp, Legenere, and Bogg's Lake Hedge-Hyssop.

Ten species associated with vernal pools or other seasonal wetlands are proposed for coverage under the NBHCP's ITPs, including three shrimp species, five plant species, and two amphibians. Only two of the ten vernal pool species covered by the NBHCP (vernal pool tadpole shrimp and vernal pool fairy shrimp) have been confirmed within the Basin.

Undisturbed areas of vernal pools within the Basin are few and relatively small. The primary purpose of including the vernal pool associated species within the NBHCP is to provide protection to the Conservancy with regard to the management of future wildlife reserves. The complex of wetland/upland habitat to be developed by the Conservancy may provide enhanced opportunities for the establishment and proliferation of vernal pool species. In the event vernal pool species do benefit from the Conservancy's efforts, it will be necessary to provide coverage to the Conservancy for activities that could result in incidental take of them. However, the Land Use Agencies (except MAPPOA) are also seeking coverage because suitable habitat for these species likely exists in their Permit Areas (except MAP).

The Land Use Agencies will employ the following measures to reduce take of the vernal pool fairy shrimp, vernal pool tadpole shrimp, and midvalley fairy shrimp, and to minimize and mitigate for the loss of Colusa grass, Sacramento Orcutt grass, slender Orcutt grass, legenere, and Bogg's Lake hedge-hyssop:

1. Prior to approval of an urban development permit, the involved Land Use Agency will require Wildlife Agency-approved pre-construction surveys. If the surveys determine that Covered vernal pool species are present, the Land Use Agency will require the developer to consult with the Service to determine appropriate measures to avoid and minimize take/loss of individuals. Procedures for reviewing projects that could affect vernal pools and vernal pool species are discussed below.

    a. General biological survey and information required. In the event a biological reconnaissance survey or the pre-construction survey identifies that vernal pool resources are on-site, a vernal pool species-specific biological assessment must be provided by the developer to the Land Use Agency to determine the type and abundance of species present. The species-specific biological assessment must address covered vernal pool plants (i.e., Sacramento Orcutt grass, slender Orcutt grass, Colusa grass, legenere, and Bogg's lake hedge-hyssop), crustaceans (i.e., vernal pool tadpole shrimp, vernal pool fairy shrimp, and midvalley fairy shrimp), and amphibians (i.e., California tiger salamander and western spadefoot toad). The vernal pool plant survey must be a Service-approved plant survey prepared by a Service-approved qualified field biologist and will list the methods of field analysis, condition of habitat, size and acreage of direct and indirect impact (as defined by seasonal inundation and hydric soils and other appropriate characteristics), and species present. The vernal pool crustacean survey will be in accordance with the Service's *Interim Survey Guidelines to Permittees for Recovery Permits under Section 10(a)(1)(A) of the Endangered Species Act for the Listed Vernal Pool Branchiopods* (April 19, 1996) or the most recent Service-approved survey guidelines for vernal pool species (see Appendix L of the NBHCP). The biological assessment must be submitted with the Urban Development Permit application and prior to approval of an Urban Development Permit by the Land Use Agency. If it is determined that wetland and/or vernal pool resources would be disturbed by a project, then take of vernal pool-associated Covered Species would be covered under the NBHCP, subject to the following limitation and guidelines:

        i. Where site investigations indicate vernal pool species may occur, the developer will notify the Land Use Agency regarding the potential for impacts to vernal pool species. Such notification will include biological data (see Section (a) above regarding biological information required) adequate to allow the Land Use Agency, and the Service and CDFG to determine the potential for impacts to vernal pool species resulting from the proposed development.

ii. Following notification by the Land Use Agency, the Service and CDFG will identify specific measures required to avoid, minimize and mitigate impacts to vernal pool species to be implemented prior to disturbance and in accordance with adopted standards or established guidelines (e.g., the Service's programmatic biological opinion for vernal pool species attached as Appendix G to the NBHCP). In some cases, the Service and CDFG may require complete avoidance of vernal pool species, such as where Covered Species such as slender Orcutt grass, Sacramento Orcutt grass, Colusa grass and/or vernal pool tadpole shrimp are found to be present. Such measures will be identified by the Service and CDFG within 30 days or as soon as possible thereafter of notification and submittal of biological data to the Wildlife Agencies by the Land Use Agency.

iii. The requirement by the Service to preserve a vernal pool within development would be based on identification of an intact vernal pool with minimal disturbance where the presence of one or more of the following species is recorded: slender Orcutt grass, Sacramento Orcutt grass, Colusa grass, or vernal pool tadpole shrimp. Prior to requiring on-site preservation of a vernal pool area, the Service will consider the suitability of the vernal pool as Conservancy Mitigation Lands. The Service will not require the vernal pool to be preserved unless it is appropriate as Conservancy mitigation lands. Such vernal pool areas, including any required buffer land dedication, will apply toward the Land Acquisition Fee component of the development project's NBHCP mitigation obligation.

b. Mitigation Strategies. Vernal pool resources (i.e., vernal pool fairy shrimp, vernal pool tadpole shrimp, midvalley fairy shrimp, Sacramento Orcutt grass, slender Orcutt grass, Colusa grass, legenere, and Bogg's Lake hedge-hyssop) identified through site specific investigations will be mitigated in one of three general approaches as described below. Strategies to minimize and mitigate the take of the California tiger salamander and western spadefoot toad will be conducted according to Sections V.A.5 and V.B.4 of the NBHCP.

i. Avoidance and preservation on-site as a means to minimize impacts. In the event the Service requires on-site preservation in accordance with Section a.3 of the NBHCP, on-site mitigation will be required. In the event the Service does not require on-site mitigation, a developer or private land owner may still propose to dedicate fee title or conservation easement for that portion of the property with vernal pool resources and an associated 250-foot buffer surrounding the vernal pool resource to the Conservancy. Acceptance of the offer to dedicate will be subject to review and approval by the Land Use Agency, the Conservancy's Board and the

Wildlife Agencies. The Conservancy's Board of Directors and the Wildlife Agencies will consider the location, connections, species present, condition of the proposed site to be dedicated, and may decide to accept the dedication in lieu of payment of the Land Acquisition Fee portion of the NBHCP Mitigation Fee for the affected acreage. The Conservancy's Board of Directors may accept or decline the offer based on the balance of habitat needs and the biological goals of the NBHCP. If the dedication is accepted, a reduction in the Land Acquisition Fee portion of the habitat Mitigation Fee will be granted the developer for the portion (calculated on an acreage basis) of the site permanently preserved by easement or dedication. However, habitat Mitigation Fees must be paid on the remaining developable acreage on the site, and all fees other than Land Acquisition Fees will be paid for all acres on the site. Additional conditions to preserve the biological integrity of the site (such as reasonable drainage conditions) may be imposed by the Land Use Agency in consultation with the Conservancy and the Conservancy's TAC. In the event the developer does not support on-site preservation or the Conservancy does not accept the offer to dedicate, then one of the following mitigation approaches will be employed.

ii. Construction period avoidance and relocation of vernal pool resources. No grading, development or modification of the vernal pool site or the buffer area extending 76.2 m (250 ft.) around the perimeter of the vernal pool site may occur during the vernal pool "wet" season, as determined by the Service. Protective fencing will be established around the perimeter of the vernal pool site and the buffer area during the vernal pool wet season. In consultation with Conservancy and the TAC, soils and cysts from the vernal pool may be relocated as soon as practicable during the dry season to a suitable Conservancy reserve or other reserve site, provided the relocation/recreation site is approved by Conservancy, TAC and the Service. If it is not practicable to relocate vernal pool resources, and/or the Conservancy and the TAC determine that the Conservancy does not have a suitable reserve site for relocation of resources, then the applicant will follow the mitigation approach outlined in Section (iii) below.

iii. Payment into a Service approved conservation bank. In the event all of the above approaches are not appropriate for the site, the Land Use Agency will require the developer to purchase credits from a Service-approved mitigation bank in accordance with the standards set forth in Table 3. The Service will determine the type and amount of credits to be purchased based on the impacts associated with the development.

In order to ensure that vernal pools and their associated species are adequately protected on reserve lands, the Conservancy will consult with the TAC and vernal pool crustacean experts

periodically during implementation of the NBHCP to determine what, if any, additional conservation opportunities for vernal pool fairy shrimp, vernal pool tadpole shrimp, midvalley fairy shrimp, Colusa grass, slender Orcutt grass, Sacramento Orcutt grass, Boggs Lake hedge-hyssop, and legenere might exist within the proposed reserve system. Any conservation measures identified through this process will be incorporated, as appropriate, into the NBHCP's conservation program through its adaptive management provisions.

Threatened Giant Garter Snake Avoidance and Minimization Measures. The Land Use Agencies have proposed to employ or ensure that the following measures are followed to minimize and avoid the effects of the proposed action on the snake:

1. Within the Basin, all construction activity involving disturbance of habitat, such as site preparation and initial grading, will be restricted to the snake's active period (May 1 - September 30).

2. Pre-construction surveys for the snake, as well as other Covered Species, will be completed for all development projects by a qualified biologist who has been approved by the Service. If snake habitat is found within a specific site, the following additional measures will be implemented to minimize disturbance of habitat and harassment of the snake, unless that project is specifically exempted by the Service:

    a. Between April 15 and September 30, all irrigation ditches, canals, or other aquatic habitat will be completely dewatered, with no puddled water remaining, for at least 15 consecutive days prior to the excavation or filling in of the dewatered habitat. The dewatered habitat will be observed to ensure that it does not continue to support snake prey, which could attract snakes to the project site. If a site cannot be completely dewatered, snake prey items will be removed using netting or other salvage methods.

    b. No more than 24-hours prior to the start of construction activities (site preparation and/or grading), the project area will be surveyed for snakes. If construction activities stop on the project site for a period of two weeks or more, a new snake survey will be completed no more than 24-hours prior to the re-start of construction activities.

    c. Clearing will be confined to the minimal area necessary to facilitate construction activities. Giant garter snake habitat within or adjacent to the project as will be flagged as Environmentally Sensitive Areas and designated as avoided. This area will be avoided by all construction personnel.

    d. Construction personnel completing site preparation and grading operations will receive Service-approved environmental awareness training. This training instructs workers on how to identify the snake and its habitats and what to do if a

snake is encountered during construction activities. An on-site biological monitor will be designated during the training.

e. If a live snake is found during construction activities, the Service and the project's biological monitor will be immediately notified. The biological monitor, or his/her assignee, will halt construction in the vicinity of the snake. The snake will be monitored and allowed to leave the area on its own. The monitor will remain in the area for the remainder of the work day to make sure the snake is not harmed or, if it leaves the site, does not return. Escape routes for the snake should be determined in advance of construction and snakes should always be allowed to leave on their own. If a snake does not leave on its own within one working day, further consultation with the Service will be conducted.

f. Upon locating dead, injured or sick Covered Species, the Permittees or their designated agents will notify, within one working day, the Service's Division of Law Enforcement (2800 Cottage Way, Sacramento CA 95825) or the Sacramento Fish and Wildlife Office (2800 Cottage Way, Room W-2605, Sacramento, CA 95825, telephone 916 414-6600). Written notification to both offices will be made within three calendar days and will include the date, time, and location of the finding of a specimen and any other pertinent information.

g. Fill or construction debris may be used by the snake as an over-wintering site. Therefore, upon completion of construction activities, any temporary fill and/or construction debris will be removed from the site. If the material is located near undisturbed snake habitat and will be removed between October 1 and April 30, it will be inspected by a Wildlife Agency-approved biologist to ensure that snakes are not using it as hibernaculae.

h. No plastic, monofilament, jute, or similar erosion control matting that could entangle snakes will be placed on the project site when working within 200 feet of snake aquatic or rice habitat. Possible substitutes include coconut coir matting, tackified hydroseeding compounds, or other materials approved by the Wildlife Agencies.

i. Fences will be constructed along the shared boundary of urban development and the North Drainage Canal and the East Drainage Canal within Sutter's Permit Area, subject to the following guidelines:

1. A minimum of 30.5 m (100 ft.) will be provided from fence-to-fence and access to the canals will be limited by gates.

2. A snake deterrent will be placed along the fences on the North Drainage Canal and the East Drainage Canal (i.e., fence construction that restricts snake movement or an appropriate vegetative barrier either inside or

outside of the boundary fence). The design of the deterrent will be subject to approval by the Wildlife Agencies.

3. The specific fence/snake barrier design adjacent to a given development will be determined within Sutter County's review of the proposed development and the fence/barrier will be installed immediately after site grading is completed.

i. At the time of urban development along the North and East Drainage Canals, Sutter will consult with the Wildlife Agencies to determine design strategies that would enhance conditions for giant garter snake movement through the North and East Drainage Canals. Possible strategies may include expanded buffer areas and modified canal cross sections if such measures are, in the determination of Sutter and the Water Agencies, found to be feasible.

The Conservancy has proposed to employ the following measures to minimize and avoid the effects of the proposed action on the snake:

1. All construction activity involving disturbance of habitat, such as site preparation and initial grading, will be restricted to the snake's active period (May 1 - September 30).

2. Pre-construction surveys for the snake, as well as other Covered Species, will be completed for all development projects by a qualified biologist who has been approved by the Service. If snake habitat is found within a specific site, the following additional measures will be implemented to minimize disturbance of habitat and harassment of the snake, unless that project is specifically exempted by the Service:

a. Between April 15 and September 30, all irrigation ditches, canals, or other aquatic habitat will be completely dewatered, with no puddled water remaining, for at least 15 consecutive days prior to the excavation or filling in of the dewatered habitat. The dewatered habitat will be observed to ensure that it does not continue to support snake prey, which could attract snakes to the project site. If a site cannot be completely dewatered, snake prey items will be removed using netting or other salvage methods.

b. Construction activities within 200 feet from banks of giant garter snake aquatic habitat will be avoided to the extent feasible. Movement of heavy equipment will be confined to existing roadways to minimize habitat disturbance to the extent feasible.

c. No more than 24-hours prior to the start of construction activities (site preparation and/or grading), the project area will be surveyed for snakes. If construction activities stop on the project site for a period of two weeks or more, a new snake

survey will be completed no more than 24-hours prior to the re-start of construction activities.

d. Clearing will be confined to the minimal area necessary to facilitate construction activities. Snake habitat within or adjacent to the project will be flagged for avoidance. The avoidance area will be avoided by all construction personnel.

e. Construction personnel completing site preparation and grading operations will receive Service-approved environmental awareness training. This training instructs workers on how to identify the snake and its habitats and what to do if a snake is encountered during construction activities. An on-site biological monitor will be designated during the training.

f. If a live snake is found during construction activities, the Service and the project's biological monitor will be immediately notified. The biological monitor, or his/her assignee, will halt construction in the vicinity of the snake. The snake will be monitored and allowed to leave the area on its own. The monitor will remain in the area for the remainder of the work day to make sure the snake is not harmed or, if it leaves the site, does not return. Escape routes for the snake should be determined in advance of construction and snakes should always be allowed to leave on their own. If a snake does not leave on its own within one working day, further consultation with the Service will be conducted.

g. Upon locating dead, injured or sick Covered Species, the Conservancy or its designated agents will notify, within one working day, the Service's Division of Law Enforcement (2800 Cottage Way, Sacramento CA 95825) or the Sacramento Fish and Wildlife Office (2800 Cottage Way, Room W-2605, Sacramento, CA 95825, telephone 916 414-6600). Written notification to both offices will be made within three calendar days and will include the date, time, and location of the finding of a specimen and any other pertinent information.

h. Fill or construction debris may be used by the snake as an over-wintering site. Therefore, upon completion of construction activities, any temporary fill and/or construction debris will be removed from the site. If the material is located near undisturbed snake habitat and will be removed between October 1 and April 30, it will be inspected by a Wildlife Agency-approved biologist to ensure that snakes are not using it as hibernaculae.

i. No plastic, monofilament, jute, or similar erosion control matting that could entangle snakes will be placed on the project site when working within 200 feet of snake aquatic or rice habitat. Possible substitutes include coconut coir matting, tackified hydroseeding compounds, or other materials approved by the Wildlife Agencies.

Threatened Valley Elderberry Longhorn Beetle Avoidance and Minimization Measures.

The Land Use Agencies will require private developers and public infrastructure projects to comply with conservation practices for the beetle set forth in the Service's July 9, 1999, *Conservation Guidelines for the Valley Elderberry Longhorn Beetle* (Beetle Guidelines)(enclosed), which may be updated in the future. In addition, the Conservancy will follow the Beetle Guidelines. Any destruction or loss of elderberry shrub habitat will be mitigated according to the Beetle Guidelines. The Beetle Guidelines, or any revision or successor to the Beetle Guidelines approved by the Service, are incorporated as terms and conditions of the NBHCP.

Swainson's Hawk Avoidance and Minimization Measures.

In order to minimize the cumulative effects of the proposed action on the Swainson's hawk's foraging habitat, Sutter will not obtain coverage under the NBHCP and ITPs, nor will Sutter grant urban development permit approvals, for development on land within the one-mile wide Swainson's Hawk Zone. The City has limited its Permit Area within the Swainson's Hawk Zone to approximately 252 acres in the North Natomas Community Plan that was designated for urban development in 1994 and, likewise, will not grant development approvals within the Swainson's Hawk Zone beyond this designated 252 acres. Should either the City or Sutter seek to expand NBHCP coverage for development within the Swainson's Hawk Zone beyond that described above, granting of such coverage would require an amendment to the NBHCP and ITPs, which would be subject to review and approval by the Service and the CDFG in accordance with all applicable statutory and regulatory requirements. Approval of any Urban Development within the Swainson's Hawk Zone beyond that described above would constitute a significant departure from the Plan's OCP and would trigger a reevaluation of the City's and/or Sutter's ITPs and possible suspension or revocation of the City's and/or County's ITPs.

The Land Use Agencies will employ the following measures to minimize disturbance of the Swainson's hawk's nesting habitat:

1. Prior to the commencement of activities at any development site within the NBHCP area, a pre-construction survey will be completed by the site's developer to determine: (1) whether any hawk nest trees will be removed on-site; or (2) whether any active hawk nest sites occur on or within ½ mile of the development site. These surveys will be conducted by experienced hawk surveyors and according to the Swainson's Hawk Technical Advisory Committee's (May 31, 2000, enclosed) methodology or updated methodologies, as approved by the Service and CDFG.

2. If breeding hawks are identified, no new disturbances will occur within ½ mile of the active nest between March 15 and September 15, or until a Wildlife Agency-approved biologist, with concurrence by CDFG, has determined that the young have fledged or that the nest is no longer occupied. If the active nest site is located within 1/4 mile of existing urban development, the no new disturbance zone can be limited to 1/4 mile. Routine

disturbances such as agricultural activities, commuter traffic, and routine facility maintenance activities within ½ mile of an active nest will not be restricted.

3. Where disturbance of a hawk nest cannot be avoided, such disturbance will be deferred until after the nesting season (March 15 - September 15). If a nest tree must be removed, tree removal will only occur between September 15 and February 1.

4. If a Swainson's hawk nest tree must be removed and fledglings are present, the tree may not be removed until September 15 or until CDFG has determined that the young have fledged and are no longer dependent upon the nest tree.

5. If construction or other project related activities which may cause nest abandonment or forced fledgling are proposed within the 1/4 mile buffer zone, intensive monitoring (funded by the project sponsor) by a CDFG-approved raptor biologist will be required. Exact implementation of this measure will be based on specific information at the project site.

The Land Use Agencies will employ the following measures to prevent the loss of Swainson's hawk nest trees:

1. Valley oaks, tree groves, riparian habitat and other large trees will be preserved wherever possible. The City and Sutter will preserve and restore stands of riparian trees used by the hawk and other animals, particularly near Fisherman's Lake and elsewhere in the NBHCP Plan Area where large oak groves, tree groves and riparian habitat have been identified.

2. The raptor nesting season will be avoided when scheduling construction near nests in accordance with guidelines applicable guidelines published by the Wildlife Agencies or through consultation with the Wild life Agencies.

3. Annually, prior to the Swainson's hawk nesting season (March 15 to September 15) and until build out of their Authorized Development has occurred, the City and Sutter will notify each landowner of any property within the permit area(s) on which a Swainson's hawk nest tree is present, and will identify the nest tree, and alert the owner to the specific mitigation measures prohibiting the owner from removing the nest tree.

The Land Use Agencies will employ the following measures to mitigate the loss of Swainson's hawk nest trees:

1. The NBHCP will require 15 trees to be planted (5 gallon container size) within the habitat reserves for every hawk nesting tree anticipated to be impacted by authorized development. It will be the responsibility of each Land Use Agency approving development that will impact hawk nest trees to provide funding from the applicable developer for the purchase, planting, maintenance and monitoring of trees at the time of

approval of each authorized development project. The Conservancy will determine the appropriate cost for planting, maintenance and monitoring of trees.

2. The Land Use Agency approving a project that impacts an existing hawk nest tree will provide funding sufficient for monitoring survival of replacement trees (as described in item 1 above) for a period of five years. For every tree lost during the five-year monitoring period, a replacement tree will be planted immediately upon the detection of failure. Trees planted to replace trees lost will be monitored for an additional five-year period to ensure survival until the end of the monitoring period. A 100 percent success rate will be achieved. All necessary planting requirements and maintenance (i.e., fertilizing , irrigation) to ensure success will be provided. Trees must be irrigated for a minimum of the first five years after planting, and then gradually weaned off the irrigation in an approximate two-year period. If larger stock is planted, the number of years of irrigation must be increased accordingly. In addition, ten years after planting, a survey of the trees will be completed to assure 100 percent establishment success.

3. Of the replacement trees planted, a variety of native tree species will be planted to provide trees with differing growth rates, maturation, and life span. This will ensure that nesting habitat will be available quickly (5-10 years in the case of cottonwoods and willows), and in the long term (i.e., valley oaks, black walnut and sycamores), and minimize the temporal losses from impacts to trees within areas scheduled for development within the 50-year ITP life. Trees will be sited on reserves in proximity to hawk foraging areas and planted in clumps of three trees each. Planting stock will be at a minimum 5-gallon container stock for oak and walnut species.

4. In order to reduce temporal effects resulting from the loss of mature nest trees, mitigation planting will occur within 14 months of approval of the NBHCP and ITPs. The July 2002 draft NBHCP estimated that four nesting trees within the City are most likely to be affected by authorized development in the near term. Therefore, in order to reduce temporal impacts, the City will advance funding for 60 sapling trees of diverse, suitable species (different growing rates) to the Conservancy within the above referenced 14 months.

5. For each additional nesting tree removed by Land Use Agencies' Covered Activities, the Land Use Agency will fund and provide for the planting of 15 native sapling trees of suitable species with differing growth rates at suitable locations on Conservancy reserves. Funding for such plantings will be provided by the applicable Land Use Agency within 30 days of approving a Covered Activity that will impact a hawk nesting tree.

In the event that foraging opportunities, as identified in Table IV-2 of the NBHCP (i.e., foraging opportunities within Sutter and Sacramento County), are converted to urban uses without adequate provisions to maintain foraging habitat, such that the effectiveness of the NBHCP's OCP is potentially compromised, the City and Sutter would consider and the Conservancy, on behalf of the City and Sutter, would implement appropriate actions, including the following or

similar measures:

1. Modification of acquisition criteria (as defined in Sections IV.C.2.d and IV.C.4.b) to adjust for impacts to foraging habitat outside of reserves. This could include changes to increase the value of future upland reserve habitat acquisitions for the hawk. For example, the criteria could be changed to further maximize the acquisition of habitat reserves in close proximity to suitable foraging habitat while avoiding the habitat areas that have recently been converted to non-compatible uses.

2. Substitution of reserve sites that have not been restored and are impacted by substantial land use changes, with replacement reserve sites that would provide improved foraging habitat opportunities.

3. Modification of the percentages of the habitat types comprising Conservancy reserve sites. For example, the percentage of uplands in reserve sites could be increased. Such modifications would be applied prospectively to future Conservancy acquisitions and would not affect existing, improved Conservancy reserves.

4. Pursuit of outside funding sources, including private, state and Federal grants, to acquire, improve and manage additional Conservancy reserves that would maintain Basin foraging lands. The Conservancy would be responsible for preparing grant applications or undertaking other actions, as necessary, to secure these funds. Such programs would supplement the mitigation fee required by the NBHCP and would not be used to fund NBHCP mitigation obligations. Lack of outside funding would not preclude the City and Sutter County's obligation to implement appropriate action consistent with this provision and their respective obligations under the NBHCP.

The Conservancy will implement the following measures to further enhance habitat and to reduce the potential for take of upland Covered Species during improvement, operation and maintenance of Conservancy reserves:

1. The Conservancy, in conjunction with the Land Use Agencies, will monitor proposed development in the Swainson's Hawk Zone, where the majority of known hawk nest sites are currently located and, hence, much of the hawk nesting and foraging in the Basin occurs. Based upon existing general plans and the City's and Sutter's NBHCP Permit Areas, development in this zone is expected to be limited over the life of the NBHCP. However, if the NBHCP is amended and such development does occur, mitigation lands established for such development will, likewise, be located within the Swainson's Hawk Zone. In addition, the Conservancy will set as a top priority the acquisition of upland reserve sites in the Swainson's Hawk Zone. Further, any upland reserve lands established in the Swainson's Hawk Zone will, to the maximum extent possible, be managed to benefit all upland-associated Covered Species, though any management in this zone will be fully consistent with Swainson's hawk biology and needs.

2. To enhance the success of upland species, Conservancy reserves will include tree plantings of valley oaks, cottonwoods, various willow (including black willow), or other suitable species to recreate suitable nesting sites for the hawk over the life of the NBHCP. Such tree planting will be in reasonable proximity to upland foraging areas covered by the NBHCP, including agricultural areas managed by the Conservancy.

3. For rice fields operated by the Conservancy, production practices will be incorporated that increase habitat for Swainson's hawk. This includes allowing at least 10 percent of rice fields to fallow each year as well as allowing foraging before and after rice flooding.

4. Where possible, upland components of wetland reserves will be developed or restored such that upland Covered Species, including the hawk, also benefit from the habitat.

5. Best management practices to ensure availability of food sources for the hawk [including meadow voles (*Microtus californicus*) and insects] will be utilized. It is expected that improved agricultural practices, timing of water management (floodup and drawdown) on reserve lands, and the increase in edge or ecotone between upland and wetland habitats will greatly enhance upland habitat values for the hawk.

6. The Conservancy, in consultation with the TAC, will formulate specific plans for the acquisition of upland habitat reserve lands by applying the objectives and criteria described above, and consistent with the requirements described in Chapter IV of the NBHCP. Site-specific management plans for reserve sites providing hawk habitat will be developed as described in Chapter IV of the NBHCP.

7. Upland reserves will initially be designed to maintain existing hawk populations and, where possible, to increase such populations through the tree planting program. However, such reserves will be re-designed, as necessary, to meet hawk recovery plan goals, once a Swainson's Hawk recovery plan has been prepared and approved by CDFG.

8. Reserve design will use wildlife-friendly agricultural practices. For health and safety reasons, rodent control measures will be limited to that necessary to maintain structurally sound flood control levees within the Basin.

The Conservancy will implement the following measures to avoid, minimize, and mitigate Swainson's hawk nest disturbance:

1. Prior to the commencement of development activities at any reserve sites, a pre-construction survey will be completed by the Conservancy to determine whether any hawk nest trees will be removed on-site or whether active hawk nest sites occur on or within ½ mile of the development site. These surveys will be conducted according to the Swainson's Hawk Technical Advisory Committee's (May 31, 2000) methodology or updated methodologies, as approved by the SSMP, for the reserve site.

2. If an active hawk nest is identified, no new disturbances (e.g., heavy equipment operation associated with construction) will occur within ½ mile of the active nest site between March 15 and September 15. If the active site is located within 1/4 mile of existing urban development, the no new disturbance zone can be limited to 1/4 mile. Routine disturbances such as agricultural activities, commuter traffic and routine facility maintenance activities within ½ mile of an active nest site will not be restricted.

3. If practicable, disturbance or destruction of hawk nest sites will be entirely avoided by designing the project (including construction activities) to maintain the year-round integrity of the nest site.

4. If practicable, disturbance or destruction of the hawk's nest site will be avoided during the active nesting season through seasonal use or other restrictions that apply annually or as needed.

5. Where disturbance of a hawk nest cannot be avoided, such disturbance will be deferred until after the hawk's nesting season (March 15 - September 15). If any tree must be removed that has an active nest in the year the impact is to occur, the tree removal should

only occur between September 15 and February 1.

6. Disturbance should be avoided within ½ mile of an active nest between March 15 and August 15, or until fledglings are no longer dependent on nest tree habitat (which could be as late as September 15).

7. If a hawk nest tree is to be removed and fledglings are present, the tree may not be removed until September 15 or until CDFG has determined that the young have fledged and are no longer dependent upon the nest tree.

The Conservancy will plant replacement trees in upland reserve areas and where appropriate on the edges of wetland reserves. These trees may be contributed to the reserve as part of the Land Use Agencies' tree mitigation program or may be determined to be important to the habitat enhancement of objectives of the site. The replacement mitigation trees shall include a variety of native tree species with differing growth rates, maturation and life span. This will ensure that nesting habitat will be available quickly (5 to 10 years in the case of cottonwoods and willows) and in the long term (i.e., valley oaks, black walnut and sycamores). Trees shall be sited on reserves in proximity to hawk foraging areas.

Tricolored Blackbird Avoidance and Minimization Measures.

The Land Use Agencies will employ the following conservation measures to avoid, minimize, and mitigate the effects of the proposed action on the blackbird:

1. Prior to approval of an urban development permit, the involved Land Use Agency will require a pre-construction survey of potential breeding and nesting habitat for presence of breeding and nesting tricolored blackbirds.

2. If surveys determine tricolored blackbirds are present, the following measures will be implemented in accordance with the MBTA to avoid disturbance to active (occupied) nesting colonies during the nesting season: (1) a boundary will be marked by brightly colored construction fencing that establishes a boundary 152.4 m (500 ft.) from the active nest site; (2) no disturbance associated with authorized development will occur within the fenced area during the nesting season (April 1 - July 1); and (3) a Wildlife Agency-approved biologist, with concurrence of the Service, must determine young have fledged and nest sites are no longer active before the nest site may be disturbed.

The Conservancy will employ the following conservation measures on reserve lands to minimize the effects of the proposed action on the blackbird:

1. Foraging.

   a. As part of baseline species survey for each reserve and as part of the annual survey of reserves, any colonization by tricolored blackbirds will be recorded by location and if possible, with a population estimate and activity description.

   b. Where tricolored blackbirds have been observed in colonies (active nesting and foraging), the nesting area and a reasonable foraging area adjacent to the nesting area within the reserve will be identified and incorporated into the SSMP, or if necessary, accommodated through adaptive management of an existing developed reserve.

   c. In order to enhance wetland to upland edges of reserves to attract tricolored blackbirds, plantings of wild rose, tule and cattails will be incorporated in habitat reserve units where biologically appropriate.

   d. During the nesting season, disturbance of foraging areas adjacent to active nest sites or previously active nest sites on reserve lands will be avoided to the maximum extent possible. If nests are occupied, a reasonable buffer of foraging lands adjacent to the nest will be marked and protected on reserve lands.

2. Nesting

   a. Disturbance to tricolored blackbird nesting colonies will be strictly avoided within the nesting season (April 1 to July 1 or while birds are present) during Conservancy development and management activities undertaken on Conservancy property in wetland and upland reserve areas unless approved by the Service and CDFG. In accordance with the MBTA, disturbance to active (occupied) nesting colonies will be avoided during the nesting season. A boundary will be established (through a method determined by the Conservancy and in consultation with the TAC) to establish a boundary 152.4 m (500 ft.) from the active nest site on reserve lands. No disturbance associated with Conservancy reserve construction, such as major grading operations will occur within the designated 500 foot buffer of the reserve during the nesting season of April 1 to July 1 or while birds are present, unless a Wildlife Agency-approved biologist, with concurrence of the Service and CDFG, determines young have fledged and nest sites are no longer active. Routine disturbances such as agricultural activities and Conservancy reserve management within 152.4 m (500 ft.) of an active nest site are not restricted so long as no physical disturbance to the nest site occurs.

   b. During the nesting season, disturbance of foraging areas adjacent to active nest sites or previously active nest sites on reserve lands will be avoided to the maximum extent possible. If nests are occupied, a reasonable buffer of foraging

lands adjacent to the nest will be marked and protected on reserve lands if construction or major grading operations are occurring on the Reserve.

c. Plantings of wild rose, tule and cattails will be incorporated in habitat reserve units where biologically appropriate to enhance tricolored blackbird nesting habitat.

The NBHCP includes measures to avoid, minimize, and mitigate take of the snake. Because the tricolored blackbird shares some habitat similarities with the snake, these measures may also benefit the blackbird. Specific measures include: (1) timing restrictions; (2) dewatering requirements; and (3) and vegetation control management.

Aleutian Canada Goose Avoidance and Minimization Measures.

In order to avoid, minimize, and mitigate take of the proposed action on the goose, prior to approval of an urban development permit, the applicable Land Use Agency will require a pre-construction survey. If the survey determines geese are present, the Land Use Agency will require the developer to consult with the Service and CDFG to determine appropriate measures to avoid and minimize take of individuals. Such measures will be appropriate for the use (e.g., foraging, roosting, etc.) and activity of the species, since the goose is only seasonally present in the Basin.

In order to minimize the effects of the proposed action on the goose, the Conservancy will utilize applicable Service-approved goose recovery or management plans and the adaptive management provisions described in the NBHCP to implement any additional conservation measures deemed appropriate should use of the NBHCP Area by the goose appreciably increase at any time in the future.

White-faced Ibis Avoidance and Minimization Measures.

The following measures have been proposed by the Land Use Agencies to avoid, minimize, and mitigate take of the white-faced ibis:

1. Prior to approval of an urban development permit, the involved Land Use Agency will require a pre-construction survey.

2. If surveys determine the presence of active nest sites of white-faced ibis, disturbance by authorized development within 1/4 mile of nests will be avoided within the nesting season of May 15 through August 31, or until a Wildlife Agency-approved biologist, with concurrence of the Service, has determined that young have fledged or that the nest is no longer occupied.

In order to minimize the effects of the proposed action on the ibis, the Conservancy proposes to:

1. Utilize applicable Service-approved white-faced ibis recovery or management plans, and the adaptive management provisions described in the NBHCP to implement any additional conservation measures deemed appropriate should use of the Plan Area by the ibis appreciably increase at any time in the future.

2. Disturbance to white-faced ibis nesting colonies by Conservancy reserve construction activities will be strictly avoided within the nesting season (May 15 to August 31 or while birds are present, or until a Wildlife Agency-approved biologist, with concurrence of the Service and CDFG, has determined that young have fledged or that the nest is no longer occupied). During the nesting season, a foraging buffer 1/4 mile in width will be identified around any active nest site to ensure minimal disturbance to the nest and nearby foraging areas on reserve lands.

Loggerhead Shrike Avoidance and Minimization Measures.

The Land Use Agencies have proposed the following measures to avoid, minimize, and mitigate take of the loggerhead shrike:

1. Prior to approval of an urban development permit, the involved Land Use Agency will require a pre-construction survey.

2. If surveys identify an active loggerhead shrike nest that will be impacted by authorized development, the developer will install brightly colored construction fencing that establishes a boundary 30.5 m (100 ft.) from the active nest. No disturbance associated with authorized development will occur within the 100 foot fenced area during the nesting season (March 1 - July 31). A Wildlife Agency-approved biologist, with concurrence of the Service, must determine young have fledged or that the nest is no longer occupied prior to disturbance of the nest site.

The Conservancy has proposed the following measures to avoid, minimize, and mitigate take of loggerhead shrike:

1. The Conservancy will encourage and maintain loggerhead shrike perching and nesting sites to the maximum extent practicable on all Conservancy lands.

2. The Conservancy will avoid disturbance to loggerhead shrike nest sites and disturbance of the loggerhead shrike during nesting season during reserve management and enhancement activities to the maximum extent practicable, unless otherwise approved by the Conservancy and the TAC.

3. If the loggerhead shrike nests on a Conservancy reserve, the Conservancy will establish, identify and mark (through a method determined appropriate by the Conservancy and in consultation with the TAC) a buffer extending 30.5 m (100 ft.) from the active nest on reserve lands. No disturbance associated with Conservancy reserve construction, such as major grading activities, will occur within the 100 ft. marked area during the nesting season of March 1 through July 31, unless a Wildlife Agency-approved biologist, with concurrence of the Service and CDFG, determines young have fledged or that the nest is no longer occupied. Routine disturbances such as agricultural activities and Conservancy reserve management within 30.5 m (100 ft.) of an active nest site are not restricted so long as no physical disturbance to the nest site occurs.

Burrowing Owl Avoidance and Minimization Measures.

The Land Use Agencies have proposed the following measures to avoid, minimize, and mitigate take of the burrowing owl:

1. Prior to the initiation of grading or earth disturbing activities, the applicant/developer will hire a CDFG-approved biologist to perform a pre-construction survey of the site to determine if any burrowing owls are using the site for foraging or nesting. The pre-construction survey will be submitted to the Land Use Agency with jurisdiction over the site prior to the developer's commencement of construction activities and a mitigation program will be developed and agreed to by the Land Use Agency and developer prior to initiation of any physical disturbance on the site.

2. Occupied burrows will not be disturbed during nesting season (February 1 - August 31) unless a Wildlife Agency-approved biologist approved by CDFG verifies through non-invasive measures that either: (1) birds have not begun egg-laying and incubation; or (2) juveniles from the occupied burrows are foraging independently and are capable of independent survival.

3. If nest sites are found, the Service and CDFG will be contacted regarding suitable mitigation measures, which may include a 300 ft. buffer from the nest site during the breeding season (February 1 - August 31), or a relocation effort for the burrowing owls if the birds have not begun egg-laying and incubation, or the juveniles from the occupied burrows are foraging independently and are capable of independent survival. If on-site avoidance is required, the location of the buffer zone will be determined by a Wildlife Agency-approved biologist. The developer will mark the limit of the buffer zone with yellow caution tape, stakes, or temporary fencing. The buffer will be maintained throughout the construction period.

4. If relocation of the owls is approved for the site by the Service and CDFG, the developer will hire a Wildlife Agency-approved biologist to prepare a plan for relocating the owls to a suitable site. The relocation plan must include: (1) the location of the nest and owls

proposed for relocation; (2) the location of the proposed relocation site; (3) the number of owls involved and the time of year when the relocation is proposed to take place; (4) the name and credentials of the biologist who will be retained to supervise the relocation; (5) the proposed method of capture and transport for the owls to the new site; (6) a description of the site preparations at the relocation site (e.g., enhancement of existing burrows, creation of artificial burrows, one-time or long-term vegetation control, etc...); and (7) a description of efforts and funding support proposed to monitor the relocation.

Relocation options may include passive relocation to another area of the site not subject to disturbance through one way doors on burrow openings, or construction of artificial burrows in accordance with CDFG's October 17, 1995, *Staff Report on Burrowing Owl Mitigation* (Burrowing Owl Report) (attached as Appendix D to the NBHCP).

5. Where on-site avoidance is not possible, disturbance and/or destruction of burrows will be offset through development of suitable habitat on Conservancy upland reserves. Such habitat will include creation of new burrows with adequate foraging area (a minimum of 6.5 acres) or 300 ft. radii around the newly created burrows. Additional habitat design and mitigation measures are described in the Burrowing Owl Report.

The Conservancy has proposed the following measures to avoid, minimize, and mitigate take of the burrowing owl:

1. The Conservancy will avoid disturbance to active nest burrows during reserve management activities to the maximum extent practicable. Disturbance to nesting burrowing owl colonies will be strictly avoided within the nesting season or while birds are present, unless otherwise approved by the TAC. The Burrowing Owl Report will be utilized to the extent practicable to avoid active nests during reserve construction and management activities

2. The Conservancy will utilize applicable Service or CDFG-approved burrowing owl recovery or management plans, and the adaptive management provisions described in the NBHCP to implement any additional conservation measures deemed appropriate ,should use of the NBHCP Area by this species appreciably increase at any time in the future.

3. The Conservancy may be asked to create new burrowing owl habitat in upland reserve areas by creating new burrows or restoring old burrows in upland reserve areas, based on avoidance, minimization and mitigation measures applied by the Land Use Agency Permittees to proponents of authorized development (see NBHCP, Section V.A.5.h). New habitat will include adequate foraging area around the burrow and burrow design will be done in consultation with Wildlife Agency-approved biologists. Additional habitat design and mitigation measures are described in the Burrowing Owl Report.

Bank Swallow Avoidance and Minimization Measures.

The Land Use Agencies have proposed the following measures to avoid, minimize, and mitigate take of the bank swallow:

1. Disturbance to bank swallow nesting colonies will be avoided within the nesting season of May 1 through August 31 (or until a Wildlife Agency-approved biologist, with concurrence of the Service and CDFG, has determined that young have fledged or that the nest is no longer occupied) during all authorized development activities conducted in the Permit Areas.

2. If surveys identify an active bank swallow nesting colony that will be impacted by authorized development, the developer will install brightly colored construction fencing that establishes a boundary 76.2 m (250 ft.) from the active nesting colony. No disturbance associated with authorized development will occur within the fenced area during the nesting season. Additionally, disturbance within ½ mile upstream or downstream of the colony will be avoided if the colony is located upon a natural waterway.

The Conservancy has proposed the following measures to avoid, minimize, and mitigate take of the bank swallow:

1. The Conservancy will avoid disturbing active bank swallow nests during reserve management activities to the maximum extent practicable.

2. The Conservancy will utilize applicable Service or CDFG-approved bank swallow recovery or management plans and the adaptive management provisions described in the NBHCP to implement any additional conservation measures deemed appropriate, should use of the NBHCP Area by the species appreciably increase at any time in the future.

3. Disturbance to bank swallow nesting colonies will be strictly avoided within the nesting season (May 1 through August 31, or until a Wildlife Agency-approved biologist, with concurrence of the Service and CDFG, has determined that young have fledged or that the nest is no longer occupied) during Conservancy reserve development and management activities unless otherwise approved by the TAC.

4. If surveys identify an active bank swallow nesting colony that will be impacted by Conservancy activities, the Conservancy will identify and mark (through a method to be determined by the Conservancy in consultation with the TAC) a boundary 76.2 m (250 ft.) from the active nesting colony on reserve lands. No disturbance associated with Conservancy activities will occur within the 250 ft. marked area of the reserve during the nesting season of May 1 through August 31. Additionally, disturbance within ½ mile upstream or downstream of the colony on reserve lands will be avoided if the colony is located upon a natural waterway. Routine disturbances such as agricultural activities and Conservancy reserve management within 76.2 m (250 ft.) of an active nesting colony or within ½ mile upstream or downstream of an active nesting colony are not restricted so

long as no physical disturbance to the nest site occurs.

Northwestern Pond Turtle Avoidance and Minimization Measures.

In order to avoid, minimize, and mitigate take of the northwestern pond turtle by the proposed action, the Land Use Agencies have proposed to dewater suitable habitat, as described in the conservation measures for the snake.

In order to avoid, minimize, and mitigate take of the northwestern pond turtle by the proposed action, the Conservancy has proposed to consult with northwestern pond turtle researchers and experts periodically during implementation of the NBHCP to determine what, if any, conservation opportunities for the species exists within the Conservancy's reserve system. The Conservancy will implement such conservation measures through the NBHCP's adaptive management provisions as appropriate. Such opportunities might include, but are not limited to, provision of suitable upland habitat for nesting (e.g., unshaded slopes), plentiful basking sites (e.g., floating snags), and shallow water with dense emergent and submergent vegetation for juveniles.

California Tiger Salamander Avoidance and Minimization Measures.

In order to avoid, minimize, and mitigate take of the California tiger salamander by the proposed action, the Land Use Agencies have proposed to require a pre-construction survey prior to approval of an urban development permit. If the survey determines the presence of California tiger salamander, the Land Use Agency will require the developer to consult with the Service and CDFG to determine appropriate measures to avoid and minimize take of individuals. Examples include, but are not limited to: (1) developing specific measures to retain pools, hydrology, suitable estivation sites, open habitat between breeding and estivation sites; (2) replacing wetland within 1.5 miles of known breeding sites; (3) providing species and habitat training to construction personnel; (4) recording setbacks on maps; and (5) prohibiting the following: alteration of topography, structures, dumping, burning, impacting native vegetation, storm drains, fire protection, pesticides and chemicals.

The Conservancy will consult with the TAC and California tiger salamander experts periodically during implementation of the Plan to determine what, if any, additional conservation opportunities for this species might exist within the Plan's proposed reserve system. The Conservancy will implement such conservation measures through the Plan's Adaptive Management and the Site Specific Management Plans prepared for reserve sites as appropriate. In the event preconstruction surveys or other scientific evidence show that the salamander is impacted by authorized development, the Conservancy will create habitat within reserve sites that is conducive to California tiger salamanders, such as stock ponds or "artificial" vernal pools with nearby natural materials for cover such as logs or large rocks). Possible relocation from the site to be impacted or elsewhere in the Basin of tiger salamanders into the Conservancy's reserve system may be considered if preconstruction surveys or other NBHCP monitoring show the species is impacted by Authorized Development.

Western Spadefoot Toad Avoidance and Minimization Measures.

In order to avoid, minimize, and mitigate take of the western spadefoot toad by the proposed action, the Land Use Agencies have proposed to require a pre-construction survey prior to approval of an urban development permit. If the survey determines the toad is present, the Land Use Agency will require the developer to consult with CDFG and the Service to determine appropriate measures to avoid and minimize take of individuals. Examples include, but are not limited to: (1) timing restrictions (i.e., limiting time when pool can be filled to when it is not occupies by toads); and (2) avoidance of the pool.

In order to avoid, minimize, and mitigate take of the western spadefoot toad by the proposed action, the Conservancy has proposed to consult with the TAC and western spadefoot toad experts periodically during implementation of the NBHCP to determine what, if any, additional conservation opportunities for this species exist within the NBHCP's proposed reserve system. The Conservancy will implement such conservation measures through the NBHCP's adaptive management provisions as appropriate. Within reserve sites, the Conservancy will consider creating habitat that is conducive to western spadefoot toads such as areas of slow-moving waters (i.e., pools and plunge pools of small creeks), short grasses with sandy or gravelly soils, and other grassy areas.

Delta Tule Pea Avoidance and Minimization Measures.

In order to avoid, minimize, and mitigate loss of the Delta tule pea by the proposed action, the Land Use Agencies have proposed to require a pre-construction survey. If Delta tule pea plants are identified through a pre-construction survey, the involved Land Use Agency will provide notice to the Service, CDFG and the California Native Plan Society. The development proponent will allow the transplantation of the pea plants prior to site disturbance.

In order to avoid, minimize, and mitigate loss of the Delta tule pea by the proposed action, the Conservancy has proposed:

1. The Conservancy will evaluate the potential for, and as appropriate, implement measures to further the conservation of Delta tule pea within the NBHCP's reserve system through appropriate means. The Conservancy will implement such conservation measures through the NBHCP's adaptive management provisions as appropriate. In the event preconstruction surveys or other scientific documentation indicate impacts to the Delta tule pea as a result of authorized development, the Conservancy's adaptive management program and Site Specific Management Plan process will be used to further the conservation of the species including but not limited to, relocation of the impacted individuals of the into suitable locations on the Conservancy's reserve sites.

2. The Conservancy will monitor any known populations of the pea within the NBHCP Area.

Sanford's Arrowhead Avoidance and Minimization Measures.

In order to avoid, minimize, and mitigate the effects of the proposed action on Sanford's arrowhead, the Land Use Agencies have proposed to conduct a pre-construction survey. If Sanford's arrowhead plants are identified, the involved Land Use Agency will: (1) provide notice to the Service, CDFG and the California Native Plant Society; and (2) allow the development proponent to transplant the plants prior to site disturbance.

In order to avoid, minimize, and mitigate the effects of the proposed action on Sanford's arrowhead, the Conservancy has proposed to:

1. Evaluate the potential for, and as appropriate, implement measures to further the conservation of Sanford's arrowhead within the NBHCP's reserve system through appropriate means. In the event preconstruction surveys or other scientific documentation indicate impacts to the Sanford's arrowhead as a result of authorized development, the Conservancy's adaptive management program and Site Specific Management Plan process will be used to further the conservation of the species including but not limited to, relocation of the impacted individuals of the into suitable locations on the Conservancy's reserve sites.

2. Monitor any known populations of Sanford's arrowhead within the NBHCP Area.

Status of the Species and Environmental Baseline

Threatened Vernal Pool Fairy Shrimp and Endangered Vernal Pool Tadpole Shrimp

The vernal pool fairy shrimp and vernal pool tadpole shrimp were federally-listed as threatened and endangered, respectively, on September 19, 1994 (59 **FR** 48136). Neither species has been designated any special status by the State. The vernal pool fairy shrimp inhabits vernal pools, swales, and other seasonal wetlands in California and southern Oregon. The vernal pool tadpole shrimp lives in similar habitats in California's Central Valley and San Francisco Bay area. Additional information on the life history and ecology of these species may be found in the final rule, Eng *et al*. (1990), Simovich *et al*. (1992), Helm (1998), and Witham *et al.* (1998).

Description, Reproductive Ecology

The vernal pool fairy shrimp has a delicate, elongate body; large, stalked, compound eyes; 11 pairs of swimming legs; a length typically less than 2.5 cm; and no carapace. It swims or glides gracefully upside-down by means of complex, wavelike beating movements as it feeds upon algae, bacteria, protozoa, rotifers, and detritus. Females carry their eggs in pear-shaped, ventral brood sacs until the eggs are either dropped or sink to the pool bottom with the female as she dies. "Resting" or summer eggs are known as cysts. These cysts are able to withstand heat, cold, and prolonged desiccation. When pools refill in the same or subsequent seasons, some, but not all, of the cysts may hatch, resulting in a cyst bank in the soil that may include cysts from several breeding seasons (Donald 1983). Young develop rapidly and may become sexually mature as soon as two weeks after hatching (Gallagher 1996, Helm 1998). This quick maturation permits populations to persist in short-lived, shallow bodies of water (Simovich *et al*. 1992).

The vernal pool tadpole shrimp has a large, shield-like carapace typically measuring less than 2.5 cm in length that covers most of its body; dorsal, compound eyes; and a pair of long cercopods, one on each side of a flat caudal plate, at the end of the last abdominal segment. It is primarily bottom-dwelling and moves with its legs down as it feeds on detritus and living organisms, including fairy shrimp and other invertebrates (Pennak 1989). Females deposit their eggs on vegetation or other objects on the pool bottom. Although some eggs may hatch quickly, others remain dormant as cysts to hatch during later rainy seasons (Ahl 1991). When winter rains refill inhabited wetlands, the species reestablishes from dormant cysts. Individuals may become sexually mature within three to four weeks of hatching (Ahl 1991, Helm 1998) and reproductively mature adults may be present in pools until the habitats dry up in the spring (Ahl 1991, Simovich *et al*. 1992, Gallagher 1996).

Essential Habitat Components, Range

The vernal pool fairy shrimp inhabits alkaline pools, ephemeral drainages, rock outcrop pools, ditches, stream oxbows, stock ponds, vernal pools, vernal swales, and other seasonal wetlands (Helm 1998). Occupied habitats range in size from rock outcrop pools as small as one square meter to large vernal pools up to 4.5 hectares. Potential ponding depth of occupied habitat ranges from 3 cm to 1.2 m. The species has been collected from early December to early May. Known populations in California extend from Stillwater Plain in Shasta County through most of the length of the Central Valley to Pixley in Tulare County and along the central coast range from northern Solano County to Pinnacles National Monument in San Benito County. Several additional, disjunct populations exist: one near Soda Lake in San Luis Obispo County, one in the mountain grasslands of northern Santa Barbara County, one on the Santa Rosa Plateau in Riverside County, and one near Rancho California in Riverside County. Additional populations occur in southern Oregon (59 **FR** 48136).

The tadpole shrimp inhabits alkaline pools, clay flats, ditches, freshwater marshes, stream oxbows, vernal lakes, vernal pools, vernal swales, and other seasonal wetlands (Helm 1998).

Occupied habitats range in size from vernal pools as small as two square meters to large vernal lakes up to 36 hectares. The potential ponding depth of occupied habitat ranges from 4 cm to 1.5 m (59 **FR** 48136). Vernal pool tadpole shrimp populations occur in the Central Valley in California, ranging from east of Redding in Shasta County south to Tulare County. One occupied vernal pool complex is located on the San Francisco Bay National Wildlife Refuge in the City of Fremont, Alameda County (59 **FR** 48136).

The vernal pool fairy shrimp and vernal pool tadpole shrimp are ecologically dependent on seasonal fluctuations in their habitat such as presence or absence of water, duration and timing of inundation, and other abiotic factors such as temperature, salinity, conductivity, dissolved solids, and pH. Water chemistry is one of the most important factors affecting their distribution (Belk 1977, Simovich *et al.* 1992). For example, Helm (1998) found that water temperatures in excess of 24 degrees Celsius killed vernal pool fairy shrimp. This change in water temperature could be caused by placing fill in a portion of the pool. The resulting decrease in the size of the pool would change the period of inundation, thereby decreasing the capacity of the pool to buffer potential changes in water temperature caused by solar radiation.

The genetic characteristics of the fairy shrimp and tadpole shrimp, and ecological conditions, such as watershed continuity, indicate that populations of these animals are defined by pool complexes rather than by individual vernal pools (Fugate 1992). Therefore, the most accurate indication of the distribution and abundance of these species is the number of inhabited vernal pool complexes. Individual vernal pools occupied by these species are most appropriately referred to as subpopulations. The pools and, in some cases, pool complexes supporting these species are usually small. Man-caused and unforeseen natural catastrophic events such as long-term drought, non-native predators, off-road vehicles, pollution, berming, and urban development, threaten their extirpation at some sites.

Dispersal

The primary historical dispersal method for the vernal pool tadpole shrimp and vernal pool fairy shrimp may have been large-scale flooding resulting from winter and spring rains which allowed the animals to colonize different individual vernal pools and other vernal pool complexes. This dispersal mechanism may no longer function in some areas due to the construction of dams, levees, and other flood control measures, and widespread urbanization within significant portions of the range of this species. Waterfowl and shorebirds are now considered the primary dispersal agents for vernal pool tadpole shrimp and vernal pool fairy shrimp (Brusca and Brusca 1992, Simovich *et al.* 1992). The eggs of these crustaceans are ingested (Krapu 1974, Swanson 1974, Driver 1981, Ahl 1991) and/or adhere to the legs and feathers where they are transported to new habitats.

Reasons for Decline and Threats to Survival

The ephemeral wetlands that support this network of populations are remnants of what was formerly a pristine vernal pool ecosystem, which has been converted to primarily agricultural and urban uses. This highly disturbed remnant habitat is imperiled by a variety of human-caused activities, primarily urban development, water supply/flood control projects and conversion of land to agricultural use.

Holland (1978) estimated that between 60 and 85 percent of the habitat that once supported vernal pools, had been destroyed by 1973. Since 1973, a substantial amount of remaining habitat has been converted for human uses. The rate of loss of vernal pool habitat in the state has been estimated at two to three percent per year (Holland and Jain 1988).

Conversion of natural habitat for urban and agricultural uses has highly fragmented the habitat of the listed vernal pool crustaceans throughout their ranges. Fragmentation such as this results in small isolated fairy shrimp populations. Ecological theory predicts that such populations will be highly susceptible to extinction due to chance events, inbreeding depression, or additional environmental disturbance. If an extinction event occurs in a population that has been fragmented, the opportunities for recolonization are thought to be greatly reduced due to physical (geographical) isolation from other (source) populations (Gilpin and Soule 1986; Goodman 1987a, b).

Environmental Baseline and Status within the Action Area

The proposed action is located on the western extremity of the Southeastern Sacramento Valley Vernal Pool Region, one of 17 vernal pool regions defined by the CDFG in the State of California. Regions were identified according to biological, geomorphological, and soils information. According to the report, "One of the primary assumptions is that these regions are ecologically distinct and that they encompass the full range of variability of vernal pools and species in the State" (Keeler-Wolf *et al.* 1998). Of the seventeen defined regions, the Southeastern Sacramento Valley Vernal Pool Region is most threatened by development.

The Southeastern Sacramento Valley Vernal Pool Region contains almost 15 percent of the remaining vernal pool grasslands in the State of California, and supports 35 percent of the known occurrences of the vernal pool fairy shrimp documented in the California Natural Diversity Database.

Developments within Sacramento County have resulted in both direct and indirect impacts to vernal pools, and have contributed to the loss of vernal pool fairy shrimp and vernal pool tadpole shrimp populations. Although the reduction of federally-listed vernal pool crustacean populations has not been quantified, the acreage of lost habitat continues to increase. General and specific plans for the Sacramento area have identified significant, unavoidable impacts to biological communities, including elimination of vernal pools, intermittent drainages and other seasonal wetlands. Despite these impacts, many government entities continue to implement

development projects within the area. However, this is not the case in Natomas, where the City and Sutter County have engaged in regional habitat conservation planning efforts.

There are 314 reported occurrences of vernal pool fairy shrimp in California, 52 of which are reported from Sacramento County and one of which is reported from Sutter County (CNDDB 2002). However, there is only one vernal pool fairy shrimp occurrence known in the Basin; it is located in the eastern portion of Sutter's Permit Area. Additionally, there are several occurrences east of the Natomas Basin in Elverta and Rio Linda (CNDDB, 2002). Potential vernal pool fairy shrimp habitat of approximately 21.3 acres occurs in the vernal pools on the east side of the Basin, in 886 acres of grasslands primarily north of Del Paso Road. This estimate of vernal pool acreage is based upon assessments of the amount of vernal pool habitat per acre of grasslands in Sacramento County and probably greatly overestimates the actual amount of vernal pool habitat per acre of grassland in the Basin (K. Fuller, pers. comm. to C. Aubrey, 2003). Additional potential habitat occurs in 96 acres of other ponds and seasonally wet areas in the Basin. Once again, this estimate greatly overestimates the amount of potential vernal pool habitat in the Basin, as most of the ponds and seasonally wet areas do not have the hydrology sufficient to support vernal pool crustaceans. No potential vernal pool fairy shrimp habitat is located within 76 m (250 ft.) of any of MAP's proposed action activities.

There are 160 reported occurrences of vernal pool tadpole shrimp in California, 55 of which are reported from Sacramento County, and four of which are reported from Sutter County. There is only one vernal pool tadpole shrimp occurrence known in the Basin; it is located in the eastern portion of Sutter's Permit Area (CNDDB 2002). Potential vernal pool tadpole shrimp habitat of approximately 21.3 acres occurs in the vernal pools on the east side of the Basin, in 886 acres of grasslands primarily north of Del Paso Road. This estimate of vernal pool acreage is based upon assessments of the amount of vernal pool habitat in grasslands in Sacramento County and probably greatly overestimates the actual amount of vernal pool habitat in the Basin (K. Fuller, pers. comm.). Additional potential habitat occurs in 96 acres of other ponds and seasonally wet areas in the Basin. Once again, this estimate greatly overestimates the amount of potential vernal pool habitat in the Basin, as most of the ponds and seasonally wet areas do not have the hydrology sufficient to support vernal pool crustaceans. No potential vernal pool tadpole shrimp habitat is located within 76 m (250 ft.) of any of MAP's proposed action activities.

Threatened Giant Garter Snake

The Service published a proposal to list the giant garter snake as an endangered species on December 27, 1991 (56 **FR** 67046). The Service reevaluated the status of the snake before adopting the final rule. The snake was listed as a threatened species on October 20, 1993 (58 **FR** 54053). The *Draft Recovery Plan for the Giant Garter Snake* was published by the Service in July 1999. Additional information on the species' biology may be found in those documents.

Description

The giant garter snake is one of the largest garter snakes and may reach a total length of at least 160 centimeters (cm)(64 inches [in.]). Females tend to be slightly longer and proportionately heavier than males. The weight of adult female snakes is typically 500-700 grams (g)(1.1-1.5 pounds). Dorsal background coloration varies from brownish to olive with a checkered pattern of black spots, separated by a yellow dorsal stripe and two light-colored lateral stripes. Background coloration and prominence of a black-checkered pattern and the three yellow stripes are geographically and individually variable (Hansen 1980). The ventral surface is cream to olive or brown and sometimes infused with orange, especially in northern populations.

Historical and Current Range

This species formerly occurred throughout the wetlands that were extensive and widely distributed in the Central Valley. Fitch (1941) described the historical range of the snake as extending from the vicinity of Sacramento and Contra Costa Counties southward to Buena Vista Lake, near Bakersfield, in Kern County. Prior to 1970, the snake was recorded historically from 17 localities (Hansen and Brode 1980). Five of these localities were clustered in and around Los Banos, Merced County. The paucity of information makes it difficult to determine precisely the species' former range. Nonetheless, these records coincide with the historical distribution of large flood basins, fresh water marshes, and tributary streams. Destruction of wetlands for agriculture and other purposes apparently extirpated the species from the southern one-third of its range by the 1940s -1950s, including the former Buena Vista Lake and Kern Lake in Kern County, and the historic Tulare Lake and other wetlands in Kings and Tulare Counties (Hansen and Brode 1980, Hansen 1980). Surveys over the last two decades have found the snake as far north as the Butte Basin in the Sacramento Valley. As recently as the 1970s, the range of the snake extended from near Burrell, Fresno County (Hansen and Brode 1980), northward to the vicinity of Chico, Butte County (Rossman and Stewart 1987).

Essential Habitat Components

Endemic to wetlands in the Sacramento and San Joaquin valleys, the snake inhabits marshes, sloughs, ponds, small lakes, low gradient streams, and other waterways and agricultural wetlands, such as irrigation and drainage canals and rice fields, and the adjacent uplands. The snake feeds on small fishes, tadpoles, and frogs (Fitch 1941, Hansen 1980, Hansen 1988). Essential habitat components consist of: (1) wetlands with adequate water during the snake's active season (early-spring through mid-fall) to provide food and cover; (2) emergent, herbaceous wetland vegetation, such as cattails and bulrushes, for escape cover and foraging habitat during the active season; (3) upland habitat with grassy banks and openings in waterside vegetation for basking; and (4) higher elevation uplands for escape cover (vegetation, burrows) and underground refugia (crevices and small mammal burrows) (Hansen 1980).

Reproductive Ecology

The breeding season extends through March and April, and females give birth to live young from late July through early September (Hansen and Hansen 1990). Brood size is variable, ranging from 10 to 46 young, with a mean of 23 (Hansen and Hansen 1990). At birth, young average about 20.6 cm (8.1 in.) snout-vent length and 3-5 g (0.10-0.18 ounces). Young immediately scatter into dense cover and absorb their yolk sacs, after which they begin feeding on their own. Although growth rates are variable, young typically more than double in size by one year of age, and sexual maturity averages three years in males and five years for females (58 **FR** 54053).

Movements and Habitat Use

The snake typically inhabits small mammal burrows and other soil crevices throughout its winter dormancy period (November to mid-March). The snake also uses burrows as refuge from extreme heat during their active period. While the snakes usually remain in close proximity to wetland habitats, the Biological Research Division (BRD) of the U.S. Geological Service has documented snakes using burrows as much as 50 m (165 ft.) away from the marsh edge to escape extreme heat (Wylie *et al.* 1997). Overwintering snakes have been documented to use burrows as far as 250 m (820 ft.) from the edge of marsh habitat. Snakes typically select south- and west-facing burrows as hibernacula (58 **FR** 54053).

In studies of marked snakes in the Natomas Basin, snakes moved about 0.40-0.80 kilometers (km)(0.25-0.5 mile) per day (Hansen and Brode 1993). However, total activity varies widely between individuals, and individual snakes have been documented moving up to 8 km (5 miles) over the period of a few days in response to dewatering of habitat (Wylie *et al.* 1997). In agricultural areas, snakes were documented using rice fields in 19-20 percent of the observations, marsh habitat in 20-23 percent of observations, and canal and agricultural waterway habitats in 50-56 percent of the observations (Wylie 1999). Telemetry studies have also shown that active snakes use uplands extensively–more than 31 percent of observations were in uplands (Wylie 1999). Almost all snakes observed in uplands during the active season were near vegetative cover, where cover exceeded 50 percent in the area within 0.5 m (1.6 ft) of the snake; less than 1 percent of observations were of snakes in uplands with less than 50 percent cover nearby (Wylie 1999).

Reasons for Decline and Threats to Survival

Ongoing maintenance of aquatic habitats for flood control and agricultural purposes eliminate or prevent the establishment of habitat characteristics required by snakes and can fragment and isolate available habitat, prevent dispersal of snakes among habitat units, and adversely affect the availability of the garter snake's food items (Hansen 1988, Brode and Hansen 1992). In many areas, the restriction of suitable habitat to water canals bordered by roadways and levee tops renders snakes vulnerable to vehicular mortality. Fluctuation in rice and agricultural production affects stability and availability of habitat. Recreational activities, such as fishing, may disturb snakes and disrupt basking and foraging activities. Nonnative predators, including introduced

predatory gamefish, bullfrogs (*Rana catesbeiana*), and domestic cats (*Felis catus*) also threaten snake populations. While large areas of seemingly suitable snake habitat exist in the form of duck clubs and waterfowl management areas, water management of these areas typically does not provide the summer water needed by snakes. Although snakes on national wildlife refuges are relatively protected from many of the threats to the species, degraded water quality continues to be a threat to the species both on and off refuges. A number of land use practices and other human activities currently threaten the survival of the snake throughout the remainder of its range. Although some snake populations have persisted at low levels in artificial wetlands associated with agricultural and flood control activities, many of these altered wetlands are now threatened with urban development.

Status with Respect to Recovery

The draft recovery plan for the snake subdivided its historic range into four recovery units (Service 1999). These are: (1) the Sacramento Valley unit, extending from the vicinity of Red Bluff south to the confluence of the Sacramento and Feather Rivers; (2) the Mid-Valley unit, extending from the American and Yolo Basins south to Duck Creek near the City of Stockton; (3) the San Joaquin Valley unit, extending south from Duck Creek to the Kings River; and (4) the South Valley unit, extending south of the Kings River to the Kern River Basin. Portions of Mid-Valley recovery unit are within the action area.

The Sacramento Valley Recovery Unit at the northern end of the species' range is known to support relatively large, stable populations of the snake. This unit contains three populations (Butte Basin, Colusa Basin, and Sutter Basin) and a large amount of suitable habitat, in protected areas on state refuges and refuges of the Sacramento NWR Complex in the Colusa and Sutter Basins, and along waterways associated with rice farming (Service 1999).

The Mid-Valley Recovery Unit, directly to the south of the Sacramento Valley Recovery Unit, includes seven populations: American Basin, Yolo Basin–Willow Slough, Yolo Basin–Liberty Farms, Sacramento Area, Badger Creek/Willow Creek, Caldoni Marsh, and East Stockton. The status of the seven snake populations in the Mid-Valley Recovery Unit is uncertain. The East Stockton population may be extirpated, and is not considered recoverable as a result of urban encroachment into habitat (Service 1999). Five of the remaining six populations within the recovery unit are small, highly fragmented and isolated, and, except for the Badger Creek/Willow Slough population, are also threatened by urbanization. This latter population is within a small isolated area. Within the Mid-Valley unit, only the American Basin population supports a sizeable snake population which is dependent largely upon rice lands.

The remaining two recovery units are located to the south in the San Joaquin Valley, where the best available data indicate that the snake's status is precarious. The San Joaquin Valley Recovery Unit contains three historic snake populations: North and South Grasslands; Mendota Area; and Burrel/Lanare Area (Service 1999). This recovery unit formerly supported large snake populations, but numbers have declined severely in recent decades, and recent survey efforts indicate numbers are very low compared to Sacramento Valley populations.

No surviving snake populations are known from the fourth recovery unit, the South Valley Recovery Unit, at the southern end of the snake's historic range; this unit includes only extirpated populations, including the historic but lost Tulare and Buena Visa lakes.

The draft recovery criteria require multiple, stable populations within each of the four recovery units, with subpopulations well-connected by corridors of suitable habitat. Currently, only the Sacramento Valley Recovery Unit, at the northern end of the species' range, is known to support relatively large, stable populations. Habitat corridors connecting populations or subpopulations, even for the Sacramento Valley Recovery Unit, are not present and/or protected.

In 1994, the BRD (then the National Biological Survey) began a study of the life history and habitat requirements of the snake in response to an interagency request from the Service. Since April of 1995, the BRD has further documented occurrences of snakes within some of the known populations. The BRD has studied snake subpopulations at the Sacramento and Colusa NWRs within the Colusa Basin, at Gilsizer Slough within the Sutter Basin, the Badger Creek area of the Cosumnes River Preserve within the Badger Creek-Willow Creek area, and the Natomas area within the American Basin (Wylie *et al.* 1997, Wylie 1999). These subpopulations represent the largest known extant subpopulations. With the exception of the American Basin, these subpopulations are largely protected from many of the threats to the species. Outside of these protected areas, snakes in these populations are still subject to all the threats identified in the final listing rule. The remaining nine populations identified in the final rule are distributed discontinuously in small isolated patches and are vulnerable to extirpation by stochastic environmental, demographic, and genetic processes. The 13 extant populations are largely isolated from each other, with any dispersal corridors between them limited and not protected. When small populations are extirpated, the recolonization is unlikely in most cases, given the isolation from larger populations and the lack of dispersal corridors between them.

Environmental Baseline

Surveys over the last two decades have located the giant garter snake as far north as the Butte Basin in the Sacramento Valley. Currently, the Service recognizes 13 separate populations of the snake, with each population representing a cluster of discrete locality records (Service 1993). The 13 extant population clusters largely coincide with historical riverine flood basins and tributary streams throughout the Central Valley (Hansen 1980, Brode and Hansen 1992): (1) Butte Basin, (2) Colusa Basin, (3) Sutter Basin, (4) American Basin, (5) Yolo Basin-Willow Slough, (6) Yolo Basin-Liberty Farms, (7) Sacramento Basin, (8) Badger Creek-Willow Creek, (9) Caldoni Marsh, (10) East Stockton-Diverting Canal and Duck Creek, (11) North and South Grasslands, (12) Mendota, and (13) Burrell-Lanare. These populations span the Central Valley from just southwest of Fresno (Burrell-Lanare) north to Chico (Hamilton Slough).

Since April of 1995, the Biological Resources Division (BRD) of U.S. Geological Survey has further documented occurrences of giant garter snakes at the Sacramento, Delevan, and Colusa National Wildlife Refuges within the Colusa Basin, at Gilsizer Slough within the Sutter Basin, at the Badger Creek area of the Consumnes River Preserve within the Badger Creek-Willow Creek

area, and in the Natomas Basin within the American Basin (Wylie 1999; 2001: Wylie *et al.* 1997; 2000a,b; 2002). These populations of giant garter snakes represent the largest extant populations. With the exception of the American Basin, these areas are largely protected from many of the threats to the species. Outside of protected areas, giant garter snakes in these population clusters are still subject to all threats identified in the final rule. The remaining nine population clusters identified in the final rule are distributed discontinuously in small isolated patches and are vulnerable to extirpation by random environmental, demographic, and genetic processes. Until recently, there were no post-1980 sightings of snakes from Stockton and southward, and surveys of historic localities conducted in 1986 did not detect any snakes (Service 1999). Since 1995, however, surveys conducted by CDFG in cooperation with BRD in the Grasslands Area in the San Joaquin Valley have detected snakes, but in numbers much lower than those found in the Sacramento Valley populations. These observations indicate that snakes are still extant in at least three locations in the San Joaquin Valley, but probably in extremely low numbers (Service 1999). All 13 population clusters are isolated from each other with no protected dispersal corridors. Opportunities for recolonization of small populations which may become extirpated is unlikely given the isolation from larger populations and lack of dispersal corridors between them.

The proposed action occurs within the Natomas Basin portion of the American Basin population of giant garter snakes, within the Mid-Valley Recovery Unit identified by the giant garter snake recovery team (Service 1999). Scattered natural habitats comprise a small component of this larger, 53,000-acre agricultural habitat Natomas Basin complex. Numerous California Natural Diversity Database (CNDDB 2002) locality records for giant garter snakes are known from the Natomas Basin portion of the American Basin and are distributed throughout most of the Natomas Basin. Additionally, the snake has been documented in Area B (Hansen 2002). Because the Natomas Cross Canal may pose a barrier to the snake's movement, snakes in Area B and the Basin may now represent two distinct populations.

Brode and Hansen (1992) evaluated the status and future management of the snake within the Natomas Basin. They stated that the Basin provides the most important habitat remaining for the snake and observed that snake habitat within the Basin occurs in three large areas that are separated by major highways (Figure 5). Area 1 is defined as lands north of Interstate 5 (I-5) and west of State Route 99/70 (SR-99/70). Important habitat areas include Prichard Lake, the North Drain Canal, and its associated rice fields. Area 2 is defined as the lands south and west of I-5. The most important habitat area is Fisherman's Lake. Area 3 is defined as the lands east of I-5 and SR-99/70. Within Area 3, the most important habitat area is "Snake Alley," an area comprised of the North Main Canal and its associated rice fields and irrigation ditches on the east side of SR-99/70. The authors hypothesized that snakes could move between the three geographic areas through large box culverts under the major highways. Brode and Hansen (1992) attributed the snake's continued success in the Basin to the numerous irrigation ditches, rice fields, and especially the extensive network of irrigation canals, feeder canals, and drains. The authors concluded by presenting a conceptual conservation plan for the snake in the Basin. This plan was based upon a minimum of one core habitat in each of the geographic areas with connecting canal to ensure snake's could move between each of the three areas. The proposed

action includes effects to snake habitat within all three of the geographic areas.

Recent research efforts by BRD to collect demographic and habitat use data during from 1998 through 2002, have further documented occurrences of giant garter snakes within the Natomas Basin (Wylie *et al.* 2000b, Wylie and Cassaza 2002, Wylie and Martin 2002). BRD surveys have provided significant recent information on the distribution of giant garter snakes within the Natomas Basin, and supplement previous research on the snake within the Natomas Basin (e.g. Brode and Hansen 1992, Hansen and Brode 1993). BRD capture data and CNDDB records indicate giant garter snakes are distributed throughout the Natomas Basin, but the relative abundance varies. Wylie *et al.* (2000b) concluded that habitat within the Natomas Basin has apparently degraded over time, as compared to previous accounts of habitat in the Natomas Basin. They also concluded that the quality of habitat within the Natomas Basin is poorer than that at other geographic locations where giant garter snakes are found. The other localities studied by BRD included more extensive areas of native or restored and/or protected habitat as compared with the Natomas Basin. Results of the most recent snake surveys in the Natomas Basin indicated that habitat quality is decreasing near Fisherman's Lake and in the area addressed in the MAP biological opinion (Wylie and Cassaza 2002). This decrease in habitat quality is likely due to the fallowing of rice fields and encroaching development. Major areas classified as having good habitat quality are located in the northwest portion of the Basin (in the vicinity of the Conservancy's Lucich North, Lucich South, and Bennett South sites) and in the unincorporated area of Sacramento County between Elverta Road and the Sacramento-Sutter County line. Of those areas of the Basin sampled, snake densities were greatest at Bennett South, Lucich North, Lucich South, and Snake Alley.

A number of State, local, private, and unrelated Federal actions have occurred within the action area and adjacent region affecting the environmental baseline of the species. Some of these projects have been subject to prior section 7 consultation. These actions have resulted in both direct and indirect impacts to snake habitat within the region.

Several flood control programs are completed or ongoing within the action area, within the range of the species, and within the Natomas Basin. Completed projects include the Natomas Area Flood Control Project that provided flood protection necessary for development in the Natomas Basin to move forward. On-going projects associated with the common features of the American River Watershed Investigation administered by the Corps of Engineers will affect giant garter snakes within the Natomas and American Basins. Activities that are either on-going or in various stages of planning include levee raising along the Natomas Cross Canal, American River, and Sacramento River; modification of the Natomas East Main Drainage Canal levee; and relocation of canals and construction of stability/seepage berms along the levees.

Ongoing agricultural activities also affect the environmental baseline for the snake, and are largely not subject to section 7 consultation. Some agriculture, such as rice farming, can provide valuable seasonal foraging and upland habitat for the snake. Although rice fields and agricultural waterways can provide habitat for the snake, agricultural activities such as waterway maintenance, weed abatement, rodent control, and discharge of contaminants into wetlands and

waterways can degrade snake habitat and increase the risk of snake mortality (Service 1999). Ongoing maintenance of agricultural waterways can also eliminate or prevent establishment of snake habitat, eliminate food resources for the snake, and can fragment existing habitat and prevent dispersal of snakes (Service 1999). Flood control and maintenance activities which can result in snake mortality and degradation of habitat include levee construction, stream channelization, and the riprapping of streams and canals (Service 1999).

In addition to agricultural, flood control, and maintenance activities, other activities have occurred in the Basin that likely affected the snake and did not receive incidental take authorization. For example, over the last three to four years, approximately 75 acres of potential snake seasonal wetland habitat were altered and/or degraded on lands owned by the Sacramento International Airport. This is a significant percentage of the remaining natural wetlands in the Basin. These unauthorized activities are currently under investigation by the Service.

The Natomas Basin currently supports approximately 24,567 acres of snake habitat (Table 4). Of that, approximately 96 acres are ponds and seasonally wet areas, 22,693 acres are rice fields, and 1,778 are canals.

Threatened Valley Elderberry Longhorn Beetle

The valley elderberry longhorn beetle was listed as a federally-threatened species on August 8, 1980 (45 **FR** 52803). Two areas along the American River in the City's metropolitan area have been designated as critical habitat for the beetle [50 **FR** 17.95 (I)]. In addition, an area along Putah Creek, Solano County, and the area west of Nimbus Dam along the American River Parkway, Sacramento County, are considered essential habitat, according to the Recovery Plan for the beetle (Service 1984). These areas support large numbers of mature elderberry shrubs (*Sambucus* spp.) with extensive evidence of use by the beetle. A detailed account of the beetle's life history is presented in the "Valley Elderberry Longhorn Beetle Recovery Plan" (Service 1984) and Barr (1991).

Description

Longhorn beetles (family Cerambycidae) are characterized by somewhat elongate and cylindrical bodies with long antennae, often in excess of 2/3 of the body length. The valley elderberry longhorn beetle is large and stout-bodied. Males range in length from about 13-21 mm (measured from the front of the head to the end of the abdomen) with antenna about as long as the body. Females are slightly more robust than males, measuring about 18-25 mm, with somewhat shorter antennae. The beetles are dark metallic-green with a bright red-orange border on the elytra (thickened, hardened forewings). Males generally have the metallic-green elytral pattern reduced to four oblong spots, exhibiting much of the red-orange color. Females and some males are mostly metallic-green and exhibit only a narrow band of red-orange color along the front margin of the elytra.

Reproductive Biology

Adult beetles are active from March through June. They are uncommon and rarely observed despite their large size and conspicuous coloration. They presumably mate at this time, the females laying their eggs on the bark of an elderberry. How the beetle locates mates is unknown, although some other cerambycids appear to use pheromones. The larvae hatch in a few days and bore into the stem, where they remain, feeding on the pith until they complete their development. The larva then cuts an emergence hole, pupates inside the stem, and emerges as an adult in the spring. The complete life cycle is thought to take one or two years. Adults are presumed to die after reproducing, but this is not definitively known.

Essential Habitat Components, Movement

The beetle is dependent on its host plant, elderberry, which is a common component of the remaining riparian forests of the Central Valley. Use of the elderberry by the beetle, a wood borer, is rarely apparent. Frequently, the only exterior evidence of the shrub's use by the beetle is an exit hole created by the larva just prior to the pupal stage. Recent field work along the Cosumnes River and in the Folsom Lake area indicates that larval galleries can be found in elderberry stems with no evidence of exit holes; the larvae either succumb prior to constructing an exit hole or are not far enough along in the developmental process to construct an exit hole. Larvae appear to be distributed in stems which are 1.0 inch or greater in diameter at ground level. Barr (1991) noted that elderberry shrubs and trees with many exit holes were most often large, mature plants; young stands were seldom occupied.

Population densities of the beetle are probably naturally low (Service 1984); it has been suggested, based on the spatial distribution of occupied shrubs (Barr 1991), that the beetle disperses poorly. Low density and limited dispersal capability may cause the beetle to be vulnerable to the negative effects of the isolation of small subpopulations due to habitat fragmentation.

Range

The beetle's current distribution is patchy throughout the remaining habitat of the Central Valley from Redding to Bakersfield. Surveys conducted in 1991 (Barr 1991) found evidence of beetle activity at 28 percent of the 230 sites with elderberry. The beetle appears to be only locally common i.e., found in population clusters which are not evenly distributed across available elderberry shrubs). Frequently, only particular clumps or trees in the study areas were found to harbor the beetle.

Reasons for Decline and Threats to Survival

Extensive destruction of California's Central Valley riparian forests has occurred during the last 150 years due to agricultural and urban development (Katibah 1984, Smith 1977, Thompson 1961). Based on a 1979 aerial survey, only about 102,000 acres out of an estimated 922,000 acres of Central Valley riparian forest remain (Katibah *et al.* 1984). More extreme figures were given by Frayer *et al*. (1989), who reported that approximately 85 percent of all wetland acreage

in the Central Valley was lost before 1939 and that from 1939 to the mid-1980's, the acreage of wetlands dominated by forests and other woody vegetation declined from 65,400 acres to 34,600 acres. Differences in methodology may explain the differences between the studies. In any case, the historical loss of riparian habitat in the Central Valley strongly suggests that the range of the beetle has been reduced and its distribution greatly fragmented. Loss of non-riparian habitat where elderberry occurs (e.g., savanna and grassland adjacent to riparian habitat, oak woodland, mixed chaparral-woodland), and where the beetle has been recorded (Barr 1991), suggests further reduction of the beetle's range and increased fragmentation of its upland habitat. In Sacramento County, some riparian forest along the American River corridor is protected as parks and open space, but elderberries in savanna and streamside riparian habitats in the southern portion of the County are vulnerable to expansion of residential and commercial developments.

Habitat fragmentation not only isolates small populations, but also increases the interface between habitat and urban or agricultural land, increasing negative edge effects such as the invasion of non-native species (Huxel 2000) and pesticide contamination (Barr 1991). There are several edge effect-related factors that may be related to the decline of the beetle. Recent evidence indicates that the invasive Argentine ant (*Iridomyrmex humilis*) poses a risk to the long-term survival of the beetle. Surveys along Putah Creek found beetle presence where Argentine ants were not present or had recently colonized, and beetle absence from otherwise suitable sites where Argentine ants had become established (Huxel 2000). The Argentine ant has negatively impacted populations of other native arthropod species (Holway 1995; Ward 1987). Predation on eggs, larvae, and pupae are the most likely impacts these ants have on the beetle. In Portugal, Argentine ants have been found to be significant egg predators on the eucalyptus borer (*Phoracantha semipunctata*), a cerambycid like the valley elderberry longhorn beetle. Egg predation on the beetle could lead to local extirpations, as indicated by a population viability study suggesting that egg and juvenile mortality are significant factors affecting probability of extinction for the beetle (Huxel and Collinge, in prep.). The Argentine ant has been expanding its range throughout California since its introduction around 1907, especially in riparian woodlands associated with perennial streams (Holway 1995, Ward 1987). Huxel (2000) states that, given the potential for Argentine ants to spread with the aid of human activities such as movement of plant nursery stock and agricultural products, this species may come to infest most drainages in the Central Valley along the valley floor, where the beetle is found.

Direct spraying and drift of pesticide, including herbicides and/or insecticides, in or near riparian areas (which is done to control mosquitos, crop diseases, invasive and/or undesirable plants, or other pests) is likely to adversely affect the beetle and its habitat. Although there have been no studies specifically focusing on the effects of pesticides on the beetle, evidence suggests that the species is likely to be affected by pesticides. As of 1980, the prevalent land use adjacent to riparian habitat in the Sacramento Valley was agriculture, even in regions where agriculture was not generally the most common land use (Katibah *et al.* 1984). Therefore, the species is likely vulnerable to pesticide contamination from adjacent agricultural practices. Recent studies of major rivers and streams documented that 96 percent of all fish, 100 percent of all surface water samples and 33 percent of major aquifers contained one or more pesticides at detectable levels

(Gilliom 1999). Pesticides were identified as one of the 15 leading causes of impairment for streams included on the Federal Water Pollution Control Act, as amended (Clean Water Act), section 303(d) lists of impaired waters. As the beetle occurs primarily in riparian habitat, the contamination of rivers and streams affects this species and its habitat. Pesticides have been identified as one of a number of potential causes of pollinator species' declines and declines of other insects beneficial to agriculture (Ingraham *et al.* 1996). Therefore, it is likely that the beetle, typically occurring adjacent to agricultural lands, has suffered a decline due to pesticides.

Status Within the Action Area and Environmental Baseline

The California Natural Diversity Database lists 168 beetle occurrences in California (CNDDB 2002). Three of these are located in Sutter County and 16 are located in Sacramento County. The beetle has not been documented to occur within the Basin. However, several occurrences have been recorded in close proximity to the Basin along the Sacramento River. For example, the beetle has been observed on the Yolo County side of the Sacramento River directly west of Fisherman's Lake. Potential beetle habitat (i.e., elderberry shrubs with stems greater than one inch diameter at ground level) is located along the outside perimeter of the Basin, and small patches of potential habitat are known to exist in many locations within the Basin. The number of elderberry shrubs in the Natomas Basin and the local population status of the beetle are not known.

Beetle habitat is defined as elderberry shrubs (*Sambucus* spp.) with stems greater than one inch in diameter at ground level. No attempt was made to quantify the number of elderberry shrubs with stems measuring greater than one inch in diameter at ground level within the proposed action's action area. However, habitat class types identified in the EIR/EIS that may potentially be inhabited by elderberry shrubs (and therefore, the beetle) include 98 acres of oak groves, 124 acres of riparian, and 106 acres of other tree groves (i.e., groves that are neither oak groves or riparian)(Table 13). Additional elderberry shrubs are likely scattered throughout the action area.

Threatened Colusa Grass

Colusa grass is endemic to vernal pools of California's Sacramento and San Joaquin valleys. The Service (1997b) listed it as a threatened species in 1997. Colusa grass has been state-listed as endangered since 1979 (CDFG 1991) and has been considered to be rare and endangered by the California Native Plant Society since 1974 (Powell 1974). The California Native Plant Society now includes Colusa grass on List 1B and considers it to be "endangered throughout its range" (Skinner and Pavlik 1994) and "seriously endangered in California" (Tibor 2001). CDFG considers the status of Colusa grass to be declining (CDFG 2001).

Description

Unlike terrestrial grasses, Colusa grass has pith-filled stems, lacks distinct leaf sheaths and ligules, and produces exudate. Colusa grass differs from other members of the Orcuttieae in that it has zigzag stems, cylindrical inflorescences, and fan-shaped lemmas and lacks glumes,

whereas the other genera within the tribe have fairly straight stems and possess glumes. Moreover, *Orcuttia* species have distichous spikelets and narrow, five-toothed lemmas, and *Tuctoria* species have spikelets arranged in a loose spiral, and narrow, more-or-less entire lemmas. Colusa grass is not likely to be confused with Anthochloa, despite their former taxonomic affiliation. The latter does not occur in North America, is perennial, does not have glands, the inflorescence is not cylindrical, and the spikelets have glumes (Hoover 1940).

All members of the Orcuttieae share several characteristics that differ from many other grasses. Most grasses have hollow stems, but the Orcuttieae have stems filled with pith. Another difference is that the Orcuttieae produce two or three different types of leaves during their life cycle, whereas most grasses have a single leaf type throughout their life span. The juvenile leaves of the Orcuttieae, which form underwater, are cylindrical and clustered into a basal rosette. After the water dries, terrestrial leaves form in all species of the tribe; these leaves have flattened blades and are distributed along the stem (Keeley 1998). *Orcuttia* species have a third type of leaf that is not found in *Neostapfia* or *Tuctoria* (Reeder 1982, Keeley 1998). The terrestrial leaves of the Orcuttieae also differ from other grasses in other respects. Whereas grass leaves typically are differentiated into a narrow, tubular *sheath* that clasps the stem tightly and a broader blade that projects away from the stem, terrestrial leaves of the Orcuttieae are broad throughout and the lower portion enfolds the stem only loosely. The Orcuttieae also lack a ligule, which is a leaf appendage commonly found in other grasses (Reeder 1965, Reeder1982, Keeley 1998). Another characteristic common to all Orcuttieae is the production of an aromatic exudate, which changes from clear to brown during the growing season (Reeder 1965, Reeder 1982). The exudate most likely helps to repel herbivores (Crampton 1976, Griggs 1981).

Compared to other members of the Orcuttieae, Colusa grass shows fewer adaptations to existence underwater, indicative of its relatively primitive evolutionary position and the shorter duration of underwater growth (Keeley 1998). The aquatic seedlings of Colusa grass have only one or two juvenile leaves (Keeley 1998). The terrestrial stage consists of multiple stems arising in clumps from a common root system. The stems are decumbent and have a characteristic zigzag growth form (Crampton 1976). Overall stem length ranges from 10 to 30 cm (3.9 to 11.8 in.). The entire plant is pale green when young (Davy 1898) but becomes brownish as the exudate darkens (Reeder 1982, Reeder 1993). Leaf length is 5 to 10 cm (2.0 to 3.9 in.) (Hitchcock and Chase 1971). Each stem produces one dense, cylindrical inflorescence that is 2 to 8 cm (0.8 to 3.1 in.) long and 8 to 12 mm (0.31 to 0.47 in.) broad. Within the inflorescence, the spikelets are densely packed in a spiral arrangement; the tip of the rachis projects beyond the spikelets. Each spikelet typically contains five florets but does not have glumes. The fan-shaped lemmas are approximately 5 mm (0.20 in.) long. The grains are 2.5 mm (0.10 inch) long and are coated with exudate. Colusa grass has a diploid chromosome number of 40 (Reeder 1982, Reeder 1993).

Historical and Current Range

In the 50 years after its initial discovery (Davy 1898), Colusa grass was reported from only three sites other than the type locality; these were in Merced and Stanislaus counties. By the mid-

1970's, Colusa grass had been reported from a total of 11 sites in Colusa, Merced, Solano, and Stanislaus counties (Hoover 1936, Hoover 1940, Crampton 1959, Medeiros 1976, Reeder 1982). During the 1980's, many new populations of Colusa grass were located during extensive surveys. As of 1989, 40 occurrences were extant and 11 already had been extirpated. Of the 51 occurrences known up to that point, 26 were in Merced County, 22 were in Stanislaus county, two were in Solano County, and one was in Colusa County (Stone *et al*. 1988, CNDDB 2001). These occurrences were in the San Joaquin Valley, Solano-Colusa, and Southern Sierra Foothills vernal pool regions (Keeler-Wolf *et al*. 1998).

Although fewer than one-quarter of the historical occurrences have been visited within the past decade, their status is presumed to be the same as on the last visit (CNDDB 2002). Currently, CNDDB (2002) includes 59 occurrences of Colusa grass; 48 occurrences are presumed to be extant and 11 others are either known or presumed to be extirpated.

The extant populations occur primarily in the Southern Sierra Foothills Vernal Pool Region, where they are concentrated northeast of the city of Merced in Merced County (24 occurrences) and east of Hickman in Stanislaus County (16 occurrences). Of the remaining eight extant occurrences, four are in central Merced County, representing the San Joaquin Valley Vernal Pool Region. The others are in the Solano-Colusa Vernal Pool Region, with two each in southeastern Yolo and central Solano counties (Stone *et al*. 1988, Keeler-Wolf *et al*. 1998, CNDDB 2002). The species has been extirpated from Colusa County (CNDDB 2002).

Life History and Habitat

Many life-history characteristics are common to all members of the Orcuttieae. They are annuals, and all exhibit C_4 photosynthesis (Downton 1975, Griggs 1981, Keeley 1998). All are wind-pollinated, but pollen probably is not carried long distances between populations (Griggs 1980, Griggs and Jain 1983). Local seed (i.e., caryopsis) dispersal is by water, which breaks up the inflorescences (Reeder 1965, Crampton 1976, Griggs 1980, Griggs 1981). Long-distance dispersal is unlikely (Service 1985*c*) but seed may have been carried occasionally by waterfowl (family Anatidae), tule elk (*Cervus elaphus nannoides*), or pronghorn (*Antilocapra americana*) in historical times (Griggs 1980). The seeds can remain dormant for an undetermined length of time, but at least for three or four years, and germinate underwater after they have been immersed for prolonged periods (Crampton 1976, Griggs 1980, Keeley 1998). Unlike typical terrestrial

grasses that grow in the uplands surrounding vernal pools, members of the Orcuttieae flower during the summer months (Keeley 1998).

All members of the Orcuttieae are endemic to vernal pools. Although the various species have been found in pools ranging widely in size, the vast majority occur in pools of 0.01 hectares (0.025 acres) to 10 hectares (24.7 acres) (Stone *et al*. 1988). Large pools such as these retain water until May or June, creating optimal conditions for Orcuttieae (Crampton 1959, Crampton 1976, Griggs 1981, Griggs and Jain 1983). Within the pools, Orcuttieae occur in patches that are essentially devoid of other plant species (Crampton 1959, Crampton 1976). Typically, plants near the center of a pool grow larger and produce more spikelets than those near the margins, but patterns vary depending on individual pool characteristics and seasonal weather conditions (Griggs 1980).

Reproductive Ecology

In an experiment where Colusa grass was grown along with Greene's tuctoria and two species of *Orcuttia* (Keeley 1998), seeds of Colusa grass took approximately three months to germinate following inundation, longer than all other species. Unlike *Orcuttia* species, Colusa grass does not produce flattened, floating juvenile leaves (Reeder 1982, Keeley 1998). Germination and seedling development have not been studied in the wild but are assumed to be similar to those of *Tuctoria* species, which have similar seedlings. Thus, Colusa grass seed would be expected to germinate in late spring when little standing water remains in the pool, and flowering would begin approximately three to four weeks later, as observed for *Tuctoria* (Griggs 1980). Flowering individuals of Colusa grass have been collected as early as May throughout the range of the species (CNDDB 2002). Colusa grass spikelets break between the florets (Reeder 1993), shattering as soon as the inflorescence matures (Crampton 1976).

Among all members of the Oructtiaeae, the soil seed bank may be 50 times or more larger than the population in any given year. In general, years of above-average rainfall promote larger populations of Orcuttieae, but population responses vary by pool and by species (Griggs 1980, Griggs and Jain 1983). Population sizes have been observed to vary by one to four orders of magnitude among successive years and to return to previous levels even after three to five consecutive years when no mature plants were present (Griggs 1980, Griggs and Jain 1983, Holland 1987). Thus, many years of observation are necessary to determine whether a population is stable or declining.

Reproductive and survival rates of Colusa grass have not been reported, but annual monitoring confirms that population sizes of Colusa grass vary widely from year to year. Over a 6-year monitoring period, the population at the Bert Crane Ranch in Merced County dropped from 250 plants in 1987 to zero in 1989 and 1990 but rebounded to over 2,000 plants in 1992 (Silveira in litt. 2000). At Olcott Lake in Solano County, the lowest population of the decade was 1,000 in 1994 yet was followed by a high of over one million the following year (CNDDB 2001).

Habitat and Community Associations

Colusa grass has the broadest ecological range among the Orcuttieae. It occurs on the rim of alkaline basins in the Sacramento and San Joaquin valleys, as well as on acidic soils of alluvial fans and stream terraces along the eastern margin of the San Joaquin Valley and into the adjacent foothills (Stone *et al*. 1988). Elevations range from 5 m (18 ft.) to approximately 105 m (350 ft.) at known sites (CNDDB 2001). Colusa grass has been found in Northern Claypan and Northern Hardpan vernal pool types (Sawyer and Keeler-Wolf 1995) within rolling grasslands (Crampton 1959). It grows in pools ranging from 0.01 to 250 hectares (0.02 to 617.5 acres), with a median size of 0.2 hectares (0.5 acres), and also occurs in the beds of intermittent streams and in artificial ponds (Stone *et al*. 1988, K. Fuller personal communication 1997, EIP Associates 1999). This species typically grows in the deepest portion of the pool or stream bed (Crampton 1959, Stone *et al*. 1988) but also may occur on the margins (Hoover 1937, Stone *et al*. 1988). Deeper pools and stock ponds are most likely to provide the long inundation period required for germination (EIP Associates 1999).

Several soil series are represented throughout the range of Colusa grass. In the Solano-Colusa Vernal Pool Region, Colusa grass grows on clay, silty clay, or silty clay loam soils in the Marvin, Pescadero, and Willows series. In the San Joaquin Valley Vernal Pool Region, soils are clay or silty clay loam in the Landlow and Lewis series (Silveira in litt. 2000). Colusa grass habitat in the Southern Sierra Foothills Vernal Pool Region includes many soil series with textures ranging from clay to gravelly loam. For sites with known soil series, these include Bear Creek, Corning, Greenfield, Keyes, Meikle, Pentz, Peters, Raynor, Redding, and Whitney (Stone *et al*. 1988, EIP Associates 1999, CNDDB 2001). The type and composition of impermeable layers underlying occupied vernal pools also varies, ranging from claypan to lime-silica or iron-silica cemented hardpan and tuffaceous alluvium (Stone *et al*. 1988)

Colusa grass usually grows in single-species stands, rather than intermixed with other plants. Thus, associated species in this case are plants that occur in different zones of the same pools but are present in the same season. For example, Crampton (1959) observed that Colusa grass dominated pool beds, with hairy Orcutt grass forming a band around the upper edge of the stand. In saline-alkaline sites, common associates of Colusa grass are frankenia and saltgrass, whereas on acidic sites associates include coyote-thistle, turkey mullein (*Eremocarpus setigerus*), and vernal pool popcorn flower (Stone *et al*. 1988, EIP Associates 1999). Greene's tuctoria formerly grew in one vernal pool with Colusa grass, but the former no longer occurs there (Stone *et al*. 1988, CNDDB 2001).

Reasons for Decline and Threats to Survival

Colusa grass declined primarily because pools in which it occurred were destroyed by conversion to irrigated agriculture, primarily to orchards and vineyards (Crampton 1976, Medeiros 1976, CNDDB 2001). Other factors that extirpated populations of Colusa grass included altered hydrology, surface disturbance, and excessive livestock grazing. At least nine, and possibly 11, occurrences have been extirpated, although several others most likely were eliminated before being reported (Stone *et al*. 1988). The Yolo County occurrences have been damaged by herbicide application (Witham in litt. 2000) and the groundwater there has been

contaminated by industrial chemicals (K. Fuller personal communication 1997).

The same factors that contributed to the decline of Colusa grass continue to pose threats. Agricultural conversion is most likely to occur in eastern Stanislaus County and threatens the 16 extant occurrences there. Dry-land farming there is gradually being replaced by irrigated agriculture; the former apparently is compatible with the persistence of Colusa grass, but the latter is not (Crampton 1959, Crampton 1976). Changes in natural hydrology, such as draining pools or creating reservoirs, could create unsuitable conditions for Colusa grass by decreasing or increasing inundation periods. Increased grazing intensity or summer grazing would threaten Colusa grass, even though moderate cattle grazing in spring has not posed a problem (Stone *et al*. 1988). Sheep grazing is compatible if the flock is removed before Colusa grass begins growth for the year. However, sheep trampling and bedding during the seedling and flowering stages are detrimental (Witham in litt. 1992).

Another threat to the survival of Colusa grass comes from the construction of the proposed University of California campus and associated community in Merced County. Four occurrences (constituting five pools and ponds) are in the area expected to be developed within the next 15 years, and two others (constituting one pool and one stockpond) are within the "planning area" (EIP Associates 1999, CNDDB 2001).

Additional factors threaten the survival of Colusa grass, particularly the problem of small population size. Although populations may drop to only a few visible plants in certain years, seven consisted of fewer than 100 plants even at their peak (CNDDB 2002) and thus are likely to represent small populations. Non-native plants such as swamp grass and alkali mallow, and invasive native species such as cocklebur and lippia could out-compete Colusa grass and may be particular problems in combination with other factors such as decreased inundation and inappropriate livestock grazing (Stone *et al*. 1988, Witham in litt. 2000). Grasshopper foraging has been observed on Colusa grass (Stone *et al*. 1988), but the extent of this threat is unknown. The two Yolo County occurrences are threatened by herbicide run-off from adjacent agricultural operations (CNDDB 2001).

Status with Respect to Recovery

Most of the conservation efforts for Colusa grass have been accomplished as part of the broader effort to survey and protect vernal pools in the Central Valley. Surveys conducted by Crampton (1959), Medeiros (1976), and Stone *et al.* (1988) contributed to distributional records and identification of threats. Four occurrences of Colusa grass, comprising six occupied pools, have been protected by The Nature Conservancy. One is Olcott Lake on the Jepson Prairie Preserve in Solano County, where the Colusa grass population has been monitored annually since 1989

(Witham in litt. 1992, CNDDB 2001). The other five pools are on the Flying M Ranch conservation easement in eastern Merced County (Stone *et al*. 1988).

Three additional occurrences of Colusa grass are on federal land, which offers more options for conservation but does not in itself constitute protection. Two are on a U.S. Department of Defense facility in Yolo County, which was scheduled to be released from federal ownership in 2001 (Fuller in litt. 2000). The other occurrence is on the Arena Plains Unit of the Merced National Wildlife Refuge in Merced County. The Service, which administers the refuge, acquired the Arena Plains in 1992, and refuge personnel have been monitoring the Colusa grass population annually since 1993. Although the refuge allowed grazing to continue on the Arena Plains after it was purchased, temporary electric fencing was placed around the Colusa grass pool one year to exclude cattle when the population was deemed to be particularly vulnerable (D. Woolington pers. comm. 1997, Silveira in litt. 2000).

Status within the Action Area and Environmental Baseline

Fifty-nine Colusa grass occurrences have been reported in California (CNDDB 2002). None of those are from Sacramento County, Sutter County, or the Basin. The closest reported Colusa grass occurrences are from Yolo County, approximately ten miles southwest of the Basin.

The Natomas Basin supports limited amounts of potential Colusa grass habitat. Potential habitat of approximately 21.3 acres occurs in the vernal pools on the east side of the Basin, in 886 acres of grasslands primarily north of Del Paso Road. This estimate of vernal pool acreage is based upon assessments of the amount of vernal pool habitat per acre of grasslands in Sacramento County and probably greatly overestimates the actual amount of vernal pool habitat per acre of grassland in the Basin (K. Fuller, pers. comm. to C. Aubrey, 2003). Additional potential habitat occurs in 96 acres of other ponds and seasonally wet areas in the Basin. However, none of the vernal pools that have been identified in the Basin are either large or deep. Orcuttieae are almost always associated with pools that retain water into May or June (Crampton 1959, Crampton 1976, Griggs 1981, Griggs and Jain 1983).

Threatened Slender Orcutt Grass

Slender Orcutt grass was federally listed as threatened in 1997 (Service 1997*b*) and has been state-listed as endangered since 1979 (CDFG 1991). It was recognized as rare and endangered by the California Native Plant Society as early as 1974 (Powell 1974), is now included on List 1B, and is considered to be "endangered throughout its range" (Skinner and Pavlik 1994).

Description

Slender Orcutt grass occurs in valley grassland and blue oak woodland. It grows in vernal pools on remnant alluvial fans and high stream terraces and recent basalt flows. It has some ability to

colonize artificial habitats, such as the margins of stock ponds (Stone *et al*. 1988, Corbin and Schoolcraft 1989, CNDDB 2000).

Slender Orcutt grass grows as single stems or in small tufts consisting of a few stems. The plants are sparsely hairy and branch only from the upper half of the stem. Although the stems typically are erect, they may become decumbent if many branches form near the stem tip (Reeder 1982). The stems range from 5 to 20 cm (2.0 to 7.9 in.) in height (Schoolcraft in litt. 2000) and are approximately 0.5 mm (0.02 in.) in diameter. The terrestrial leaves are 1.5 to 2 mm (0.06 to 0.08 in.) wide. In slender Orcutt grass, the inflorescence comprises more than half of the plant's height, and the spikelets are more or less evenly spaced throughout the inflorescence. Each spikelet contains from five to 20 florets. The grains are approximately 3 mm (0.12 in.) long (Hitchcock 1934, Reeder 1982, Stone *et al*. 1988, Reeder 1993). In one study, seed weight ranged from 0.32 to 0.81 milligrams (mg)(1.1 to 2.8 x 10^{-5} ounces) (Griggs 1980). The diploid chromosome number of slender Orcutt grass is 26 (Reeder 1982).

Slender Orcutt grass is most similar to hairy Orcutt grass, but the former has narrower stems and leaves, branches at the upper nodes, larger spikelets that are not crowded on the rachis, larger seeds, a different chromosome number, and flowers earlier (Reeder 1982). Other *Orcuttia* species have unequal lemma teeth and also differ in seed size and chromosome number (Reeder 1982).

Historical and Current Range

By the mid-1980's, slender Orcutt grass was known from only 18 localities in Lake, Sacramento, Shasta, and Tehama counties (Reeder 1982, Stone *et al*. 1988). During the late 1980's, Stone *et al*. (1988) and others (CNDDB 2000) discovered 34 additional occurrences of slender Orcutt grass. Of the 52 occurrences reported prior to 1990, the majority (29 occurrences, 55.8 percent) were in the Northeastern Sacramento Valley Vernal Pool Region of Tehama County; most of those were in the vicinity of Dales, except for four occurrences on the Vina Plains. Another 14 occurrences (26.9 percent) were in the Northwestern Sacramento Valley Vernal Pool Region, on the Stillwater and Millville Plains of Shasta County. The Modoc Plateau Vernal Pool Region accounted for another six occurrences (11.5 percent), including four in Shasta County and two in Siskiyou County. The remaining three occurrences included two in Lake County, which was in the Lake-Napa Vernal Pool Region, and one in Sacramento County, in the Southeastern Sacramento Valley Vernal Pool Region (Griggs and Jain 1983, Stone *et al*. 1988, CNDDB 2000).

During the past decade, 27 new occurrences of slender Orcutt grass have been reported, including three that were introduced into created pools. Thus, a total of 79 occurrences are known, of which 73 are presumed to be extant (Corbin in litt. 1999, CNDDB 2000). In addition to the counties where it was reported historically, slender Orcutt grass is now known from Lassen and Plumas counties.

The primary area of concentration for slender Orcutt grass (42.5 percent of occurrences) is still in the vicinity of Dales, Tehama County, where 28 natural occurrences and the three introduced populations remain extant. Those 31 occurrences and the four in the Vina Plains of Tehama County are all in the Northeastern Sacramento Valley Vernal Pool Region (Keeler-Wolf *et al*. 1998). A secondary area of concentration for slender Orcutt grass is the Modoc Plateau Vernal Pool Region in Lassen, Plumas, Shasta, and Siskiyou counties with 22 extant occurrences (30.1 percent). The portion of Shasta County that is in the Northwestern Sacramento Valley Vernal Pool Region has 12 extant occurrences (16.4 percent). The Lake-Napa Vernal Pool Region accounts for two extant occurrences, both in Lake County, and the remaining two occurrences are in Sacramento County, in the Southeastern Sacramento Valley Vernal Pool Region (Stone *et al*. 1988, Corbin and Schoolcraft 1989, Corbin in litt. 1999, CNDDB 2000).

Reproductive Ecology and Demography

Optimal germination of slender Orcutt grass is achieved through stratification followed by warm days and mild nights (Griggs 1974 in Stone *et al*. 1988). Peak flowering of this species typically occurs in May in the Central Valley (Griggs 1981, Reeder 1982) but not until June or July on the Modoc Plateau (Corbin in litt. 2000, Schoolcraft in litt. 2000). Unlike hairy Orcutt grass and Greene's tuctoria, slender Orcutt grass is not likely to die when pools are flooded by late spring or summer rains. At two sites near Dales that were inundated by rains in May 1977, slender Orcutt grass plants dropped their existing inflorescences but resprouted and flowered again within one month (Griggs 1980, Griggs and Jain 1983). Moreover, the population at the Vina Plains Preserve in Tehama County experienced a second pulse of germination after summer rains in 1982 (Broyles 1983, in Alexander and Schlising 1997). Conversely, drought has been known to cause 100 percent mortality (Griggs 1980, Griggs and Jain 1983).

Similar to other vernal pool annuals, slender Orcutt grass populations can vary greatly in size from year to year. Fluctuations of up to four orders of magnitude have been documented in Lake and Shasta counties (Griggs 1980, Griggs and Jain 1983). At the Vina Plains Preserve, the single population ranged in size from 1,000 to 147,700 individuals during the five times it was reported over a 13-year period (Stone *et al*. 1988, Alexander and Schlising 1997). However, slender Orcutt grass populations do not always fluctuate in size. Among five populations of slender Orcutt grass that Griggs tracked from 1973 to 1979, two remained at the same order of magnitude for the entire period. Both were in the Dales area. None of the other five species of Orcuttieae included in the study remained stable for the full seven years (Griggs 1980, Griggs and Jain 1983).

Seeds of slender Orcutt grass germinate even in dry years, but the proportion of plants surviving to maturity varies. In a 1977 demographic study of two slender Orcutt grass populations near Dales and a third near Redding (Griggs 1980, Griggs and Jain 1983), survivorship ranged from 0 to 75 percent (average = 40 percent). At the two sites near Dales, densities of slender Orcutt grass were 694 and 1,530 per square meter (64.5 and 142.1 per square foot, respectively) in 1977 (Griggs 1980, Griggs and Jain 1983). At the Vina Plains Preserve, the single occupied pool had a density of 71 plants per square meter (6.6 per square foot) in 1995 (Alexander and Schlising

1997). Slender Orcutt grass produced an average of 58 seeds per plant in 1977, ranging from 11.3 to 163.9 among the populations studied. At one Dales-area site, the soil seed bank was estimated to be more than 14 times greater than the population of growing plants in 1977 (Griggs 1980, Griggs and Jain 1983).

Griggs (1980) and Griggs and Jain (1983) reported that most of the genetic diversity in slender Orcutt grass occurred among individuals with the same seed parent. He found nearly as much genetic diversity within a single population but little difference between populations. However, his study included only two populations from Tehama County, which were in close proximity. One of the Sacramento County populations differs considerably from other occurrences in outward appearance, suggesting that it may differ genetically (Cochrane in litt. 1995*a*).

Habitat and Community Associations

Slender Orcutt grass is found primarily on substrates of volcanic origin (Crampton 1959, Corbin and Schoolcraft 1989), on soils that range from slightly to strongly acidic (Stone *et al*. 1988) and from clay to sandy, silty, or cobbly loam (Corbin and Schoolcraft 1989, CNDDB 2000 and unprocessed data). Sacramento Valley populations occur on the Redding, Toomes, and Tuscan soil series (Stone *et al*. 1988, CNDDB 2000). Elsewhere, soil series have not been reported. Natural pools in which slender Orcutt grass grows are classified as Northern Volcanic Ashflow and Northern Volcanic Mudflow vernal pools (Sawyer and Keeler-Wolf 1995). However, this species also has been reported from other natural and artificially-created seasonal wetlands such as creek floodplains, stock ponds, and borrow pits. Impervious layers beneath occupied pools range from iron-silica hardpan to bedrock (Stone *et al*. 1988, Corbin and Schoolcraft 1989, CNDDB 2000).

Among the populations studied by Stone *et al*. (1988), the median area of pools occupied by slender Orcutt grass was 0.65 hectares (1.6 acres) and ranged from 0.08 to 45 hectares (0.2 to 111 acres). On the Modoc Plateau, occupied pools known as of 1989 ranged in size from 2 to 40 hectares (5 to 100 acres) and were typically at least 30 cm (11.8 in.) deep; this species was restricted to the deepest areas of these pools (Corbin and Schoolcraft 1989). Slender Orcutt grass occurs through a wide range of elevations corresponding to its broad geographical range. The lowest reported elevation was 27 m (90 ft.) in Sacramento County (Stone *et al*. 1988) and the highest was 1,640 m (5,380 ft.) in Lassen County (CNDDB unprocessed data).

Vegetation types in which the occupied pools occur are diverse, ranging from grassland and oak woodland to mixed conifer forest, silver sagebrush (*Artemisia cana*) flats, and sedge meadows (Crampton 1959, CNDDB 2000). Associated species vary throughout the range of slender Orcutt grass. Among the most common associates in the Sacramento Valley are vernal pool popcorn flower, pale spikerush (*Eleocharis macrostachya*), coyote-thistle, whiteflower navarretia, and water shamrock. At other locations throughout northern California, slender Orcutt grass occurs with a wide variety of plants, including various species of *Downingia, Eryngium*, and *Navarretia* (Stone *et al*. 1988, Corbin and Schoolcraft 1989, Alexander and Schlising 1997, CNDDB 2000). Although slender Orcutt grass grows in the same vernal pool

complexes as hairy Orcutt grass in Tehama County (including the Vina Plains Preserve) and Sacramento Orcutt grass in Sacramento County, it has not been found to share any pools with either species (Stone *et al*. 1988, Cochrane in litt. 1995*a*, Alexander and Schlising 1997, CNDDB 2000).

Reasons for Decline and Threats to Survival

Urban development in the vicinity of Redding has extirpated or caused the severe decline of five slender Orcutt grass occurrences through construction activities and hydrological alterations (Griggs and Jain 1983, CNDDB 2000). Agricultural conversion apparently eliminated the species from the type locality. Although the exact location of the type collection is not known, the general area was being used for crop fields and both irrigated and dry pastures as of 1987 (Stone *et al*. 1988).

Urban development is continuing in the vicinity of Redding and could eliminate the remaining populations in that area. A variety of other factors are contributing to the continued decline of slender Orcutt grass including off-road vehicle use, inappropriate livestock grazing, altered hydrology, and competition from other plants (Stone *et al*. 1988, Corbin and Schoolcraft 1989). Off-road vehicle use is a particular problem near Redding and in forested areas of the Modoc Plateau. According to Stone *et al*. (1988), "moderate" livestock grazing in spring is compatible with slender Orcutt grass but overstocking, summer grazing, and trampling pose threats to several occurrences. However, grazing may be necessary to control aggressive competitors such as the native species, pale spikerush (Witham in litt. 2000). Altered hydrology contributes to the decline of slender Orcutt grass by creating conditions unsuitable for its germination, growth, or reproduction, and by promoting the growth of competing plant species.

Status with Respect to Recovery

Four natural occurrences of slender Orcutt grass are in designated preserves. These include the Trust for Wildland Communities' Boggs Lake Preserve in Lake County, The Nature Conservancy's Vina Plains Preserve in Tehama County, and two occurrences on CDFG's Dales Lake Ecological Reserve in Tehama County (Broyles 1987, Stone *et al*. 1988, CNDDB 2000). All four populations are monitored annually (Baldwin and Baldwin 1989*a*, Baldwin and Baldwin 1989*b*, Baldwin and Baldwin 1991, CNDDB 2000). A conservation area containing a population of slender Orcutt grass was recently established in Sacramento County to compensate for impacts to vernal pools (Fuller in litt. 2000). An unknown number of additional occurrences are protected from development by conservation easements; one is in Shasta County (CNDDB 2000), and the others are in the Dales Lake area of Tehama County, where a private landowner put more than 16,188 hectares (40,000 acres) of ranch land into a conservation easement in cooperation with The Nature Conservancy (Witham in litt. 2000).

Introductions of slender Orcutt grass have been attempted at two privately-owned sites. In 1978, slender Orcutt grass was seeded into two adjacent "ponds" in Chico, Butte County. Fewer than 100 plants grew in the two ponds that year or in 1979 (Griggs 1980), which was the last time the population size was reported. The other introduction was in 1982, when slender Orcutt grass was seeded into an artificial pool in Shasta County. As of 1987, the population was thriving (CNDDB 2000), but its current size is not known. An unintentional introduction may have taken place at the Dales Lake Ecological Reserve. In 1995, slender Orcutt grass appeared in 11 of 21 artificially-created vernal pools there, possibly because its seeds were contained in plant litter from nearby natural pools that was spread on the surface of the created pool (Witham in litt. 2000). The CNDDB (2000) considers those 11 pools to comprise three element occurrences, but the populations may not be viable; very few plants were found in 1995 and only one of the pools still supported slender Orcutt grass in 1999 (Witham in litt. 2000).

Twenty-seven of the 73 (37.0 percent) extant occurrences of slender Orcutt grass are wholly or partially on federal land. Seventeen of these are managed by the U.S. Forest Service, primarily the Lassen National Forest, although one is on the Shasta-Trinity National Forest. The other ten are on lands operated by the U.S. Bureau of Land Management; nine of these are in the Redding Resource Area and the other is in the Alturas Resource Area. Two of the occurrences on the Lassen National Forest, Adobe North and South Vernal Pools, are within an area that has been proposed as a Research Natural Area (Corbin in litt. 2000). The Green Place Reservoir occurrence in Shasta County is within a Wilderness Study Area and has been jointly proposed by the U.S. Bureau of Land Management and the Lassen National Forest as a Research Natural Area (Schoolcraft in litt. 2000). The Lassen National Forest and Susanville District of the U.S. Bureau of Land Management jointly prepared a management plan for slender Orcutt grass sites under their administration (including those in the Shasta-Trinity National Forest) in order to ensure the long-term survival of the species (Corbin and Schoolcraft 1989). Actions identified in that plan included avoidance of known populations, maintenance of natural hydrology, monitoring selected populations, and surveys in suitable habitats. As a result of the plan, several areas have been fenced to exclude livestock and a considerable number of additional populations have been discovered (Corbin in litt. 1999, CNDDB 2000, Corbin in litt. 2000, Schoolcraft in litt. 2000).

Status within the Action Area and Environmental Baseline

A review of CNDDB (2002) revealed that slender Orcutt grass had been reported 84 times in California. Slender Orcutt grass has not been recorded from Sutter County or the Basin. However, it has been reported twice from Sacramento County. The closest reported slender Orcutt grass record to the Basin is approximately 14 miles away in north-central Sacramento County.

The Natomas Basin supports limited amounts of potential slender Orcutt grass habitat. Potential habitat of approximately 21.3 acres occurs in the vernal pools on the east side of the Basin, in 886 acres of grasslands primarily north of Del Paso Road. This estimate of vernal pool acreage is based upon assessments of the amount of vernal pool habitat per acre of grasslands in

Sacramento County and probably greatly overestimates the actual amount of vernal pool habitat per acre of grassland in the Basin (K. Fuller, pers. comm. to C. Aubrey, 2003). Additional potential habitat occurs in 96 acres of other ponds and seasonally wet areas in the Basin. However, none of the vernal pools that have been identified in the Basin are either large or deep. Orcuttieae are almost always associated with pools that retain water into May or June (Crampton 1959, Crampton 1976, Griggs 1981, Griggs and Jain 1983).

Endangered Sacramento Orcutt Grass

Sacramento Orcutt grass was federally listed as an endangered species in 1997 (Service 1997b) and has been state listed as endangered since 1979 (CDFG 1991). The California Native Plant Society has included it on lists of very rare and endangered plants for over two decades (Powell 1974); Sacramento Orcutt grass is currently on List 1B, with the highest endangerment rating possible (Skinner and Pavlik 1994).

Description

Sacramento Orcutt grass has unequal lemma teeth, unlike hairy and slender Orcutt grasses. Both California and San Joaquin Valley Orcutt grasses have unequal lemma teeth but can be distinguished from Sacramento Orcutt grass by the length of the lemma and its teeth and bristles, the size and density of the inflorescence, and the size of the seeds. Moreover, the chromosome number of Sacramento Orcutt grass differs from all other *Orcuttia* species (Reeder 1982).

Historical and Current Range

Sacramento Orcutt grass is endemic to the Southeastern Sacramento Valley Vernal Pool Region (Keeler-Wolf *et al*. 1998) and has always been restricted to Sacramento County. The earliest collection was from 1936 near Phoenix Field. Three other occurrences documented in 1941 and 1958 extended the range north to Orangevale and south to near Sloughhouse. Sacramento Orcutt grass was introduced to Phoenix Park, Sacramento County, in 1978. Three additional natural occurrences were discovered in the late 1980's, including one in extreme southeastern Sacramento County near Route 104. Thus, by 1990, this species was known from a total of seven natural occurrences and one introduction (Stone *et al*. 1988, CNDDB 2000).

Within the past decade, Sacramento Orcutt grass has been discovered at one new site in Sacramento County, within the previously known range. However, one entire occurrence and a portion of another have been extirpated. Thus, eight of the nine occurrences are extant. Five occurrences, comprising more than 70 percent of the occupied habitat, are concentrated into a single area of approximately 6 km^2 (2.3 square miles) east of Mather Field. Two other occurrences are adjacent to each other: Phoenix Field Ecological Reserve and the introduced population at Phoenix Park. The eighth extant occurrence is near Rancho Seco Lake (Stone *et al*. 1988, Cochrane in litt. 1995*a*, Morey in litt. 1996, CNDDB 2000). All occurrences are in the Southeastern Sacramento Valley Vernal Pool Region (Keeler-Wolf *et al*. 1998).

Reproductive Ecology and Demography

Sacramento Orcutt grass flowers in May and June (Griggs 1977, Skinner and Pavlik 1994, Cochrane in litt. 1995*a*) and sets seed in June and July (Holland 1987). The plants are adapted for wind pollination but do provide a source of pollen for native bees (Griggs 1974, in Stone *et al*. 1988). Seeds likely do not disperse far under natural conditions. In a 6-year period, an experimental population spread at most 3 m (10 ft.) from the seed source, and 95 percent of plants were within 30 cm (11.8 in.) of the source (Holland in litt. 1986). A demographic study conducted from 1974 to 1978 (Griggs 1980, Griggs and Jain 1983) indicated that Sacramento Orcutt grass produced an average of 500 seeds per plant. At one site in 1978, 88 percent of plants survived to maturity. The size of the seed bank stored in the soil was approximately 44 times as great as the population of growing plants (Griggs 1980, Griggs and Jain 1983). The number of plants varies with rainfall. Large numbers of plants grow only in years when seasonal rainfall exceeds 40 cm (15.7 in.), particularly when heavy rains begin in November and continue through the end of April (Holland 1987). This species is less likely to germinate in years of below-normal precipitation than other members of the tribe (Griggs 1980, Griggs and Jain 1983).

In studies of enzyme systems, genetic diversity between populations of Sacramento Orcutt grass was low. However, plants from the primary area of concentration had alleles that did not occur in other areas. The amount of genetic variation occurring among related individuals was approximately equal to that within populations (Griggs 1980, Griggs and Jain 1983).

Habitat and Community Associations

Sacramento Orcutt grass has been found in Northern Hardpan and Northern Volcanic Mudflow vernal pools (Sawyer and Keeler-Wolf 1995). It occurs on high-terrace sites (Stone *et al*. 1988) at elevations of 46 to 82 m (150 to 270 ft.) (CNDDB 2000). Occupied pools occur in blue oak woodland and annual grassland (Crampton 1959, Griggs 1977, CNDDB 2000). Among occupied pools discovered prior to 1988, the median area was 0.28 hectares (0.69 acres) and ranged from 0.1 hectares (0.25 acres) to 0.82 hectares (2.03 acres). Soils underlying pools where Sacramento Orcutt grass grows are acidic with an iron-silica hardpan (Stone *et al*. 1988), and the pools contain numerous cobbles (Crampton 1959, Stone *et al*. 1988). Most of the known occurrences are on soils in the Redding series, but at least two are in the Pentz-Pardee-Red Bluff association (Stone *et al*. 1988).

The most common associates of Sacramento Orcutt grass are vernal pool popcorn flower, coyote-thistle, pale spikerush, and dwarf woolly-heads (Stone *et al*. 1988). Boggs Lake hedge-hyssop co-occurs with Sacramento Orcutt grass in one pool (Stone *et al*. 1988, CNDDB 2000). One population of slender Orcutt grass grows in the same vicinity as Sacramento Orcutt grass, but the two species have not been found together (Cochrane in litt. 1995*a*).

Reasons for Decline and Threats to Survival

One former occurrence of Sacramento Orcutt grass between Orangevale and Folsom was

eliminated by urban development. The species was extirpated from one pool near Grant Line Road by changes in hydrology: pool depth was increased artificially to provide a longer-lasting water source for livestock, which created conditions unsuitable for persistence of Sacramento Orcutt grass (Stone *et al*. 1988, CNDDB 2000). Although they have not been extirpated, extant occurrences at the Phoenix Field Ecological Reserve and the Phoenix Park Vernal Pool Preserve have been degraded by off-road vehicles and alterations to natural drainage patterns (Clark *et al*. 1998).

The remaining pools where Sacramento Orcutt grass grows are subject to a wide variety of factors that threaten the species' survival. Urban encroachment, which encompasses many activities, is the primary factor. One occurrence in the primary area of concentration could be destroyed by expansion of the county landfill (Cochrane in litt. 1995*a*); the precise area of expansion has yet to be determined. At present, trash from the landfill frequently blows into the pools (Cochrane in litt. 1995*b*). An industrial park and road widening threaten another one of the occurrences in the same area (Stone *et al*. 1988, Cochrane in litt. 1995*a*). The Phoenix Field Ecological Reserve and Phoenix Park occurrences are affected by excess runoff from lawns, ball fields, and roads; by herbicide and fertilizer applied in adjacent areas (Griggs and Jain 1983, Holland in litt. 1986, Stone *et al*. 1988, Cochrane in litt. 1995*a*, Morey in litt. 1996, Clark *et al*. 1998); and by dumping of landscape waste (Clark *et al*. 1998). Another threat at the Phoenix Field Ecological Reserve is invasion of garden plants (Clark *et al*. 1998). Recreational activities such as rollerblading (Witham in litt. 2000), biking, and horseback riding (Cochrane in litt. 1995*a*, Cochrane in litt. 1995*b,* Clark *et al*. 1998) also are damaging the Phoenix Park occurrence.

Competition from native plants such as pale spikerush and non-native plants such as mannagrass (*Glyceria* spp.) could displace Sacramento Orcutt grass (Stone *et al*. 1988, Cochrane in litt. 1995*a,* Cochrane in litt. 1995*b*, Clark *et al*. 1998). Livestock grazing during the growing season, or overstocking during winter grazing, may degrade habitat for Sacramento Orcutt grass; however, grazing may be useful in providing control of competing plants if appropriate timing and stocking rates can be determined (Griggs 1977, Stone *et al*. 1988, Cochrane in litt. 1995*b*).

Status with Respect to Recovery

Two reserves have been set aside to protect Sacramento Orcutt grass. The Phoenix Field Ecological Reserve encompasses 3.2 hectares (8 acres) and is managed by CDFG. The site has been fenced and only authorized persons have access. CDFG plans to install a drain to prevent urban and landscape runoff from entering the pools. Volunteers and agency personnel monitor the Sacramento Orcutt grass population periodically (Morey in litt. 1996, Clark *et al*. 1998). The nearby Phoenix Park Vernal Pool Preserve encompasses 5.7 hectares (14 acres) and is managed by the Fair Oaks Recreation and Park District. A low fence excludes motorized vehicles but allows foot traffic. Interpretive signs and a footbridge also have been installed (Clark *et al*. 1998).

Griggs (1980) studied the ecology, demography, and genetics of several species in the Orcuttiae

tribe, including Sacramento Orcutt grass. In the course of his research, he introduced local seeds into an unoccupied, natural pool in Phoenix Park. The introduction apparently was successful because the population has persisted and remained stable since 1978 (Cochrane in litt. 1995*a,* CNDDB 2000).

The Service funded a status survey for members of the Orcuttieae in the 1980's, which led to the discovery of several new populations (Stone *et al*. 1988). The CDFG sponsored a native plant recovery workshop in 1995 to develop recovery strategies for Sacramento Orcutt grass (Cochrane in litt. 1995*a*). Workshop participants have since conducted several tasks contributing to the species' recovery, including monitoring populations, assessing threats, and providing public education (Cochrane in litt. 1995*b*, Morey in litt. 1996).

Status within the Action Area and Environmental Baseline

A review of CNDDB (2002) revealed that Sacramento Orcutt grass had been reported nine times in California. Sacramento Orcutt grass has not been recorded from Sutter County or the Basin. However, it has been reported nine times from Sacramento County. Most of these records are from northeastern Sacramento County. The closest reported Sacramento Orcutt grass record to the Basin is approximately 15 miles away in northeastern Sacramento County.

The Natomas Basin supports limited amounts of potential Sacramento Orcutt grass habitat. Potential habitat of approximately 21.3 acres occurs in the vernal pools on the east side of the Basin, in 886 acres of grasslands primarily north of Del Paso Road. This estimate of vernal pool acreage is based upon assessments of the amount of vernal pool habitat per acre of grasslands in Sacramento County and probably greatly overestimates the actual amount of vernal pool habitat per acre of grassland in the Basin (K. Fuller, pers. comm. to C. Aubrey, 2003). Additional potential habitat occurs in 96 acres of other ponds and seasonally wet areas in the Basin. However, none of the vernal pools that have been identified in the Basin are either large or deep. Orcuttieae are almost always associated with pools that retain water into May or June (Crampton 1959, Crampton 1976, Griggs 1981, Griggs and Jain 1983).

Swainson's Hawk

The Swainson's hawk is listed by the State of California as a threatened species and is protected under the MBTA. Additional information on the life history of the Swainson's hawk can be found in CDFG's November 1, 1994, *Staff Report regarding Mitigation for Impacts to Swainson's Hawk (Buteo swainsoni) in the Central Valley of California* (CDFG 1994).

Description

The Swainson's hawk is a medium sized buteo (708 - 992 g [25-35 ounces]) with relatively long, pointed wings and a long, square tail. It occurs in three primary color phases (plumage morphs), including a light-morph, dark-morph, and rufous-morph. Some individuals are an intermediate morph, with variations of the three primary morphs (Estep 2001, in City *et al.* 2003). The dark-morph hawk differs from the light-morph in that it is entirely brown with a light patch under the tail. The trailing edges of the wings are slightly lighter in color than the leading edges. Both the dark and light morphs can have white undertail coverts. The third variation is a rufous-morph, which is characterized by a lighter color of brown with rusty barrings on the underparts. The Swainson's hawk soars with its wings held above the horizontal in a dihedral or "v" shape. When perched, its wings are slightly pointed and extend to or beyond the tail feathers (Estep 2001, in City *et al.* 2003).

Swainson's hawks are opportunistic foragers, flushing prey (rodents, insects and some birds) from fields, pastures and grasslands adjacent to their nests. In the Central Valley, their primary diet consists of small rodents, including meadow voles (*Microtus californicus*). During the summer months, the hawks consume large quantities of insects (Estep 1989).

Historical and Current Range, Movements

The Swainson's hawk breeds throughout western North America, including provinces of Canada and most states west of the Mississippi River (Dechant *et al*. 2001). It winters in grassland and agricultural regions from Central Mexico to southern South America (England *et al*. 1997).

Historically, the Swainson's hawk nested throughout lowland California. However, its current California nesting distribution is limited to the Mojave Desert, northeastern California, the Central Valley, and a few isolated locations in the Owens Valley (CDFG 1992b, 1994). The Swainson's hawk typically occurs in California only during the breeding season (March through September) and winters outside of the U.S. in Mexico and South America. The species was once thought to winter exclusively in Argentina. However, recent telemetry studies (satellite radio) have shown the species to winter in Mexico, with additional detections in Central America and South America. The Central Valley population migrates only as far south as Central Mexico (Estep 2001, in City *et al.* 2003). Additionally, 30 individual hawks have been wintering in the Delta for the past several years (Estep 2001, in City *et al.* 2003) and there are records of small numbers of Swainson's hawks wintering in southern Florida and Texas.

Essential Habitat Components and Use

Stringers of remnant riparian forest along drainages contain the majority (87 percent) of known nests in the Central Valley (England *et al*. 1995, Estep 1984, Schlorff and Bloom 1984). Swainson's hawks usually nest in large (12.2-18.3 m, 40-60 ft.) native trees such as valley oak (*Quercus lobata*), cottonwood (*Populus fremontii*), walnut (*Juglans* sp.), and large willow (*Salix* sp.) and generally do not utilize non-native trees (Estep and Teresa 1992). Nest sites are always

directly associated with high-quality foraging habitat (Estep 1989). The loss of foraging habitat is recognized as having the potential to cause the abandonment of breeding territories and to contribute to a continued reduction in the statewide breeding population (CDFG 1988).

The hawk's minimum foraging area depends upon the vegetation supporting the prey populations and the farming activities that make prey particularly susceptible to predation, such as reduction of cover after harvesting, discing, mowing, flood irrigation and burning. The hawk's highly active foraging behavior often results in birds traveling as far as 30 km from a nesting site (Estep, 1989). Hawk foraging ranges fluctuate annually in response to changing crop patterns, and seasonally in response to changes in prey accessibility and abundance (Estep and Teresa 1992). Communal foraging occurs, especially when agricultural fields such as alfalfa undergo some form of cutting or harvesting (Babcock 1995). Swainson's hawks have been observed foraging behind farm machinery (moving harvester blade or disc), capturing rodents that have become exposed from ground disturbance (Estep, 1989). Foraging ranges in fields with increased vegetation cover and reduced prey availability can be as large as 15,000 acres (Koford, 1992). Suitable cover types for foraging habitats, in order of suitability, include native grassland, agriculture soon after discing, alfalfa and other hay crops, fallow fields, lightly grazed pasture, combinations of hay, grain, and row crops, rice fields prior to flooding and after draining, and heavily grazed pasture. Unsuitable cover types for foraging habitats include vineyards, mature orchards, flooded rice fields, cotton, thistle in fallow fields and any crop where prey are unavailable due to high vegetation height and density (Estep 1989). Because of the distribution of remaining potential nest trees (i.e., narrow riparian bands), Central Valley hawks have shortest average inter-nest distance recorded to date (Estep 1989).

Reproductive Ecology

Swainson's hawks begin to arrive in the Central Valley from their wintering grounds in March to breed and raise their young. The species typically roosts and migrates in groups. Territories are usually established by April with incubation and brooding occurring through June. The earliest fledging of young occurs in July and the young remain with the parents for approximately one month following fledging or until the southern migration in early fall. Recent telemetry studies have shown that some fledglings leave the nesting area and their parents to join a juvenile group or remain alone before the fall migration (Estep 2001, in City *et al.* 2003). Males provision females while the females incubate the eggs. Later, both parents feed the young. Nesting success is inversely correlated with distance to foraging habitat (Woodbridge 1991).

Swainson's hawks show a high degree of nest fidelity and generally return to the same area in which they nested previously. They will investigate several nest sites within this "territory," and settle on one nest dependent on local disturbances, surrounding habitat variables, the proximity of other nesting raptors (i.e., great horned owls, redtail hawks, etc.), and nest condition, although this selection mechanism is not well understood. Some pairs may repair several nests before settling in on one nest site. In the case of juvenile birds, they may build and/or repair a nest and then leave without laying eggs. Therefore, in any given year, and any given area, depending on nest site availability, many of the available nest sites may not be used. Generally, in the

Natomas Basin, one in every three nest sites are used each year, based on annual surveys of successfully nesting Swainson's hawks (T. Roscoe, pers. comm., in NBHCP 2003).

Reasons for Decline and Threats to Survival

Swainson's hawks were once described as a very common raptor in California, found throughout the State's lowlands (Sharp 1902). Since the mid-1800s, the native grasslands have undergone a gradual conversion to agricultural uses. This habitat loss has caused a substantial reduction in the breeding range and size of the breeding population in California (Bloom 1980, England *et al.* 1995).

The loss of agricultural lands due to urban development is further removing essential Swainson's hawk foraging habitat throughout the mid-section of the Central Valley (Estep and Teresa 1992). Swainson's hawks are sensitive to habitat fragmentation and will avoid low density development even though suitable prey conditions may exist (Estep and Teresa 1992). They have not been found in apparently suitable urban areas in the Central Valley where foraging habitat is unavailable for 5-8 km (e.g., Lodi and Sacramento), thus requiring long-distance transport of prey throughout the entire nesting cycle. Rapid urbanization or crop changes near cities could cause the long-term decline of Swainson's hawks in existing urban neighborhoods (England *et al*. 1995). Additional threats are habitat loss due to riverbank protection projects, conversion from agricultural crops that provide abundant foraging opportunities to crops such as vineyards and orchards, shooting, pesticide poisoning of prey animals and hawks on wintering grounds, competition from other raptors, and human disturbance at nest sites.

Status with Respect to Recovery

Nesting surveys conducted periodically by CDFG indicate a relatively large and stable hawk population along the Sacramento River every three or four years. Populations of meadow voles, the principal prey item of adult Swainson's hawks in the Central Valley, vary cyclically, peaking every three to four years. Vole populations in the Basin appeared to reach a peak in 1999 (SHTAC 2000).

Historically, as many as 17,000 Swainson's hawk pairs may have nested in California (CDFG 1992b, 1994). Currently, there are 882 known extant nesting site occurrences in California (Estep 2001, in City *et al.* 2003). The proposed action is in the Central Valley population of hawks, which consists of an estimated 600 to 900 of the remaining breeding pairs. The overall Swainson's hawk population is considered to be declining (CDFG 1992b, 1994). However, the Central Valley's breeding population has remained stable over the past ten years (Estep 2001, in City *et al.* 2003).

Status within the Action Area and Environmental Baseline

More than 87 percent of the known nest sites in the Central Valley are within riparian systems (Estep, 1984; Schlorff and Bloom, 1984). This is primarily a function of tree availability and not a preference for large riparian stands or the presence of other components of a riparian forest. Swainson's hawks also nest in mature roadside trees, isolated individual trees in agricultural fields, small groves of oaks, and trees around farm houses (CDFG, 1992, 1994). The Sacramento River location affords the hawk relatively easy access to foraging uplands on either side of the river, including lands in Yolo County. Relative to the Basin specifically, information indicates that nesting sites and foraging activity occur throughout the Basin (Estep 2001, in City *et al.* 2003), again depending on the presence of suitable trees in proximity to upland foraging areas.

Estep (2002) monitored Swainson's hawk nesting in and along the Natomas Basin in 2002. Seventy hawk territories were identified and monitored; the majority of them were located along the banks of the Sacramento River. Nest trees included walnut, cottonwood, willow, eucalyptus, valley oak, ornamental mulberry, and sycamore. Forty-three of the total 70 territories monitored were active (i.e., at least one adult was active on the nesting territory). Of the 43 active sites, 24 were occupied by breeding pairs that successfully nested (i.e., reared at least one young to fledging). The remaining nineteen sites were either unsuccessful (N = 18) or could not be determined (N = 1). At the 18 failed nest sites, eleven nested but failed to rear young to fledging; seven were occupied by the adult breeding pair but did not attempt to nest. Although the number of nests and active nests has increased yearly since 1999, overall reproductive performance has remained relatively constant because the proportion of successful nests has declined. The number of young per successful nest has remained relatively stable and is consistent with the Sacramento Valley population as a whole.

The proposed action will occur within the range of the Central Valley population of Swainson's Hawks. Much of this population's nesting habitat has been lost to agricultural practices, flood control projects, and urban expansion (Estep 2002). These same factors have also contributed to an overall reduction in native foraging habitat (e.g., grasslands). Within the proposed action's action area, projects have been and continue to be conducted that likely degrade the baseline of the species. In 2001 and 2002, the County of Sacramento approved several small development projects (residential and commercial) in the Natomas Basin that likely resulted in the loss of Swainson's foraging habitat. These developments were discussed in a January 31, 2003, letter from the Service and CDFG to the County of Sacramento (Service File no. 1-1-03-TA-0052). Some of the County-approved developments were relatively close to Swainson's hawk nest trees, which may affect nesting success at those trees. However, the total amount of habitat converted was small (< 10 acres) and was dispersed throughout the southwestern portion of the Basin. The amount developed would not be considered urbanization. The Sacramento International Airport removed three Swainson's hawk nest trees in 2002, two of which had been active in 2001. The third had not been active for the last couple of years (J. Estep, pers. Comm. to Craig Aubrey, 2003).

The Natomas Basin currently supports approximately 328 acres of potential Swainson's nesting habitat (riparian = 124 acres, oak groves = 98 acres, tree groves = 106 acres) (Table 5). This does not include potential nesting habitat on the west side of the levee on the Sacramento River. The majority (80 percent) of nesting habitat is located outside of the proposed Permit Areas. The amount of potential Swainson's foraging habitat fluctuates and is dependant on the amount and composition of agricultural crops. There is currently a total of approximately 22,051 acres of potential Swainson's foraging habitat in the Basin. Non-rice crops represent the majority (16,686 acres). Additional habitat types include: alfalfa (371 acres), idle (1,464 acres), grassland (886 acres), pasture (674 acres), and ruderal (1,970 acres). About 40 percent of the potential foraging habitat is located within the proposed Permit Areas. Drained rice fields are also known to provide potential foraging habitat for the hawk. Therefore, when drained or fallow, a portion of the Basin's 22,693 acres of rice fields are potential foraging habitat for the hawk.

In their April, 2003, Addendum to the Technical Memorandum for the NBHCP (Technical Addendum), the applicants include a detailed analysis regarding potential suitable foraging habitat in the Basin (see Appendix K to the NBHCP). Using assumptions derived from the literature (e.g., Bechard 1982, Estep 1989, Estep and Theresa 1992), they classified the Basin's available foraging habitat according to habitat quality and temporal availability. They found: (1) the majority (almost 75 percent) of available foraging habitat is moderate in quality (Table 5); (2) only eight percent of potential foraging habitat in the Basin is considered high quality; and (3) most of the Basin's potential foraging habitat is not available during the hawk's nesting period, especially when considered in proximity to nest sites because most of the Basin's row crops are bot available as foraging habitat until the late summer and early fall crop harvest. The availability of foraging habitat in proximity to the nest during the nesting season is important because studies have shown that Swainson's hawk reproductive performance decreases with increasing distance between the nest and foraging habitat (England *et al.* 1997, Woodbridge 1991). The authors analyzed the effects of the project under three possible scenarios[3] in which mitigation would be implemented and determined: (1) in two of the three scenarios, although there was an overall decrease in the amount of available foraging habitat, the amount of foraging habitat available to the hawk throughout the nesting season increased; (2) the NBHCP's conservation recommendations directed the Conservancy to focus upland habitat acquisitions in the vicinity of Swainson's nests; (3) implementation of the NBHCP would result in a net increase in the amount of high-quality foraging habitat in the Basin, especially in the vicinity of nest sites; and (4) although some nest sites in the vicinity of the proposed development activities might be abandoned upon implementation of the proposed action, factors such as the existing surplus of nest territories and planned tree plantings in the Basin would prevent any significant adverse effects to the nesting population.

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[3]The authors evaluated these three potential scenarios in which the mitigation program would be implemented depending on the nature of the baseline habitat to be replaced by the mitigation in order to capture the full range of potential future baseline habitat conditions in the Natomas Basin.

Aleutian Canada Goose

The Aleutian Canada goose (goose) was federally listed as endangered on March 11, 1967 (32 **FR** 4001), reclassified as threatened on December 12, 1990 (55 **FR** 51112), and de-listed on March 20, 2001 (66 **FR** 15643). The State has not issued the goose any special status. Additional details of the physical description and life history of the goose can be found in the Aleutian Canada Goose Recovery Plan (Service 1991a).

Description

The Aleutian Canada goose is one of the smallest subspecies of Canada goose . Adults are slightly larger than a mallard duck (*Anas Platyrhynchos*), weighing 1.8-2.7 kg. Like all Canada geese, Aleutian Canada geese have a black head and neck with a white cheek patch, brown wings and back, a grayish-brown breast and belly, a white rump patch, and black legs and feet. The Aleutian Canada goose is distinguished from other Canada goose subspecies by its small size, short bill, and white ring encircling the base of the neck.

Wintering and migrating Aleutian Canada geese forage in harvested corn fields, newly planted or grazed pastures, or other agricultural fields (e.g., rice stubble and green barley). Lakes, reservoirs, ponds, large marshes, and flooded fields are used for roosting and loafing (Grinnell and Miller 1944, Service 1991). In winter, Aleutian Canada geese exhibit a crepuscular foraging pattern, roosting in large flocks during most of the day and night and flying to and from foraging areas during the hours around dawn and dusk.

Historical and Current Range

Historically, the Aleutian Canada goose nested on most of the larger islands in the Aleutian chain and in the Commander and northern Kuril Island chains. When it was listed in 1967, it was only known to nest on Buldir Island in the western Aleutian Islands. Subsequently, remnant flocks have been found on Chagulak Island in the eastern Aleutians, and Kaliktagik in the Semidi Islands.

The Aleutian Canada goose's major migration and wintering areas include coastal areas of Oregon and northern California and California's Sacramento and San Joaquin Valleys. The Aleutian Canada goose migrates between breeding and wintering areas from August to mid-March.

Reasons for Decline and Threats to Survival

The decline in numbers of Aleutian Canada geese and the reduction of their breeding range is attributed to predation by arctic fox (*Alopex lagopus*), which were introduced on many Aleutian islands by fur traders during the period from 1836 to 1930 (55 **FR** 239). The role of migration and wintering habitat loss in the historic decline of Aleutian Canada geese is not well understood. Changing land use practices, including the conversion of cropland and pastures to

housing and other urban development, and sport and subsistence hunting likely contributed to the historical decline (Service 1991).

Status with Respect to Recovery

Most historic nesting islands are protected and managed, in part, for Aleutian goose recovery by the Alaska Maritime National Wildlife Refuge (Service 1991). The overall population of Aleutian Canada geese has sustained a strong increase in numbers since 1990. The most recent and highest population estimate of Aleutian Canada geese from the Aleutian Islands is of birds from their staging area near Crescent City in spring 1998. This estimate suggests that the Aleutian Canada goose population now exceeds 27,000 individuals, compared to fewer than 800 birds in 1975. Since 1990, the annual rate of growth of the population, based on peak counts of birds in California, has averaged about 20 percent. The overall annual growth rate of the population since recovery activities began in the 1970s has been about 14 percent. The Service delisted the Aleutian Canada goose on March 20, 2001 (66 **FR** 15643).

Environmental Baseline and Status within the Action Area

Aleutian geese forage and roost in suitable habitats throughout the Sacramento Valley, including the Sacramento, Colusa, Butte Sink, and Sutter National Wildlife Refuges and the agricultural fields that surround them. The Butte Sink, in particular, is a major fall staging area for Aleutian geese. Aleutian geese migrate to this location in the fall, remain about 1.5 months, then continue south in December (Service 1991). Staging geese roost in flooded fields, ponds, and berms in rice fields in the Butte Sink, and fly out to surrounding agricultural fields to forage on waste grains and beans, and sprouting winter wheat. Approximately 40,000 acres of potential suitable winter habitat exists in the Natomas Basin (Table 6). The Aleutian Canada goose winters in areas both north and south of the Natomas Basin and occasionally seen as a winter transient foraging in the Basin.

Burrowing owl

The borrowing owl is classified by the State of California as a Species of Special Concern. It is classified as endangered in Canada and is listed as threatened or endangered in many of the states that it is known to inhabit (Rosenberg *et al*. 1998).

Description, Essential Habitat Components

The burrowing owl is a small, long-legged owl of open habitats that possesses a short tail, long, narrow wings, and flat head. It is often observed perched on the ground or on fence posts (Sibley, 2000). The burrowing owl generally inhabits vacated burrows created by small mammals, such as badgers (*Taxidea taxus*), ground squirrels (*Spermophilus* spp. and *Ammospermophilus* spp.), and foxes (*Vulpes* spp.) or artificial structures (e.g., culverts, wood debris piles, etc...) for nesting and shelter. It also uses the burrow as refugia from the daytime heat (Haug and Oliphant, 1990). Ground squirrel burrows are most often used by burrowing

owls in central California (Johnson, pers. comm.). At the Conservancy's Betts-Kismat-Silva and Ayala properties, owls use ground squirrel and muskrat burrows (Roberts, pers. comm.). Burrowing owls forage nocturnally on small mammals and may take invertebrates during the day (Haug and Oliphant, 1990). The species is often found in areas with few visual obstructions such as roadsides and other disturbed areas inhabited by ground squirrels. It also favors elevated places such as berms, levees, road and rail beds where it can overlook open lands (NBHCP 2003). Additional information about burrowing owls can be found in CDFG's *Staff Report on Burrowing Owl Mitigation* (CDFG, 1995).

Historical and Current Range, Movements

The burrowing owl is a neotropical migrant that occurs throughout the western United States, including portions of northern Mexico and southern Canada. Its breeding range extends from the Canadian prairie provinces through the western United States to southern California and Texas. The species is also locally distributed throughout suitable habitat in the Caribbean, Central America, and South America. The owl winters in the southern portion of its range (Haug *et al*. 1993).

There are two subspecies of burrowing owl in North America. The Florida burrowing owl (*Speotyto cunicularia floridans*) is located primarily in Florida and the Bahamas. The western burrowing owl (*S. c. hypugaea*) is located throughout Mexico, the western United States , and southwestern Canada (Haug *et al.* 1993).

California appears to have a nonmigratory population of burrowing owls (primarily in the Imperial Valley), as well as burrowing owls wintering from other regions. Burrowing owls in northern California are probably migratory, but little information is known about their migration habits (Haug *et al*. 1993). Burrowing owls in Natomas are non-migratory and resident (Johnson, pers. comm.). The owl is fairly uncommon along the coast north of Marin County, and rare east of the crest of the Sierra Nevada. Additional populations are reported from the Modoc Plateau and Great Basin region. Fragmentation or elimination of historic habitat and population declines have been noted throughout its range (NBHCP 2002).

Essential Habitat Components

Burrowing owls occupy open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation (e.g., campuses, airports, golf courses, perimeter of agricultural fields, banks of irrigation canals) (Natureserve 2000). They use well-drained, level to gently sloping areas characterized by sparse vegetation and bare ground such as moderately to heavily grazed pasture. Although specific habitat characteristics associated with burrowing owls vary by location, the three basic attributes of nesting habitat are: (1) available nest burros; (2) short or sparse vegetation; and (3) open terrain (Zarn, 1974). Burrowing owls forage in a variety of habitats including cropland, pasture, prairie dog colonies, fallow fields, and sparsely vegetated areas. In Saskatchewan, burrowing owls preferred foraging in dense, permanent grass-forb vegetation greater than 30 cm in height located in uncultivated areas and

right-of-ways. They also tended to avoid cultivated cropland and pasture (Haug and Oliphant 1990). Benedict *et al*. (1996), Warnock (1997), and Warnock and James (1996) stated that large, contiguous areas of native grassland are important for the species.

Reasons for Decline and Threats to Survival

Numerous factors have contributed to the owl's decline throughout its range including: (1) habitat loss, fragmentation, and degradation (e.g., agricultural practices, land development); (2) vehicle collisions; (3) rodent control measures; and (4) predation from domestic animals. Of these, habitat alteration and destruction is most important (Sheffield 1997). Habitat alteration and destruction as a result of development appears to be the most important recent influence on burrowing owl populations in central California. Agricultural practices such as the removal of ground squirrels, use of chemical herbicides on levees along irrigation canals, and increased use of insecticides and rodenticides likely also contribute to the owl's decline in central California (DeSante *et al.* 1997). Urbanization is likely a key threat to the species in the proposed action's action area.

Status with Respect to Recovery

Populations of the Florida burrowing owl are stable and are at no risk of extinction. In contrast, populations of the western burrowing owl are declining throughout the subspecies' range (Haug *et al.* 1993).

Burrowing owl populations are decreasing in California. DeSante *et al*. (1997) observed: (1) that only about 873 breeding pairs of owls existed in central California in 1991; (2) owls almost exclusively bred at lower elevations (where the majority of development is occurring); (3) the species was apparently extirpated in the last decade from Sonoma, Marin, Santa Cruz, and Napa Counties; (4) there was at least a 12 percent decrease in the number of breeding pairs in Central California between 1986 and 1991; and (5) there was at least a 23 percent decrease in the number of breeding groups in central California between 1986 and 1991. They also observed that burrowing owls in central California had been or would soon be reduced to three isolated breeding populations: (1) lower San Francisco Bay between Alameda and Redwood City; (2) Livermore; and (3) the Central Valley. Of the three remaining populations, the Central Valley was the largest with approximately 720 breeding pairs and appeared to have decreased the least between 1986 and 1991.

Little scientific information is available for the local burrowing owl population (e.g., home range information), but suitable habitat in the action area consists of areas with small mammal burrows and nearby foraging habitat. The Sacramento Regional County Sanitation District (SRCSD) monitors and manages burrowing owls at its Bufferlands facility south of Sacramento. The number of owls observed in annual surveys increased from 12 resident owls in 1991 to more than 20 in 1997, with as many as 38 birds observed in one survey (SRCSD 2002).

Status within the Action Area and Environmental Baseline

CNDDB (2002) lists 514 burrowing owl occurrences in the State; one of them is from Sutter and 25 are from Sacramento County. Four CNDDB occurrences are known from the Natomas Basin; three of them are presumed extant. Two of the three extant CNDDB occurrences are located within the City's and Sutter's proposed Permit Areas. CNDDB (2002) does not list all of the known owl occurrences (records were likely not submitted to CNDDB). There is presently a colony of burrowing owls located within the MAP Area (Thomas Reid Associates 2000), and colonies have been protected via the acquisition of the Betts-Kismat-Silva and Ayala reserves by the Conservancy (NBHCP EIR 2003). The Conservancy's Betts-Kismat-Silva and Ayala reserves include four owl sites (Roberts, pers. comm.).

The Natomas Basin has about 140 miles of canals and ditches and associated adjacent agricultural fields which are potentially suitable burrowing owl habitat. Due to the frequently changing conditions of the crop fields, occupied owl burrows are likely to be restricted to the canal and ditch banks which are mostly left undisturbed, except when bank stabilization is needed. The adjacent agricultural fields provide foraging habitat for the owls. Crop types that provide potential owl foraging habitat include alfalfa (371 acres), grassland (886 acres), and pasture (674 acres)(Table 7).

Loggerhead Shrike

The shrike is listed as threatened or endangered in 14 states, and is also listed as endangered in eastern Canada and threatened in western Canada. The Service designated it as a Migratory Nongame Bird of Management Concern in the United States in 1987. The shrike is designated as a state Species of Special Concern (CDFG 1992) and was designated as a Category 2 candidate for federal listing as threatened or endangered throughout its range in 1991. However, on November 15, 1994, the Service eliminated all subspecies of the shrike, except the migrant loggerhead shrike of the central, eastern, and southern United States, from the federal candidate list. The Service determined that populations of the other loggerhead shrike subspecies, including populations of the subspecies that occur in California, were more abundant or widespread than previously thought and were not subject to any identifiable threat (59 FR 58992, November 15, 1994). Therefore, no loggerhead shrike subspecies that occur in California are candidates for federal listing.

Description

The loggerhead shrike is a mockingbird-like songbird with a hooked and notched beak and a heavy build. It has slender legs and feet designed for perching. It ranges in size from 20 to 25 cm and has a wing span of 30 to 35 cm. The loggerhead shrike is gray with a black eye band and black tail. It has a white underbelly and white patch on the wing. Sex is indistinguishable from a distance. Juveniles are a lighter gray color on top then adults. Juveniles also have light gray barring on the breast (USACE, 1997).

The shrike preys upon insects, small rodents and small birds. It impales its prey on barded wire, and thorns in the fork of branches so that it can eat it (USACE 1997). The shrike's primary

spring and summer diet is insects. In the winter, it primarily fees upon small rodents (Fraser and Luukkonen 1986). The shrike is often observed perching on branches, fences or other structures with an unobstructed view its surrounding area. It drops off the perch before beginning a rapid flight low to the ground and glides upwards before perching. It has a rapid wing beat in flight.

Historical and Current Range

Deserts, shrub-steppes, and southern savannas were likely the shrike's main habitat types prior to 1800. Reforestation, abandoned fields and loss of habitat due to human development beginning in the 1930 pushed the shrike's populations from its northeast range (Cade and Woods 1997).

The expansion of agriculture and deforestation associated with settlement and western expansion of North America allowed for an expansion of the shrike's range. Logging practices and agricultural methods opened up addition breeding and feeding habitat for the loggerhead shrike (Cadman 1985). However, the development of new farming practices and the use of pesticides in central and southern Canada, throughout the United States and most of Mexico later caused the shrike's breeding and wintering range to contract. The shrike no longer breeds with regularity in the northeastern portions of its former range or in northern tier states of Michigan, Wisconsin, and Minnesota (CWS 1999). Loggerhead shrikes occasionally winter as far north as southern New England (Bent 1950). Eastern populations are not regularly found north of Oklahoma, Arkansas, Kentucky and Maryland (Miller 1931). The milder winters have allowed the species to extend its winter range into northern California, southern Pennsylvania, southern Nevada, northern Utah, central Colorado and southern and eastern Kansas (Hunter *et al*. 1995). The shrike's winter range also extends south into much of Mexico (Yosef 1996).

Essential Habitat Components

Habitat requirements include nesting habitat with nearby forging habitat. Nesting habitat requires shrubs or trees for nests that are isolated in short grass fields (Yosef 1996). Individuals may build nests in trees or shrubs from three to 6.1 m (20 ft.) from the ground (Fraser and Luukkonen 1990). They will require perches the allow for an unobstructed view of the surrounding area for hunting, as well as thorns, barbed wire, or other objects that can be used to impale or hang their prey.

Movement and Habitat Use

The loggerhead shrike prefers grassland habitat throughout its life cycle. It may use man-made or heavily altered habitat types to fulfill its habitat requirements. The shrike will use agricultural, pasture land and other man-made habitat types (Temple 1995). It requires isolated or thin patches of shrubs, trees or artificial perches like fences for nesting locations and perching locations for hunting. A site for impaling prey is also a necessary habitat feature. Winter habitat requirements are the same as the breeding habitat requirements (Yosef 1996). Nonmigratory populations will use the same region in the winter as they do other times of the year (Miller 1931).

Northern populations of loggerhead shrikes will migrate south into the United States from Canada. Areas with an annual average snow cover of ten to 30 days have less abundant winter populations (Miller 1931). Many of the southern populations of shrikes do not migrate. Nonmigratory populations use the same region in the winter as they do other times of the year (Miller 1931).

Reasons for Decline and Threats of Survival

Habitat loss and, to a lesser extent, the deleterious effects of pesticides have caused the shrike's populations to decline. The conversion of pasture lands and hayfields into row crops and urbanized areas has reduced the shrike's forging habitat. Modern framing practices have removed potential hunting perches (Brooks and Temple 1990). Abandonment and reforestation of fields has also reduced the forging habitat for the species. DDE and other organochlorines have been found in the tissue of adult shrikes and eggshells (Anderson and Dunzan 1978). Low concentrations of pesticides to kill young shrikes (Busbee 1977). Although the use of organochlorines in the United States has been banned, populations continue to decline. Collisions with automobiles may be minor factor in the decline of shrike populations. Suitable foraging habitat is often associated with roadsides.

Status with Respect to Recovery

Shrike populations have declined over much of the United States, especially in the central and eastern portions of the country. Shrike populations in the western United States declined slightly between 1955 and 1979 but currently appear to be stable. No recovery plan has been prepared for the shrike. Although current laws may protect the birds from trapping, killing or harassment, they do not protect the shrike's habitat. Therefore, no efforts are being made to reduce the most significant source of the shrike's decline.

Status within the Action Area and Environmental Baseline

The loggerhead shrike is common throughout most of lowland California (CDFG 1990). It is a non-migratory resident of the Natomas Basin, is known to breed in the Basin, and is observed regularly throughout Natomas Basin (Thomas Reid Associates 2000). Suitable nesting and

foraging habitat are common throughout the Basin. Several shrikes were observed on or near the Metro Air Park project site during a site reconnaissance conducted on March 23, 2000 (Thomas Reid Associates 2000), and three shrikes were observed along the eastern portion of the Plan Area during NBHCP habitat mapping surveys in 2001 (NBHCP 2003).

CNDDB (2002) only lists two occurrences of the shrike in California; both were from Riverside County. However, as indicated above, this is not indicative of the actual distribution or abundance of the species in the State or the project's action area. Several shrikes were observed on or near the MAP project site during a site reconnaissance conducted on March 23, 2000 (MAPPOA 2000). An additional three shrikes were observed along the eastern portion of the Basin in 2001 (May & Associates 2001).

IN THE NATOMAS BASIN, POTENTIAL FORAGING HABITAT FOR THE LOGGERHEAD SHRIKE PRIMARILY CONSISTS OF PASTURE, GRASSLANDS, PONDS AND SEASONALLY WET AREAS, CROPLANDS, ORCHARDS, AND RUDERAL HABITATS. SHRIKES ALSO COULD NEST IN TREES OR SHRUBS OCCURRING IN OR ALONG THE MARGINS OF THESE HABITATS. CANALS, RIPARIAN AREAS, AND OAK AND TREE GROVES ALSO PROVIDE NESTING OPPORTUNITIES FOR THIS SPECIES. BASED ON THE GIS, THE NATOMAS BASIN SUPPORTS APPROXIMATELY 23,350 ACRES OF POTENTIAL HABITAT FOR LOGGERHEAD SHRIKE. HABITAT TYPES THAT POTENTIALLY PROVIDE HABITAT FOR THE SHRIKE IN THE BASIN include: (1) alfalfa (371 acres); (2) grassland (886 acres); (3) non-rice crops (16,686 acres); (4) oaks groves (98 acres); (5) orchard (182 acres); (6) pasture (674 acres); (7) ponds and seasonally wet areas (96 acres); (8) riparian (124 acres); (9) ruderal (1, 970 acres); 10) rural residential (377 acres); (11) tree groves (106 acres); and (12) canals (1,778 acres)(Table 8). Potential foraging habitat for the shrike primarily consists of pasture, grasslands, ponds and seasonally wet areas, croplands, orchards, and ruderal habitats. Shrikes also could nest in trees or shrubs occurring in or along the margins of these habitats. Canals, riparian areas, and oak and tree groves also provide nesting opportunities for this species. However, the actual value of much of this habitat is probably limited. Additionally, only a portion of the potential habitat likely would be used by loggerhead shrikes because the species occurs in close association with small trees and shrubs that it uses as perch sites from which foraging bouts are launched and as nest sites. Small trees and shrubs are often not found in the middle of a field; rather, they occur sporadically along the margins of fields. Telephone lines along the roads also are used as perch sites. Because loggerhead shrikes forage by making short forays from perch sites, they would not use the inner portions of fields that occur at some distance from perch sites. Thus, loggerhead shrikes would predominantly use only the margins of fields and areas where there are perch sites. Considering the entire acreage of agricultural fields as potential habitat for loggerhead shrike likely overestimates the amount of habitat available to this species in the Natomas Basin.

Tricolored Blackbird

The Service (since 1995) considers the tricolor blackbird a Species of Concern (Service 1995) and CDFG has considered it a Bird Species of Special Concern in California since 1992.

Description

The tricolor was first described in 1836 and given the name "tricolored red-wing." In the mid 1900s the species was given its current name. There have been no subspecies described (American Ornithologist Union [AOU] 1998).

The tricolor is a medium-sized, sexually dimorphic blackbird. Males and females are strikingly similar in appearance to the common and ubiquitous red-winged blackbird (*Agelauis phoeniceus*, hereafter "redwing") with which they are sympatric (but do not hybridize). Adult male tricolors are entirely black to glossed bluish, with bright brownish-red lesser wing coverts forming a reddish patch (epaulet) on the wing shoulder and buffy white to pure white median coverts forming a distinctive white boarder to the epaulet (DeHaven 1975). Adult female tricolors are smaller than males, mostly black, with distinct grayish streaks, a whitish chin and throat, and a small but distinct reddish epaulet (DeHaven 1975). Immature (less than 2nd year) birds of both sexes, like redwings, are generally duller in color with more mottling and less distinctive epaulets.

Two other significant morphological distinctions between tricolors and redwings are: (1) the narrower and more pointed wing shape of tricolors; and (2) the somewhat longer and narrower bill of tricolors. Nevertheless, immature birds of the two species, and also adult females of the two species, are difficult for inexperienced observers to separate in the field. Distinctions between tricolors and redwings are especially problematic when the California race of the redwing (*A.p.californicus*) is involved, since it tends to lack the yellowish median covert boarder to the epaulet which is characteristic of other redwing races and helps to distinguish them from tricolors.

The tricolor is a relatively long-lived bird. From recoveries of banded birds, DeHaven and Neff (1973) showed that some individual tricolors survive up to 13 years. However, the available banding data was and still is insufficient for estimating annual survivorship.

Historical and Current Range

The tricolor is native to California where over 99 percent of the total population occurs (Beedy and Hamilton 1999). Tricolor distribution within California extends throughout the Central Valley, surrounding foothills, coastal areas, and scattered inland areas of northern and southern California (Beedy and Hamilton 1999). Small segments (less than 1 percent) of the population sporadically extend into scattered sites in Oregon, western Nevada, central Washington, and western coastal Baja California (Beedy and Hamilton 1999). Several occurrences on the fringes of the species' range are relatively recent phenomena, which may reflect either the increased focus of attention the species has experienced in recent decades or minor range extensions. However, there is no evidence that the species is undergoing any significant range expansion or

that its primary current range is substantially different from that described by Neff (1937), based on studies he conducted in the 1930s.

Reproductive Ecology

Tricolors are colony nesters which form the largest colonies of any North American passerine species. Under its colonial regime, the tricolor male only briefly defends a small area of up to a few square feet immediately around the nest(s), nests with 1-4 females (average 2), and (with females) forages in groups up to several miles from the colony site. The tricolors' synchronized colonial breeding may have been an adaptation resulting from the need to exploit a rapidly changing environment where the locations of secure nesting habitat and rich insect food supplies were ephemeral and likely to change each year (in Beedy and Hamilton 1997). Females breed in the first year, whereas males apparently defer breeding until at least year two (Orians 1963; Payne 1969).

Colony Distribution and Size

Over the past two decades, active breeding colonies of tricolors have been observed in 46 California counties, but most of the population and the species' largest colonies have regularly been recorded in the Sacramento and San Joaquin valleys (Beedy and Hamilton 1999). Colonies range in size from a few hundred birds (rarely as small as just a few dozen birds) to about 300,000 (Neff 1937), but the majority found during the 1930s by Neff (1937) and during the 1970s by DeHaven *et al*. (1975a) contained 1,000-10,000 birds. The most recent studies of the tricolor, beginning in the early 1990s show that many of today's colonies remain in the 1,000-10,000-bird range, but a significant number of larger colonies in the 25,000-50,000-bird range have also been located (in Beedy and Hamilton 1999). Overall during recent studies, most (greater than 60 percent) of the total range-wide nesting effort each year has been in the ten largest colonies, and in 1994, greater than 71 percent of all adult tricolors counted throughout the nesting season were associated with colonies of 10,000 or more birds (Beedy and Hamilton 1997). Also, the recent range-wide surveys of breeding colonies have demonstrated that in many years greater than two-thirds of all tricolor nests are found on private agricultural land (in Beedy and Hamilton 1997).

The annual concentration of such high proportions of the overall breeding population in just a few colonies which are often on private lands increases the risks of continued population declines of tricolors if perturbations to reproduction occur (Beedy and Hamilton 1997; RWD = Richard W. DeHaven's personal observations).

Nesting Substrates

Breeding colonies may establish over water or land and utilize a wide range of nesting substrates. In studies conducted prior to the 1990s, the most common substrates were cattail and bulrush marshes, and Himalaya blackberries (Neff 1937; DeHaven *et al*. 1975a). During the 1990s, along with these substrates, a significant number of colonies have been recorded utilizing

certain spiny grain crops, including barley and wheat grown for either grain or dairy silage (Beedy and Hamilton 1999). Sporadic nesting also occurs in other dense, protective vegetation such as willows, nettles, thistles, giant cane, and safflower, and at sites with various mixtures of the recorded wetland and upland vegetation types (DeHaven *et al*. 1975a; Beedy and Hamilton 1999).

In several recent years, over half of the total yearly breeding effort has occurred in Himalya blackberries (California blackberry is rarely utilized, perhaps due to its smaller clump-size, larger spines, and generally more robust cane structure) and other exotic, non-native plant substrates (in Beedy and Hamilton 1997). During one recent study, the overall reproductive success for entire colonies was higher in Himilaya blackberry colonies than in cattail marshes (Cook 1996), although great variation can occur between years (RWD).

The tricolors' nests are generally bound with grasses to upright plant stems from a 0.3 to 1.5 m (1-5 ft.) above the water or ground.

Insect Requirements

In addition to a spiny, thorny, or wetland-plant nesting substrate capable of supporting the nests and affording protection from weather and predators, another major tricolor breeding requirement is for a large supply of insects (for adults to feed nestlings) in proximity to, and in synchrony with, the colony's nestling production (in DeHaven *et al*. 1975a; DeHaven 2000a; in Beedy and Hamilton 1999). Insect foraging associated with any given colony may occur nearby (within sight of the colony) or extend out greater than ten miles; however, most foraging occurs within about 3 miles of the nesting site (Orians 1961a; Beedy and Hamilton 1997).

Tricolors opportunistically utilize locally available insect populations (Skorupa *et al*. 1980; Beedy and Hamilton 1997). Thus, the insect taxa utilized for nestling provisioning may vary widely by location or time, or both. For example, Beedy and Hamilton (1999) found extensive utilization of dragonfly larvae (Odonata) and lakeshore midges (Diptera) at different colonies. Crase and DeHaven (1977) and Skorupa *et al*. (1980) found other insect taxa broadly utilized for nestling provisioning, including Coleopterans (ground-dwelling beetles, water beetles, and weevils), Orthopterans, Arachnidans, Hemipterans, and others.

Nesting success at large colonies of tricolors in particular necessitates exploitation of concentrated and temporarily abundant insect food resources (Orians 1961b; Payne 1969). Often, suitable insect densities for provisioning nestlings of large colonies become available in response to insects being driven from the ground en masse by shallow flooding associated with agricultural or wetlands management. The most ideal shallow flooding occurs where livestock pastures (or silage fields) of alfalfa, hay, grain, or native grasses, which have recently been cut or grazed to optimal height (less than 15 cm [6 in.]; see below), are being flood-irrigated to stimulate additional forage production (DeHaven 2000a).

Such ideal habitat is often found in association with dairy operations, and dairies and livestock

feedlot operations have become an increasingly important component of many tricolor breeding habitats (Beedy and Hamilton 1999). For example, in 1994, over half of all observed tricolor nesting efforts were associated with dairies and their related/surrounding crops and agricultural uses (Beedy and Hamilton 1997); this included pastures, hay, and silage fields as well as tricolors using the feeding troughs or bunkers at dairies and feedlots (for both grain- and insect-gathering).
The flock-foraging behavior and characteristics of tricolors facilitates their locating and most efficiently exploiting insect food resources suitable to support their colonial breeding activity (Orians, 1961a; RWD). Large foraging areas may be needed by the species to locate the proper juxtaposition of abundant seasonal insect supply and protective nesting substrate capable of supporting a successful colony. Tricolors can quickly respond and begin nesting when such proper conditions are located.

Range-wide breeding surveys in recent years have shown that often, less than 85 percent of all foraging by nesting tricolors occurs on private agricultural land (in Beedy and Hamilton 1997). Tricolors generally do not forage over, or in, deep water greater than wading depth of 2.5-5 cm (1-2 in.). However, recently, birds from several breeding colonies nesting near flooded rice fields have been observed procuring insects from the fields while perching on the rice plants (Hamilton pers. comm., 2001 and report in prep.).

Water Requirement

The more recent studies of tricolors over the past decade have also cited the importance of a third breeding colony requisite: the presence nearby of open, accessible water (Beedy and Hamilton 1997; 1999). Water is necessary for tricolor drinking, preening, and bathing. While a strong association of colonies with such water is apparent, it is less clear whether the lack of such water constitutes a significant limitation on breeding substrate utilization (RWD).

Low-Value Habitats

Outside of dairy (or pasture and grazing)-associated habitats and crops, most cultivated agricultural crops are low in insect-foraging values for breeding tricolors. Examples of low-value, mainly non-habitat crops include: tomatoes, sugar beets, potatoes, beans, cole (Brassica spp.) crops, melons, cucumbers, peas, peppers, spices and herbs, and a wide range of other vegetables. Cotton fields, vineyards (grapes; berry crops), and orchards (fruit or nut crops) are particularly low in value, and are rarely utilized by tricolors for food gathering (RWD; Beedy and Hamilton 1997, 1999).

The large number of agricultural crop-types with low or no values for tricolor breeding is likely related to: (1) the relative lack of large concentrations of preferred insects in such crops; and (2) the tricolors' basic foraging strategy. Like other blackbirds, tricolors forage primarily in small groups or flocks in open spaces, where the vegetative ground cover is less than 15.2 cm (6 in.) in height and overhead cover is sparse or absent, thereby providing good visibility of aerial predators (DeHaven 2000a).

Occasionally, grain crops not associated with dairy operations, including ripening corn, oats, wheat, barley, sorghum, rye, and rice are utilized by tricolors for insect gathering and provisioning of young. More often, however, adult tricolors are found "milking" such crops and consuming the ripening seed heads as they mature during spring through fall.

Patterns Determined from Banding

Banding studies (i.e., Neff 1942; DeHaven and Neff 1973; DeHaven *et al*. 1975b) in which about 70,000 tricolors were banded through the early 1970s revealed:

1. During the annual post-breeding period, many tricolors from throughout the Sacramento Valley and San Joaquin Valley converge on the major rice-growing area near Colusa (in the Sacramento Valley), presumably because of abundant food (waste rice grain) and suitable roosting habitat (blackbirds utilize large [hundreds of thousands to greater than one million birds], mixed-species, communal roosts at night during fall and winter).

2. During winter, a sizable but variable proportion of the Central Valley tricolor population migrates to the San Joaquin Valley and San Francisco Bay-Delta area, with other tricolors wintering throughout fringe areas of their range, including foothill locations above 305 m (1,000 ft.) elevation adjacent to agricultural valleys.

3. During spring, roving flocks of tricolors begin to distribute back out to breeding areas. However, most individuals do not end up breeding where they were hatched or where they bred the previous year (although there may indeed be somewhat greater breeding site fidelity after the initial breeding; RWD). Breeding colony establishment is probably largely controlled by where abundant insects necessary for nestling provisioning are encountered by the roving flocks. Thus, the general distribution of breeding colonies can vary widely between years.

4. Some tricolors may travel nomadically the entire length of the Central Valley and from there into the Bay-Delta region, the northern and eastern plateau region of California, and southern Oregon. In short, Central Valley tricolors move nearly everywhere within the species' range, except no band recoveries have demonstrated any interchange with southern California (which could support a hypothesis that tricolors consist of two separate and largely distinct metapopulations). Thus, overall, a reasonable description of the tricolor is that it is largely a resident within California, but partly migratory within the Sacramento-San Joaquin drainage.

Despite most tricolors not nesting where they were hatched or had nested the previous year (DeHaven *et al*. 1975b), certain breeding sites do show site fidelity with the same location and substrate being used year after year. The consistently used sites may have the three essential breeding requirements–a protective nest substrate, water, and suitable insect-foraging habitat–available on a consistent basis (Beedy and Hamilton 1997;1999).

Habitat Use

Throughout their non-breeding periods, and particularly during winter, tricolors continue to forage in flocks. Such flocks may contain mixed blackbird species and sexes or be highly species and/or sex-specific. For example, during the 1970s, flocks estimated at from 50,000 to over 100,000 tricolors have been observed foraging, and on foraging flights, in the San Joaquin Valley and Bay-Delta area; some of these large flocks were less than 99 percent composed of adult male tricolors (RWD). Tricolors collected during food-habits studies in the fall and winter months in the 1970s had consumed by volume predominantly (88-91 percent) plant matter composed of rice, water grass, sorghum, oats and various other cultivated grains and wild seeds. Rice utilization was particularly high, at 49 and 37 percent, respectively, during the fall and winter periods (Crase and DeHaven 1978). The present non-breeding season food-habits of tricolors, including whether significant changes have occurred since the 1970s have not been assessed (RWD). Nevertheless, it is clear that irrigated and non-irrigated pastures (alfalfa, various hay crops, etc.) and grasslands of various kinds, dry seasonally-wet areas, dairies, livestock feedlots, and harvested grain fields continue to be important foraging areas for tricolors during their non-breeding periods (Beedy and Hamilton 1997, 1999; RWD) just as during breeding periods.

Reasons for Decline and Threats to Survival

Early in the twentieth century, widespread commercial hunting of blackbirds, including tricolors, occurred in California, partly for their commercial value and partly because of their depredations on agricultural crops. In one 5-year period during the 1930s for example, greater than 300,000 tricolors and redwings were killed and marketed for food in the Sacramento Valley alone (Neff 1937). As agriculture expanded in the State, blackbird depredations also increased, and blackbird "control" was expanded to include widespread poisoning of thousands of blackbirds annually for many decades up to about the mid-1960s.

Prior to 1989, under two depredations orders (50 CFR 21.43 and 21.44), such population control could be done without a Federal permit if birds were "committing or about to commit" depredations. However, effective November 15, 1989 [Federal Register 54(219):47524-47526], the Service modified these two previous depredations orders and began requiring Federal permits for such depredations control efforts. This gave the additional protection believed necessary for tricolors and several other birds, while still permitting control if and when necessary for the protection of California's agriculture.

More recently, in 1991, as tricolor populations appeared to be continuing a long-term population decline, the Service included the species as a candidate (Category 2) for federal listing as either Threatened or Endangered (Federal Register 59 [219]:58990). However, subsequent policy changes by the Service in 1995 eliminated the Category 2 designation and further listing action for the tricolor was curtailed.

Nevertheless, the most recent work suggests that this species' downward trend is continuing.

Relevant factors include further incremental habitat losses and direct losses during nesting, which, because of the species' colonial breeding, have the potential to affect thousands of nests and birds.

In the Central Valley, of the more than 4 million acres of wetlands estimated to exist at the start of modern, intensive development and reclamation in the 1850s, only about 560,000 acres (14 percent) remained by 1939. By the mid-1980s, freshwater emergent marsh acreage had been reduced to only about 243,000 acres (6 percent). In addition, the native perennial grasslands historically used by foraging tricolors were reduced by greater than 99 percent in the Central Valley and surrounding foothills (in Beedy and Hamilton 1997).

The early decades of modern development in California may have had little, if any, overall effect on tricolor populations. However, as agriculture, especially expansion of low-tricolor-value crops and urbanization expanded, critical thresholds were eventually exceeded beyond which tricolors were no longer able to continue adapting to cumulative habitat losses. Their populations began a gradual decline. The habitat losses, and downward population trend, are both continuing today.

Urbanization, which in most cases totally eliminates tricolor habitat, has been large and ever-intensifying throughout most of the important tricolor range areas. For example, just within the CALFED sphere of influence alone, over 1.4 million acres in the State are estimated to now be urbanized (Service 2000). This suggests that for the State as a whole, the loss of historical habitat, much of which served the tricolor, due to urbanization has likely been in the range of at least 2-3 million acres. And urbanization is continuing today at an ever-increasing pace.

Losses of tricolor habitat in the State to agriculture have also been quite large, are still continuing, and in some instances, are accelerating. Some 350 crops, including seeds, flowers, and ornamentals are produced in the State. Agricultural commodities include at least 13 field crops, 25 fruit and nut crops, 22 vegetable and melon crops, and numerous nursery products and cut flowers. In addition, the State produces at least 11 major categories of livestock and poultry products. A vast majority of these commodities are neither utilized by, nor otherwise useful to, tricolors.

Crops which do provide some limited values to the species in certain circumstances include barley, wheat, corn, and oats. In recent years, tricolors have been recorded nesting in dense fields of wheat, barley, and various other spinous, grain-crop hybrids being grown for dairy silage. And the species is known to feed on both ripening grain and waste grain left in fields following harvest. The Statewide acreage for barley, wheat, corn, and oats combined is usually about two million acres annually.

Probably the crop of highest recent historical value to tricolors is rice. During the 1970s, Crase and DeHaven (1978) found that rice was an important component of the tricolor's fall and winter diet. Although Statewide acreages of rice have remained relatively stable over the past quarter century at about 0.4-0.5 million acres annually, this crop may now have become much less

valuable to the species, which in turn may be resulting in a population-limiting factor during fall and winter (DeHaven 2000a). The drop in value of rice to tricolors is related to major changes in cultural practices.

From the time rice was introduced in the State early in the century to about the mid-1980s, rice fields were commonly burned in the fall following harvest. This practice resulted in abundant fall-winter food resources for blackbirds and other birds including waterfowl, in the form of waste rice seeds remaining on the ground in harvested fields. And burning of fields reduced or removed the rice straw, thus providing the "open" foraging conditions with less than 6-inch-tall vegetation, which is preferred by blackbirds. As a result, in the Sacramento Valley during the fall and winter months of the 1970s, it was quite common to observe huge foraging flocks of mixed blackbird species (including large numbers of tricolors) foraging in burned rice fields. Such flocks commonly contained tens of thousands of birds (DeHaven 2000a).

Conditions today are much different. Miller and Wylie (1996) have reported that in the past (i.e., until about the mid-1980s), rice fields harvested with conventional cutter-bar headers which cut off the rice heads, left rice stubble behind (which was burned) and rice waste grain on the ground totaling about 388 kg/ha. Today, use of cutter-bar headers has been largely replaced by new, faster technology called a "stripper header" which strips the seeds from the rice head. Although stripping results in roughly the same amount of waste rice remaining in harvested fields (Miller and Wylie 1996), it is much less available to blackbirds, because of the taller stubble left standing. This problem (for blackbird foraging) is further exacerbated because burning, which clears and opens fields for blackbird foraging, is being phased out because of environmental concerns. Moreover, an increasing amount of rice acreage is now being flooded in the fall following harvest. This provides high-value water bird habitat, especially for waterfowl, but generally precludes any significant foraging by blackbirds (DeHaven 2000a).

Clearly, the specific issue of availability of waste rice grain and the overall issue of fall-winter food resources and availability for blackbirds in the Central Valley, including tricolors, needs further study. How these factors may relate to the tricolors' observed and continuing population decline have not been studied. Clearly, problems for this species may not only be related to its breeding, as is being commonly assumed and reported by most recent investigators (DeHaven 2000a).

Besides rice (and occasionally the other spinous grain crops), the other main agricultural crop-type of importance to tricolors is hay. Hay is classified as either "alfalfa" or "other" by the California Agricultural Statistics Service (CASS). Together, these two hay classifications total about 1.5 million acres statewide annually. The benefits of hay fields, as well as irrigated and non-irrigated pastures, grasslands, and vernal pool/grassland complexes, is mainly for tricolor insect-foraging, especially during the breeding season. Generally, for tricolors to extensively use a particular field, it must have been grazed or mowed to reduce vegetative height to less than 15.2 cm (6 in.). Tricolors will generally not settle to the ground to forage in taller, very dense vegetation. Although there have been no confirming studies, with respect to hay fields, it is likely that modern, intensive pest control management practices implemented over recent

decades have substantially reduced insect-foraging opportunities in such crops (RWD).

Population Status

A number of studies were conducted on tricolors throughout the 1990s, including: (1) an historical breeding records analysis; (2) several annual State- or range-wide surveys of breeding colonies, beginning in 1994; and (3) a number of studies of breeding ecology. While these recent efforts have shown the species' geographic range mostly unchanged compared to the 1930s (Neff 1937) and 1970s (DeHaven *et al*. 1975a), they do provide strong evidence of a continuing overall population decline. In particular, Beedy *et al*. (1991) summarized all historical and recent breeding records, including unpublished reports and inventories, and through supplemental field surveys concluded that breeding tricolors had declined further since the DeHaven *et al*. (1975a) study era. In addition, extensive breeding colony surveys in 1994 and 1997, showed a 37 percent population decline in the later year (Beedy and Hamilton 1997; 1999). The recent population declines have been most apparent in historical strongholds of the species' range in the Central Valley, including Fresno, Kern, Merced and Sacramento counties, although range-wide losses are evident as well (Beedy and Hamilton 1997).

Recent extensive breeding-season surveys of tricolors in which dozens of participants canvassed all known breeding sites, except a few very sparsely used areas on fringes of the species' range, found these total numbers of individuals: 1994–369,000 birds; 1997–238,000 birds; 1999–105,000 birds; and 2000–163,000 birds (in Hamilton 2000). It is believed that these annual totals reflect most of the overall remaining breeding population of the species.

The consensus among recent tricolor investigators as well as the principal investigator from the 1970s work on this species (RWD) is that the tricolors' decline is resulting largely from continuing losses of nesting and foraging habitats due to agricultural conversions and urban expansions (e.g., Cook 1996; Beedy and Hamilton 1997, 1999; DeHaven 2000a). Range-wide losses of tricolor habitat due to such land-use changes have not yet been systematically quantified. However, a picture of the severity of the problem is evident in DeHaven's (2000a) recent report comparing tricolor breeding over a quarter-century observation period. In Sacramento County–a traditional stronghold of the species' breeding, for example, he found that the losses of habitat due to urbanization of thousands of acres in the Natomas, Elk Grove, and Galt areas, was striking. Similar striking losses of habitat have occurred from conversions of pastures, grasslands, hay, and grain fields to vineyards and orchards. For example, Sacramento County's grape acreage expanded 75 percent from 7,533 acres to 13,176 acres in just one recent 2-year (1996-1998) period, which was far ahead of the 50 percent increase rate for the State overall during the entire previous 10-year (1989-1998) period.

Status within the Action Area and Environmental Baseline

CNDDB (2002) lists 348 tricolor occurrences in the State; six of these are from Sutter and 79 are from Sacramento County. A nesting colony is located on the Conservancy's Betts-Kismat-Silva reserve in the eastern edge of the Natomas Basin. The colony nests in riparian scrub and its population has increased in recent years (Roberts, pers. comm.).

In the Natomas Basin, large canals, ponds and seasonally wet areas, and riparian habitat have the potential to support tricolor nesting colonies. For foraging, pasture, annual grassland, alfalfa, rice, and nonrice crops could be used in addition to the nesting habitats. Based on these definitions, the Natomas Basin currently supports about 1,998 acres of potential nesting habitat and 41,310 acres of potential foraging habitat (Table 9).

White-Faced Ibis

The white-face ibis was formerly included as a Category 2 candidate for listing as endangered or threatened (Service 1991b), but is now considered a species of concern. It is a Species of Special Concern in the State of California because of population declines in the 1960s and 1970s (Remsen 1978). Additional information can be found in the *Draft Recovery Plan for the Giant Garter Snake* (Service 1999).

Description

The white-faced ibis (*Plegadis chihi*) is closely related to the glossy ibis (*P. falcinellus*) and the puna ibis (*P. ridgwayi*) (Hancock *et al*. 1992) and is considered a full species (American Ornithologist's Union 1988, Sibley and Ahlquist 1990, Hancock *et al.* 1992). There are no recognized subspecies (American Ornithologist's Union 1998).

Adult white-faced ibis are medium-sized wading birds [total length 46 to 56 cm (18.1 to 20.0 in.), weight 450 to 525 g (15.8 to 18.5 ounces)], dark maroon-brown in color, with a long decurved bill that is thicker at the base than in curlews. The neck and legs are long; the bill and legs are blackish in color (Belknap 1957, Cogswell 1977, Ryder and Manry 1994). During the breeding season the plumage reflects iridescent purple, violet, and green; a white band of feathers separates the face from the forehead and extends completely behind the back of the eye; the legs and the irises are red; and bare facial skin turns reddish or purple (Belknap 1957, Cogswell 1977, Hancock *et al*. 1992, Ryder and Manry 1994).

Breeding white-faced ibis can be distinguished from breeding glossy ibis by the latter's brown iris, blackish facial skin, grayish legs, and lack of white encircling the back of the eye (Belknap 1957, Ryder and Manry 1994). Non-breeding adult plumage is similar in these two species except for the red iris (versus brown) in the white-faced ibis (Belknap 1957, Ryder and Manry 1994). In the wild, juveniles of the two species are difficult or impossible to distinguish (Hancock *et al.* 1992).

White-faced ibis forage largely on invertebrates and to a lesser degree on small vertebrates. Major food items reported include earth worms (Bray and Klebenow 1988), crayfish (Belknap 1957) and larval and adult insects (Belknap 1957, Capen 1976). Other foods include spiders, snails, leeches (Kaneko 1972, Capen 1976), small fish, and frogs (Belknap 1957).

White-faced ibis are highly gregarious and feed in loose flocks that can exceed 1,000 birds (Ryder and Manry 1994). They feed while walking by probing in soft substrates or at the base of vegetation (Belknap 1957, Kotter 1970, Bray and Klebenow 1988). Foraging white-faced ibis also secure food by snatching animals exposed on the soil surface (Capen 1976). In deeper water, they feed by sweeping their bills sideways while vibrating their mandibles rapidly in the water column (Belknap 1957).

Historical and Current Range

White-faced ibis occur in two disjunct populations, one largely in western North America and the other in the pampas of central and southern South America (Hancock *et al.* 1992). In North America, white-faced ibis winter primarily in Mexico and also in the Central and Imperial Valleys of California, coastal Louisiana, and Texas (Ryder 1967, Capen 1976, Ryder and Manry 1994, Shuford and Hickey 1996). Key areas of wintering white-faced ibis in California's Central Valley include the Delevan-Colusa Butte Sink Area, northwestern Yuba County, the Yolo Bypass, Grasslands Wetlands Complex, and Mendota Wildlife Area (Shuford and Hickey 1996). In southern California, wintering areas include the Imperial and Coachella Valleys, and the Prado Basin/Upper Santa Ana River Valley (Shuford and Hickey 1996).

The largest North American breeding colonies of white-faced ibis occur in Utah (Great Salt Lake), Nevada (Carson River Basin), Oregon (Harney Basin), and coastal Texas and Louisiana (Ivey *et al.* 1988, Taylor *et al.* 1989, Ryder and Manry 1994, Kelchlin 1997). Substantial colonies of nesting white-faced ibis have recently been reported in southeastern Idaho (Taylor *et al.* 1989) and in California. The largest recent breeding colonies in the Central Valley of California have been reported from Mendota Wildlife Area and Colusa National Wildlife Refuge. Reports of smaller breeding colonies of white-faced ibis in California's Central Valley since 1985 include the Woodland Sugar Ponds (Earnst *et al*. 1998), San Luis National Wildlife Refuge, and Tulare Lake Basin. White-faced ibis have also bred in California's Central Valley at South Wilbur Flood Area (Ivey and Severson 1984), Kern National Wildlife Refuge (Voeks and English 1981, J. Allen pers. comm. 1998), and Buena Vista Lake (Voeks and English 1981, Booser and Sprunt 1980).

The distribution of white-faced ibis before settlement by Europeans was likely greater than it is now because rapid human population growth during the last century has destroyed wetland habitat throughout its distribution in California (Frayer *et al.* 1989). Ibis breeding colonies have been destroyed at various historical locations throughout California, including Tulare and Buena Vista Lakes (Kern County) and San Jacinto Lake (Riverside County). Both of these areas also provided habitat for ibis during migration (Booser and Sprunt 1980).

Reproductive Ecology

White-faced ibis nest in colonies of varying size. Nesting in North America begins about mid-April and ends with fledged young in August or September (Kotter 1970, Kaneko 1972, Capen 1977, Ryder and Manry 1994). Reproduction is often asynchronous with courting, nest-building, incubating birds, and fledglings present concomitantly within larger colonies (Belknap 1957, Ivey and Severson 1984).

Usually three to four eggs are laid, approximately one every two days per nest (Kotter 1970, Kaneko 1972, Capen 1976, Kelchlin 1997). Both parents share with incubation, which lasts about 17 to 26 days (Belknap 1957, Kotter 1970). The parents also share with feeding their altricial (not capable of moving about on its own soon after hatching) young until fledging approximately eight weeks later (Kotter 1970). Mortality of young occurs from exposure to excessive heat, cold and rain, and predation by birds and mammals (Belknap 1957, Kotter 1970, Capen 1976). Usually one brood is attempted each nesting season except when an earlier nesting attempt fails (Capen 1976). Annual reproductive success has been reported to range from 1.42 to 2.99 chicks per clutch (Ryder and Manry 1994, Taft *et al.* 1995).

Nesting and wintering white-faced ibis concentrate locally in large numbers and also occur in lesser numbers over a wide area of its range (Ryder 1967, Booser and Sprunt 1980, Hancock *et al.* 1992). The white-faced ibis is well adapted to changes in environmental conditions such as drought and flooding (Ryder 1967). Therefore, use of specific areas can vary greatly from year to year depending on habitat conditions (Ryder 1967).

Most populations of white-faced ibis are migratory (Ryder 1967). Birds breeding in Utah, Nevada, Oregon, and Idaho migrate southerly to wintering grounds in Mexico, and the Central Valley and southern coastal regions of California (Ryder 1967, Ryder and Manry 1994, Kelchlin 1997). Ibis breeding in California's Klamath Basin also migrate south in winter. However, the proportion of California's breeding population that overwinters outside of California is unknown (E. Kelchlin pers. comm. 1998). White-faced ibis nesting in Louisiana and Texas are mostly resident (Ryder and Manry 1994). Individuals also wander and have been sighted in southern British Columbia, Alberta, Saskatchewan, Ohio, New York, Illinois, Florida, and Hawaii (Hancock *et al.* 1992, Ryder and Manry 1994).

Habitat Use

White-faced ibis typically nest over water in emergent vegetation such as hardstem bulrush (*Scirpus acutus*), baltic rush (*Juncus balticus*), and cattail (*Typha latifolia*) (Kaneko 1972, Capen 1976, Ivey and Severson 1984, Cornely *et al*. 1994, Taft *et al.* 1995). The height of the nest above water is variable ranging from near the water's surface to 137 cm (53.9 in.) above (Ryder and Manry 1994). Nests are constructed of the dominant emergent plants available (Ryder and Manry 1994).

Foraging occurs in flooded [less than 20 cm (7.9 in.) water depth] fields, pastures, open marshes

(Kotter 1970, Capen 1976, Bray and Klebenow 1988, Taft *et al.* 1995), mudflats, and edges of canals, ponds and ditches (Belknap 1957, Taylor *et al.* 1989). In Yolo, Sacramento and Colusa Counties, rice is preferred foraging habitat; ibis may be foraging primarily on crayfish (E. Beedy pers. comm. 1998). Flooded alfalfa is reported to be a preferred foraging habitat compared to irrigated pasture, wheat-barley, and corn (Capen 1976, Bray and Klebenow 1988). Nitrogen fixation by alfalfa and reduced tillage practices may contribute to greater invertebrate abundance for foraging ibises (Bray and Kebenow 1988).

White-faced ibis communally roost in dense vegetation over shallow water and in open sites. They are reported to roost in dense emergent vegetation such as reed (*Phragmites communis*), bulrush, and cattail (Belknap 1957, Kaneko 1972, Ryder and Manry 1994). They also roost in open marshes and small shallow ponds surrounded by dense emergent vegetation, and on exposed islands in the middle of ponds (Hancock *et al.* 1992, Shuford and Hickey 1996).

Other bird species that have been reported to nest in mixed colonies with white-faced ibis include great blue heron (*Ardea herodias*), double crested cormorant (*Phalacrocorax auritus*), great egret (*Casmerodius albus*), snowy egret (*Egretta thula*), cattle egret (*Bubulcus ibis*), black-crowned night heron (*Nycticorax nycticorax*), Franklin's gull, Forster's tern (*Sterna foresteri*) and American coot (*Fulica americana*) (Ryder 1967, Kotter 1970, Ivey and Severson 1984, Cornely *et al*. 1994, Taft *et al.* 1995).

Reasons for Decline and Threats to Survival

Low numbers of white-faced ibis in the western United States including California during the 1950s and 1960s have been attributed to a variety of human induced factors, including destruction of breeding habitat and pesticide effects (Ryder 1967, Booser and Sprunt 1980, Ryder and Manry 1994). Approximately 91 percent of wetlands [more than 1.8 million hectares (4.5 million acres)] in California have been lost to agricultural and urban development since the 1780s (Dahl 1990). About 98,000 hectares (243,000 acres) of potential ibis nesting habitat (emergent wetlands) were lost in the California Central Valley between 1939 and the 1980s (Frayer *et al.* 1989). Wetlands were also lost at high rates in other western states with important white-faced ibis breeding colonies: Idaho (56 percent wetland loss), Nevada (52 percent wetland loss), Oregon (38 percent wetland loss) and Utah (30 percent wetland loss) (Dahl 1990).

The agricultural pesticide DDT was used widely in the United States until its ban in the 1970s. DDE, a metabolic biproduct of DDT, is positively associated with egg shell thinning and cracking, and crushed eggs in birds including white-faced ibis (Capen 1976, Steele 1984, Henny and Herron 1989, Dileanis and Sorenson 1992, Dileanis *et al.* 1996). DDE concentrations greater than or equal to three to four parts per million have been associated with lower hatching success and reproductive output in white-faced ibis (Steele 1984, Henny and Herron 1989). White-faced ibis are considered highly susceptible to the toxic effects of DDE because DDE concentrations in body tissues have remained relatively high in this species, and the levels of DDE resulting in reproductive failure are lower in white-faced ibis compared to other bird

species (Capen 1976, Henny *et al.* 1985).

White-faced ibis continue to experience high concentrations of DDE, egg shell thinning, and reproductive failure in California and adjacent western states (Henny and Herron 1989, Dileanis and Sorenson 1992, Cornely *et al.* 1994, Dileanis *et al.* 1996). Ibis may be exposed to DDT used in agricultural fields in Mexico (Shuford and Hickey 1996). In the Imperial Valley of California, a major wintering area for white-faced ibis, DDE residues are among the highest reported in the United States (Setmire *et al.* 1993). DDE concentrations in white-faced ibis are among the highest of the birds sampled at the Salton Sea, California (Setmire *et al.* 1993).

A wide variety of agricultural pesticides are currently used as algicides, fungicides, herbicides and insecticides in California (Dileanis *et al.* 1996). Many pesticides in use are moderately to highly toxic; synergistic effects are largely unknown. White-face ibis are at risk to direct contact with pesticides during and shortly after application because they feed in and nest near agricultural lands (King *et al.* 1980). Ibis wintering in Mexico are at potential risk from pesticide contamination, excessive hunting, and habitat destruction (Hancock *et al.* 1992). The magnitude of these risks for white-faced ibis wintering in Mexico, however, has received little attention (Ryder 1967).

Because white-faced ibis depend on wetland habitat for nesting, increased competition in the Central Valley for water by urban, industrial, and agricultural uses may threaten the integrity of breeding habitat in the future. White-faced ibis wintering and breeding colonies close to large human populations such as the southern Sacramento Valley, San Joaquin Valley and the southern California region may be at risk from increasing human disturbance and loss of foraging habitat to urban development.

Status With Respect to Recovery

Numbers of overwintering white-faced ibis in the major wintering areas of California have tended to increase from the 1970s to the 1990s (Shuford and Hickey 1996). In the Sacramento Valley, wintering ibis were rare in the 1970s, with the highest counts of 11 birds in 1978 and 1979 (Shuford and Hickey 1996). In the 1980s, flocks of 225 were frequently seen at or near Colusa and Delevan National Wildlife Refuges, Colusa County. At Delevan National Wildlife Refuge in January and December 1994, 1,100 and 1,370 ibis were reported, respectively (Shuford and Hickey 1996). Aerial surveys of the Grasslands wetlands complex near Los Banos showed increases in ibis numbers from 100-300 in the early 1980s, to 500-700 in the mid to late 1980s, to 2,000-2,200 during 1992 to 1994 (Shuford and Hickey 1996). In 1985, Beedy (pers. comm. 1998) estimated about 800 adult ibis at the Woodland Sugar Ponds in Yolo County. Shuford and Hickey (1996) estimated that a minimum of 10,000 to 11,000 ibis wintered in California's Central Valley in 1994-1995. Between 2,000 to 3,000 ibis were in the Sacramento Valley, and up to 8,000 in the Grasslands wetlands complex during this time.

There are seven known ibis occurrences (rookeries) in California (CNDDB 2001). There are no known nesting occurrences in Sutter or Sacramento counties. The nearest known nesting

occurrence is in Yolo County, north of the City of Woodland. No suitable white-faced ibis nesting habitat occurs in the Natomas Basin, although approximately 20,000 acres of suitable winter foraging habitat (i.e., rice, alfalfa, and other agricultural fields) exists there (MAPPOA 2000). In the Sacramento Valley, wintering ibis were very rare in the 1970s, with the highest counts numbering only 11 birds in 1978 and 1979. Since then, they have increased in the Sacramento Valley, and white-faced ibis are now common in the Natomas Basin in the winter.

Overall numbers of white-faced ibis breeding pairs have tended to increase in the Central Valley of California since 1985. Ibis are not reported to have bred at Mendota Wildlife Area during 1985 to 1991. However, breeding ibis numbers at Mendota Wildlife Area represented approximately 95 percent of breeding ibis in the Central Valley during 1992 to 1997. Ibis numbers at Colusa National Wildlife Refuge increased from 1985 to 1989, but no nesting was reported there from 1990 to 1997.

Environmental Baseline

White-faced ibis are most-often associated with emergent wetland habitats, particularly for nesting. The elimination of marsh habitat from the Natomas Basin has precluded the ibis from nesting there. However, the ibis does commonly winter and forage in the Basin. The Natomas Basin supports about 25,000 acres of potential ibis wintering and foraging habitat including alfalfa fields (371), rice (22,693), canals (1,778), and ponds and seasonally wet areas (96 acres)(Table 10).

Bank Swallow

The bank swallow is listed by the State of California as a threatened species. It is a protected migratory bird in the United States and Canada (Schloriff 1992, Palmer-Ball 1996).

Description

The bank swallow (*Riparia riparia*) is approximately 12 cm long, has a wing span of 89-110 cm, and weighs 10-18 g. Adults have a grayish brown mantle, crown, rump and wing-coverts; a white throat with a distinct brown breast-band that extends to the belly and ends at a point; a black to brown-black bill; a dark brown iris; and black-brown or dark brown legs and feet. Adult males and females have the same color scheme but may be distinguished by the presence or absence of a brood patch (Lethaby 1996, Pyle 1997, Turner and Rose 1989).

Juvenile bank swallows can be identified from adults by whitish upperparts and a buffy pink wash to the throat, which they lose after one year (Lethaby 1996 and Pyle 1997). They have a horn-brown bill and pale yellow bill flanges that darken after the first month of fledging. The iris of juveniles is a lighter brown, and the feet and legs are flesh-brown or horn brown at fledging. The claws are dull yellow.

The bank swallow is a social bird that spends most of its life in a colony or migrating with mix-

species flocks. It develops colonies from ten to 2,000 birds. The bank swallow is an aerial feeder that forages over lakes and ponds, rivers and streams, meadows, pastures, and bogs (Stoner 1936, Gross 1942). It tends to avoid dense forests, woodland, deserts, and alpine areas. During breeding, its forging sites are usually 200 m from the colony (Mead 1979; Turner 1980, in Garrison 1999). The bank swallow feeds upon terrestrial and aquatic jumping or fly insects and larvae. It forages primarily from dawn to dusk (Hobson and Sealy 1987) and may feed singly, in pairs or in a flock. Flock feeding usually occurs when a colony is feeding on a local source of food (Stoner 1936, Turner and Rose 1989).

Preening can occur singly or in large groups. Preening in larger groups usually occurs during the migration period (Cramp *et al*. 1988, in Garrison 1999). Preening occurs on wires and vegetation, often spaced as closely as three to four cm or with shoulders touching (Meservey and Kraus 1976). Bank swallows are also known to dust-bathe in areas of loose bare soil (Hobson and Sealy 1987). A bank swallow will bathe in water by wading into shallow water or hitting the surface of the water briefly while flying (Cramp *et al*. 1988, in Garrison 1999). Sunbathing is done by spreading open both wings slightly away from body, ruffling feathers, and leaning to one side (Barlow *et al*. 1963).

Historical and Current Range

The breeding range for the bank swallow covers most of central and southern Alaska, most of Canada (except in the northern extremes), and across the northern half of the United States. The winter range is primarily in South America and the Pacific slopes of southern Mexico. The bank swallow can also be found in most of Europe and Asia during the breeding season and in Arabia and Africa during the winter. Its range has been changed in local areas where development, flood and erosion control projects has reduced the available nesting habitat.

In California, bank swallow colonies were found in Siskiyou, Shasta, and Lassen Counties. Colonies were also found along the Sacramento River from Shasta County south to Yolo County (Small 1994). Colonies in California range from sea level to 21,00 m above sea level (Campbell *et al*. 1997). The bank swallow was know to nest on coastal bluffs in southern California and riverbanks throughout the Central Valley and northern California. Current populations are concentrated on the banks of the Central Valley streams. Seventy-five percent of the current populations occur along the banks of the Sacramento and Feather Rivers (most on the Sacramento River upstream of its confluence with the Feather River). Other colonies are located along the central coast, from Monterey to San Mateo County. There are no breeding colonies remaining in southern California (Laymon *et al.* 1988). No suitable nesting habitat exists within the Natomas Basin.

Essential habitat components

The bank swallow requires vertical or near vertical dirt banks formed by erosion action on low-gradient, meandering streams or rivers, or bluffs or cliffs formed by storms, tidal action and wind-eroded banks along the coastline. Potential nesting sites need alluvial soils or other soil material that the bank swallow can dig a burrow in. Foraging areas should be near the colony and may include wetlands, open water, agricultural areas or grasslands.

Reproductive ecology

The bank swallow usually arrives at the colony site unpaired. In California, some of the flocks arrive at the colony site and spend most of their time foraging for food for two to three weeks before the rest of the flocks arrive. The later groups arrive at the colony site and begin to form pair bonds (Kuhnen 1985). The male secures a mate as he builds the burrow. Soon after he secures a mate and the burrow is finished, nest building begins. Building of the burrow usually takes four to five days; the nest takes one to three days to complete (Asbik 1976, Sieder 19870). Nest building has been observed as early as April 12 in California. However, egg-laying has been observed as early as April 11. A brood may be replaced if lost in the early or middle of the breeding period.

Egg incubation by the female begins one to two days before the clutch is complete (Petersen 1955, Turner and Rose 1989). The male only incubates the clutch when the female leaves the nest (Ellis 1982). The clutch is incubated for 13 to 16 days before hatching begins. Hatching may take two to three days to finish (Petersen 1955). Brooding begins after hatching and is continuous for the first two to three days, gradually decreasing and halting after seven to ten days. Females do all the brooding at night. Both parents brood during the day (Beyer 1938). Feeding of the hatchlings begins after hatching and ends three to five days after fledging. Both parents are involved in the feeding process, with the male predominating. Feeding rate increases as hatchling size increases. Fledging occurs in mid-July approximately 22 days after hatching. During fledging, the parents reduce the feeding rate of the hatchlings. The fledgling returns to the nest after first flight and stays in the burrow for four to five days before leaving the nest. The flock stays at the colony site about one week after the juveniles fledge (Turner and Bryant 1979, Petersen 1955; Cramp *et al*. 1988, in Garrison 1999).

Movements and Habitat Use

The bank swallow is a medium to long-distant migrant that migrates with mixed-species flocks, which may be as large as 5,000 to 9,000 birds (Bull 1985, in Garrison 1999). The flocks can be mixed with Barn, Cliff, Northern Rough-winged, and Tree swallows. The bank swallow usually leaves the wintering grounds in February (when nestlings fledge) and arrive in North America between early March and late May. It returns to the wintering grounds in Mexico, Central America and South America during late summer or early fall (Am. Ornithol Union 1998, Hilty and Brown 1986, Oberholser 1974, in Garrison 1999; Keller *et al*. 1986). The species arrives in California around early March and begins to leave for the wintering grounds in July and early

August (NBHCP 2003).

Nesting colonies are usually found along rivers, streams, lakes, coastlines, or in sand and gravel pits. The colony site is usually near open water at erosion sites, or areas exposed to wave wash (Hjertaas 1984, in Garrison 1999). The colony site is chosen by the colony before the individual burrow sites are chosen. The colony site selection is based on the colony size, breeding success of the previous year and available habitat. A colony site is more likely to be recolonized if the previous year was a successful breeding year (Freer 1979). The preferred burrow site is higher on the stream bank to protect them from predators (Sieder 1980). The burrow is dug with bill, feet and wings, which takes about 4 to 5 days to complete.

Both the male and female bank swallow roost in the burrow during nest-building and the beginning of the egg-laying period. During the egg incubation and brooding of young nestlings period the female would spend most of the time roosting in the burrow. During this period of time the male would roost on rocks, fences, trees, empty burrows or other available structures. The male bank swallow may occasionally roost in the burrow at night during the brooding period. In adverse weather several adults may roost in the same burrow. Young bank swallows would roost in the burrow about one week after fledging. After fledging and before the colony migrates, adults and juveniles roost on exposed rocks, vegetation, logs and other available structures (Cramp *et al*. 1988, in Garrison 1999). Migration roosts include vegetation at wetlands and marshes (Paton and Fellows 1994).

The average burrow depth in California is 61.5 cm long with an average entrance of 5.5 cm by 7.2 cm. The average distance between each burrow in California is 13.2 cm (Humphrey and Garrison 1987). Most of the colonies in California were found in the banks of rivers, lakes, streams, and coastlines at a rate of 105 to 111 colonies (Laymon *et al*. 1988). The colonies were located in the vertical face of the bank and bluffs in friable soils made up mostly of sandy, silty, loamy soils. In California, of the 22 sites recorded, 14 (64 percent) were located in sandy loam soil, 4 (18 percent) in loam sand soil, 3 (14 percent) in loam soils, and 1 (5 percent) in sand soils. The average height of the colony was 3.3 m (Humphrey and Garrison 1987). The average success rate of building and occupying a burrow in California is 59.6 percent (Garrison *et al*. 1987).

Reason for Decline and Threats to Survival

The bank swallow is sensitive to weather changes that effect successful foraging, cold weather during the migration, and cause banks to collapse (i.e., flood and rain events). Predation by birds or reptiles and the collapse of a burrow when predators are digging into the burrow also result in mortalities (Persson 1987). Collision with automobiles has contributed to the decline of bank swallow populations. Juveniles are more likely to be killed by vehicles then older bank swallows. However, loss of nesting habitat is the primary cause of decline of the species. For

example, California has lost most of its central and southern nesting habitat to flood and erosion control projects along streams and rivers (Garrison *et al*. 1987, Small 1994).

Status with respect to Recovery

In 1987, it was estimated that California had 111 colonies, with an estimated total population of 25,180 pairs. The Breeding Bird Survey estimated that between 1966 and 1991, North American bank swallow populations were stable. However, California nesting populations were reported to be declining at the same time (Humphrey and Garrison 1987).

A Recovery Plan for the Bank Swallow has been written in California. Along the Sacramento River, artificial banks and enhanced banks were built. In 1986, burrows were dug with a hand auger on the Sacramento River (Schlorff 1992, Garrison 1991).

Environmental Baseline

There are 171 known bank swallow occurrences in California (CNDDB 2001). One of these occurrences is extirpated. There are 35 bank swallow occurrences (all presumed extant) in Sutter County and seven occurrences in Sacramento County (all presumed extant). Although there is no suitable nesting habitat in the Natomas Basin, bank swallows from nearby nesting colonies have the potential to forage in the Natomas Basin and foraging could also occur during migration to nesting sites north of the Natomas Basin. The Natomas Basin supports about 43,000 acres of potential bank swallow foraging habitat including alfalfa (371 acres), grassland (886 acres), nonrice crops (61,686 acres), pasture (674 acres), ponds and seasonally wet areas (96 acres), rice (22,693 acres), riparian (124 acres), and canals (1,778 acres)(Table 11).

Northwestern Pond Turtle

The northwestern pond turtle (*Clemmys marmorata marmorata*) is a subspecies of the Pacific pond turtle (*C. marmorata*) and is a member of the family Emydidae (box and water turtles). It is considered a Species of Concern by Service and is a state Species of Special Concern. In 1993, the Service reviewed the status of the pacific pond turtle and found that listing was not warranted (Service 1993b). Both subspecies of the pacific pond turtle, however, are considered Species of Concern.

Description

The pacific pond turtle is a small (9-19 cm) aquatic turtle characterized by an olive, dark brown, or black shell with a spotted head and neck (Stebbins 1985). Ventrally, it is yellowish, sometimes with dark blotches in centers of the plasteral shield (Storm *et al.* 1995). The northern pacific subspecies is defined on the basis of its mottled head and neck coloration and a relatively high frequency of inguinal shields. The southern subspecies is defined on the basis of its light head and neck coloration with more prominent markings in these areas, and a reduced frequency of occurrence of large inguinal shields. The two subspecies of pacific pond turtle can be slightly

distinguished morphologically. *C. m. marmorata* has a pair of well-developed triangular inguinal scutes on the bridge and its brown or grayish neck and head are well marked with dark dashes. *C. m. pallida* has poorly developed inguinal scutes (missing in 60 percent of individuals) and its throat and neck are a uniform, light color (Ernst *et al.* 1994).

In both subspecies, the pacific pond turtle demonstrates sexual dimorphism at maturity. Holland (1994) noted over 20 different dimorphic characteristics between adult male and female turtles, although their gender can usually be identified by utilizing just a few. The degree of dimorphism is variable for each character and each individual, but generally adult males tend to have a flatter carapace, concave plastron posteriorly, thicker tail base with the cloacal opening at or beyond the margin of the carapace, larger head with a longer nose and pointier snout, and a larger neck with yellow or whitish chin and throat (Ashton 1997). The characteristics should be viewed in concert to determine gender, versus pinpointing a single characteristic. Juvenile males and females usually resemble adult females, but are smaller in size with relatively long tails.

The diet of pacific pond turtles is comprised primarily of small aquatic invertebrates, including crustaceans, insects and occasionally annelids (Holland 1994, Bury 1986). They may also consume small vertebrates, including fish and amphibians (Holland 1985, Bury 1986). Feeding on carrion of mammals, birds, reptiles, amphibians and fish is common (Evenden 1948; Carr 1952; Holland 1985, 1994; Bury 1986), but live prey is preferred (Bury 1986). Prey is ingested in the water, as the turtles are apparently unable to swallow in air (Holland 1991). Turtles infrequently forage on plants such as pond lily (*Nuphar polysepalum*), inforescences, willow and alder catkins and ditch grass inflorescences (Holland 1994), although post-partum females have been observed ingesting large amounts (up to 8.5 g) of tule (*Scirpus* sp.) and cattail (*Typha latifolia*) roots (Holland 1985).

Historical and Current Range

Fossil evidence indicates that pacific pond turtles have existed in the western United States since at least the late Pliocene (Hay 1908). In California, remains discovered at archaeological sites indicate that Indians ate them (Ernst *et al.* 1994). The northwestern pond turtle historically and currently ranges from Puget Sound, Washington, south through Oregon, generally west of the Sierra-Cascade crest, to the American River drainage in central California. The southern pacific subspecies ranges from the vicinity of Monterey Bay, California, south through the coast ranges to Baja California Norte, Mexico. The area of the Central Valley of California between the American River drainage and the Transverse Ranges is considered to be a zone of intergradation between the two subspecies (Seeliger 1945). Historically, the pacific pond turtle inhabited the vast permanent and seasonal wetlands on the Central Valley, with the Tulare Lake Basin being a stronghold for the species.

Records of *C. m. marmorata* from Grant County, Oregon, and British Columbia, Canada, are believed to represent introduced animals (Nussbaum *et al*. 1983, Storer 1937). Outlying populations of *C. m. marmorata* occur in Nevada primarily in the Truckee and Carson River

drainages.

Essential Habitat Components

The pacific pond turtle is found in fresh to brackish permanent to intermittent aquatic riparian habitats, including marshes, rivers, ponds, streams, and vernal pools. Pond turtles also may occur in man-made habitats, such as irrigation ditches, reservoirs, and sewage and mill ponds. Preferred aquatic habitat is characterized by slow moving or quiet water, emergent aquatic vegetation, deep pools with undercut banks for refugia, and partially submerged rocks and logs, open mud banks, matted floating vegetation, sandbars or warm water for thermoregulatory basking. Hatchling and young turtles (1 year) require shallow, slow-flowing water areas (less than 30 cm deep) dominated primarily by emergent aquatic reeds (*Juncus* sp.) and sedges (*Carex* sp.) (Holland 1991 and Reese and Welsh 1998). Pacific pond turtles have been located from brackish estuarine waters at sea level to mountains streams over 1,800 m in elevation.

Viable terrestrial habitat is nearly as important as sufficient aquatic habitat to the existence of pacific pond turtles. They have been documented as traveling on land during all times of the year (Reese and Welsh 1997). Even in the central and southern portions of its range where air temperatures are warmer, pacific pond turtles spend nearly four months a year on terrestrial sites (Rathbun *et al*. 2002). Characteristics of terrestrial habitats frequented by pacific pond turtles for basking, dispersal, nesting, overwintering and protection from predators are highly variable throughout its range, but some type of vegetative cover is required. Reese and Welsh (1998) found that the portions of the Trinity River in northwestern California containing nonvegetated shorelines were nearly absent of pacific pond turtles. Peak terrestrial activity occurs during nesting season for adult females and during an overwintering period for adults and hatchlings of both sexes. Reese and Welsh (1997) believe that the traditionally protected buffer zones along rivers is simply not adequate enough for the turtles. Holland (1994) advised 0.5 km from the known aquatic site of pacific pond turtles are needed to adequately protect nesting habitat and turtle populations. Rathbun *et al.* (2002) recommended that each site be assessed individually, due to the complex interaction of factors associated with terrestrial areas and behavioral flexibility of the pacific pond turtle.

Reproductive Ecology

The reproductive ecology of the pacific pond turtle remains poorly understood (Holland 1994). It is assumed that size and age determine first reproductive capability and it varies geographically and possibly altitudinally (Holland 1994). Most female turtles do not develop eggs until they achieve a carapace length of at least 120 millimeters (mm) (Holland 1994). The age of first reproduction is usually seven to nine years for the southern pacific pond turtle and ten to 14 years of age for the northwestern pond turtle (Holland 1994). Ashton (1997) reported that mating occurs underwater, typically in late April to early May, but may occur year-round (Holland

1994). Most females lay eggs in alternate years, although some females, particularly in southern and central California, oviposit annually (Holland 1994, Ashton 1997).

Known clutch size ranges from one to 13 eggs (average is four to seven), with larger females generally laying larger clutches (Holland 1985, 1991, 1994). Females may deposit more than one clutch a year (Rathbun *et al.* 1993, 2002; Scott *et al.* 2002; Lovich and Meyer 2002). The first clutch of 25 turtles studied in coastal streams of California had significantly more eggs than the second clutch with 27 to 43 days between each oviposit (Scott *et al.* 2002). From May through July, females move into upland habitat to nest, although observations of egg deposits have been recorded as early as late April and as late as early August (Storer 1930; Buskirk 1992; Rathbun *et al.* 1992, 1993; Holland 1994; Scott *et al.* 2002). Through hand palpation and x-radiography, Scott *et al.* (2002) and Lovich and Meyer (2002) reported that females carry shelled eggs from two to three weeks on average (recorded longest was 33 days) before oviposition.

Nest locations range from three to 585 m from aquatic habitat (Storer 1930, Holland 1994, Lovich and Meyer 2002). Nest sites are typically located in open areas dominated by sparse, low vegetation such as grasses and forbs, that allow long exposures to direct sunlight. Soils are dry and generally well drained with significant clay/silt content and have a low slope angle. Nests on sloping terrain often have a southern or southwestern exposure. Females empty the contents of their bladders to soften the soil, excavate their nests in the ground, deposit the eggs, and cover the nest by scraping soil and vegetation over the eggs. Time requirements for completion of the nest and oviposition varies from less than two hours to 86 hours (Holland 1994, Rathbun *et al.* 2002, and Lovich and Meyer 2002). Females tend to be very wary during overland nesting movements and may abandon nesting or delay attempts if even slightly disturbed (visually or audibly) or if they hit a rock or root during excavation (Holland 1991, 1994; Rathbun *et al*. 1992, 2002). Additionally, some female turtles have been observed producing one or more "false scrapes" in which they excavate a nest, but do not deposit eggs (Holland 1994). Incubation requires from 90 to 126 days in the wild with overall hatching rates at about 70 percent (Holland 1994). Hatching of the eggs occurs in the fall with hatchling sizes ranging from 23-31 mm in carapace length and 1.5-7 g (0.05-0.25 ounces) in weight with larger hatchlings occurring in the northern part of the range (Holland 1994). The majority of hatchlings remain in the nest throughout the winter and finally emerge in the spring. In southern and central California, a few records exist of some hatchlings emerging from the nest in late summer or early fall (Buskirk 1992, Holland 1994). Hatchlings that overwinter in the nest receive nourishment from an umbilical yolk sack (Holland 1994). Hatchlings double in size by the end of the first growing season (Holland 1991).

Survivorship in pacific pond turtles apparently is dependent on age. Hatchlings and first year juveniles are subject to low survivorship, averaging ten to 15 percent; survivorship may not increase significantly until turtles are four to five years old (Holland 1994). Once turtles achieve a carapace length of 120 mm, survivorship improves with an average adult turnover rate of three to five percent per year (Holland 1994). Under normal circumstances, pacific pond turtle populations consist of 55 to 70 percent adults. But in areas such as the Willamette Valley, Oregon where intense threats to juvenile survivorship exist, adult-bias populations average 90

percent (Holland 1994).

Movements and Habitat Use

In the majority of its range, pacific pond turtles are active from about March through October with the peak of activity in May and June in both aquatic and terrestrial habitats. Some turtles "overwinter" in aquatic sites such as the primary lake or pond they inhabit or other nearby ponds or pools. Turtles may also overwinter in undercut areas or holes in the banks of watercourses or move to upland habitat. It appears that most turtles that overwinter in aquatic habitats are found in lacustrine systems (lakes and ponds), whereas most turtles that overwinter in terrestrial sites are found in flowing-water systems (streams and rivers) (Holland 1994). Reese and Welsh (1997) suggested that the timing for turtles to overwinter was related to avoidance of flood conditions. An additional study supports that premise, but further surmises that subzero winter temperatures also regulated the timing of turtles seeking terrestrial refuge (Rathbun *et al.* 2002).

Turtles may move up to 260 m from aquatic habitat to overwinter under dense vegetation, logs or leaf litter (Holland 1994). Microhabitat characteristics of terrestrial overwintering sites are highly variable ranging from habitats of conifer to hardwood to woody shrubs. In northern California, Reese and Welsh (1997) studied 12 pacific pond turtles and determined that the turtles preferred terrestrial overwintering sites on relatively cool north- and east-facing slopes as opposed to south- and west-facing slopes. Rathbun *et al.* (2002) suggested the sites are a complicated interaction of factors involving elevation, moisture, slope, solar exposure and vegetative cover. Despite overwintering, most turtles still exhibit activity, although at a reduced level, including basking, foraging and moving between overwintering sites in subzero air and water temperatures (Rathbun *et. al* 2002, Reese and Welsh 1997, Holland 1994). Turtles may also engage in communal overwintering, with large numbers concentrated in a relatively small area (Holland 1994).

Bury (1972) found home ranges of pacific pond turtles to average 1 hectare (2.5 acres) for males, 0.3 hectare (0.7 acre) for females, and 0.4 hectares (1 acre) for juveniles. Within the northern California stream system studied by Bury (1972), males moved greater distances than females or juveniles. Turtles move significant distances (at least 2 km) if the local aquatic habitat changes (e.g., disappears), and adult turtles can tolerate at least seven days without water (Holland 1994). Nevertheless, dispersal abilities of juveniles and the recolonization potential of pacific pond turtles after extirpation of a local population are unknown.

Reasons for Decline and Threats to Survival

Adult males typically have a higher probability of survivorship than adult females, with skewed sex ratios observed as high as 4:1 males to females (Holland 1991). The most plausible explanation for these observed sex ratios is that females suffer higher rates of predation during overland nesting attempts (Holland 1991). Females display a rate of scarring on the shell up to six times greater than males, usually indicating attempted predation by mammals (Holland 1994). Adults are long lived, the maximum life span being approximately 40 years (Bury and

Holland unpubl. data).

Habitat loss and alteration are the primary factors that caused the historic decline of the pacific pond turtle throughout its range. In California, over 90 percent of historic wetlands have been diked, drained and filled primarily for agricultural development and secondarily for urban development (Frayer *et al*. 1989). Much of the wetland habitat lost, such as in the Tulare Lake basin, was prime habitat for the pacific pond turtle. Historic levels of pacific pond turtle populations in the Tulare Lake Basin and southern San Joaquin Valley were estimated at 3.35 million turtles (Holland 1991). Today, the pacific pond turtle remains in 90 percent of its historic range, but at greatly reduced numbers (Holland 1991).

Water projects in the mid 1900s, which accompanied agricultural growth, also had a negative effect on pond turtle populations. Construction of reservoirs directly eliminated pond turtle habitat and isolated or fragmented remaining populations. Historically, urbanization also has significantly altered or eliminated pond turtle habitat, with the greatest impact occurring in southern California within the range of the southern pacific pond turtle.

Records of harvesting pacific pond turtles for food date back to an account by Lockington (1879) of the commercial harvest of the species for the San Francisco market. At the time, commercial harvest had already depleted populations of the pacific pond turtle in the San Francisco area, resulting in commercial operations focusing on populations in the San Joaquin Valley, particularly Tulare Lake (Elliot 1883, Brown 1940). Over 18,000 pond turtles were offered for sale in San Francisco markets, presumably in one year in the 1890s (Smith 1895). This practice of large scale harvesting continued at least through the 1920s (Storer 1930).

A variety of factors working together continue to result in a significant decline of pacific pond turtle populations throughout 75 to 80 percent of its range (Holland 1991). These natural, introduced and human made factors include predators, exotic competitors, habitat destruction, alteration and degradation, parasites and disease, and drought.

The pacific pond turtle is preyed upon by a wide variety of native and introduced predators, including large and small mammals, raptors, herons, corvids, snakes, frogs and fish. Pacific pond turtles are relatively poor swimmers and rely on crypsis and use of refugia to escape predation (Reese and Welsh 1998). Of the native predators, the raccoon (*Procyon lotor*) is a ubiquitous and effective predator, taking animals of all sizes, including eggs and hatchlings. Raccoon populations, in particular, respond favorably to urban environments, where human refuse may support larger populations than normal. Larger populations of raccoons and other predators combined with reduced nesting habitat for pond turtles adjacent to aquatic habitat, results in concentrations of nests which are more easily detected by predators. In Oregon, over 99 percent of nests examined in 1991-1993 were destroyed by predators, most likely raccoons, spotted skunks (*Spilogale putorius*) or coyotes (*Canis latrans*) (Holland 1994).

Two introduced predators of particular concern are the bullfrog (*Rana catesbeiana*) and the largemouth bass (*Micropterus salmoides*). Both species were introduced into the western United

States in the latter part of the 19th century, and through range expansions, reintroductions, and transplants these species have become established across most of the western United States (Moyle 1973). Both species have been observed to feed on juvenile pacific pond turtles. When these introduced species occur in large numbers, they may effectively preclude any significant level of recruitment in some turtle populations (Holland 1994). In aquatic habitats containing largemouth bass, but no bullfrogs, a fringe of emergent vegetation around the pond edge may protect hatchling and juvenile pond turtles from predation by bass (Holland 1991).

Humans are also major predators on pacific pond turtles. Collection of pond turtles for food still exists today with numbers from 20 to over 100 known to be taken in a single instance (Holland 1991, 1994). A commercial pet market exists for pond turtles despite state prohibitions (Holland 1991). Indiscriminate shooting of pacific pond turtles can be a significant mortality factor, particularly in areas adjacent to urban development. Some sportsman shoot turtles as they incorrectly assume that turtles consume game fish and waterfowl. Turtles are also shot by private landowners that fear they may lose property rights if this species is granted federal threatened or endangered status (Ashton 1997). There are also reports of shooting turtles for target practice or sport (Milner 1986 and Holland 1994).

In some areas, humans also accidentally predate on pacific pond turtles from automobile, boat and off-road vehicle traffic, as well as incidental catch during fishing. A study of a pacific pond turtle population in the Willamette Valley indicated an annual actual or potential loss of three to five percent of the total population to automobile traffic (Holland 1994). Reese and Welsh (1997) noted that pacific pond turtles frequently cross roads in agricultural areas.

Off-road vehicle activity poses a threat to pacific pond turtles both directly and indirectly. Direct impacts include crushing of individual turtles or nests and access to remote populations of the turtle for the purposes of collection or shooting. Off-road vehicle activity indirectly impacts pond turtles by interfering with normal foraging and basking activities, and by altering or restricting overland or instream movements of turtles. Long-term impacts of off-road vehicle activity include increased soil erosion, soil compaction, vegetation removal, siltation of the watercourse, and alteration or loss of refugia. According to Holland (1991), pacific pond turtle populations located in off-road vehicle areas in California tend to be small and disjunct, and occur in very limited habitats. Poor habitat quality combined with a very low probability of maintenance or reestablishment by immigration, renders these populations highly susceptible to extirpation.

Incidental collection of pond turtles by fisherman may be a significant mortality factor in some areas. Approximately 3.6 percent of turtles captures by Holland (1991) at an Oregon site had ingested fish hooks. At a southern Sierra Nevada, California site, about six percent of captured turtles showed evidence of trauma related to removal of hooks, had hooks in place, or were found dead with hooks embedded in the esophagus or stomach (Holland 1991). Turtles captured by Holland (1991) in Oregon before and after ingestion of fish hooks had lost a significant amount of weight, suggesting that hooked turtles may eventually starve to death. Hooked turtles are often killed by fisherman, who mistakenly presume that pond turtles are competitors for fish

or consume ducklings (Holland 1991).

Another factor that may adversely affect pond turtle populations is the introduction of nonnative competitors. Numerous species of nonnative aquatic turtles have been observed within the range of the pacific pond turtle (Jennings 1987). These include the painted turtle (*Chrysemys picta*), red-eared slider (*Pseudemys scripta elegans*), common snapping turtle (*Chelydra serpentina*), spiny soft-shelled turtle (*Apalone spinifera*), alligator snapping turtle (*Macroclemys temmincki*), stinkpot (*Sternotherus odoratus*), diamondback terrapin (*Malaclemys terrapin*), and the Mississippi map turtle (*Graptemys kohni*). Most of these turtles represent animals imported for the pet or food trade that have been released or escaped captivity. In addition to competition for food, exotic turtles also may carry new pathogens and/or parasites for which pond turtles exhibit no immunity.

Additional exotic competitors of particular concern are carp (*Cyprinus carpio* and *Carassius auratus*), sunfish (*Lepomis* spp. and *Pomoxis* spp.), and crayfish (*Cambarus*, *Procambarus*, and *Pacifasticus*). Carp alter aquatic habitats by consuming emergent and floating vegetation. Their activities also produce turbid water conditions. These alterations of the aquatic habitat may have a significant impact on hatchling turtle habitat, may reduce the availability of invertebrate prey and decrease turtle foraging success as turtles rely primarily on vision to capture prey (Holland 1991). Sunfish, which are capable of reaching large population sizes in aquatic habitats may modify or compete for the available invertebrate prey base (Holland 1991). Although direct scientific data are unavailable to support this hypothesis, Holland (1991) noted that several sites lacking native or non-native fishes support the largest known pacific pond turtle populations. Crayfish, which also may prey on young pond turtles, may compete with pond turtles for both the invertebrate prey base and carrion (Holland 1991).

The pacific pond turtle has been described as an aquatic generalist as it occurs in a wide variety of aquatic habitats throughout its range (Holland 1991, 1994). Currently across its range, Ashton (1997) believes that loss of aquatic habitat through destruction, alteration or degradation is the greatest anthropogenic threat to pacific pond turtles. Reese and Welsh (1997) and Holland (1994) agree but charge that since pacific pond turtles are semi-terrestrial, finding protection not only for their aquatic habitat, but also adjacent uplands used for nesting, overwintering and dispersal purposes is of paramount importance to protecting pacific pond turtles. Conversion of wetlands to farmland, destruction of riparian area and uplands, urbanization, irrigation, channelization, water diversions, dams, grazing, mining, contaminants, roads, railroads and recreational activity all continue to have significant negative impacts on turtle populations.

Wetlands that have persisted are often indirectly affected by adjacent agricultural practices. Many of these aquatic habitats are utilized to convey or store agricultural water and, therefore, are subject to changes in the timing and amount of water flow. These wetlands often are channelized and periodically cleaned of aquatic vegetation rendering them unsuitable for pond turtles. Where pond turtles persist adjacent to agricultural lands, upland nesting opportunities may be limited or nonexistent because of the practice of farming up to the edge of the aquatic habitat. Because the pond turtle is long-lived, populations may persist in these areas long after

recruitment of young has ceased. According to Holland (1991), turtle populations in agricultural settings tend to be very small and heavily adult biased.

Another significant source of habitat alteration throughout the range of the pacific pond turtle is livestock grazing. Livestock have been documented as a major cause of excessive habitat disturbance in riparian areas (Behnke and Raleigh 1978, Kauffman and Krueger 1984). Cattle have a disproportionately greater adverse affect on riparian and other wetland habitats because they tend to concentrate in these areas, particularly during the dry season (Marlow and Pogacnik 1985). Cattle trample and eat emergent vegetation (Platts 1981) that serves as foraging habitat for turtles of all sizes and as critical microhabitat for hatchlings and first year animals. Streambanks also are trampled by cattle often resulting in the collapse of undercut banks (Platts 1981, Kauffman *et al*. 1983) that provided refugia for turtles. Cattle grazing results in increased erosion in the stream (Winegar 1977) which fills in deep pools, increases stream velocity, and adversely affects aquatic invertebrates (Behnke and Raleigh 1978, Platts 1981). Cattle may also crush turtles (Holland 1991).

Construction of roadways adjacent to pond turtle habitat adversely affects pond turtles in several ways. First, roads often present a partial or complete barrier to turtles traveling overland to nesting or overwintering sites. In studies in California, Oregon and Washington, pacific pond turtles have been observed crushed on roadways (Holland 1985, 1992), with the majority of these being gravid or post-partum females. In addition to hampering access to nesting areas, the road bed itself reduces the area of potential nesting. Roads constructed on south-facing slopes adjacent to the Umpqua River in Oregon probably eliminated both existing and potential nesting habitat (Holland 1992).

Parasites known to use pacific pond turtles as a host include trematodes, helminths, nematodes, lungworms and leeches (Holland 1994). Leeches were found on 7 to 10 percent of turtles studied from several sites in northern California (Holland 1991). Substantial numbers of nematodes have been found in the guts of northern pacific pond turtles from northern California (Bury 1986).

Status with Respect to Recovery

Northwestern pond turtle recovery efforts have been limited. In Washington, long-term recovery efforts are underway. Lands containing remaining populations have been preserved through purchase by the state of Washington or other non-profit organizations. The pacific pond turtle habitat on these lands have been enhanced by elimination of grazing, addition of basking materials, removal of non-native predators (bullfrogs and warm water fish), removal of invasive plant species, and planting of native shrubs (Washington Dept. of Fish and Wildlife 2000). A captive breeding program formally initiated in 1990 through the partnering of the Washington Department of Fish and Wildlife, Woodland Park Zoo and Center for Wildlife Conservation resulted in the release of 38 juvenile turtles in the Columbia River Gorge Puget Sound lowlands between 1991 and 1998 (Washington Dept. of Fish and Wildlife 2000). Since the program informally started (i.e., prior to 1990), 490 juvenile turtles have been released back into the wild

in Washington, with at least 90 percent surviving.

A similar "head start" program was implemented for the Kern River Preserve in 1992, 1993 and 1995 by the Audubon Society with consultation from the Woodland Park Zoo. The program successfully released and gave a head start to 53 turtles onto the Kern River Preserve. Recapture studies indicate the released turtles appeared healthy in 1993 with future studies forthcoming to determine exact survival rate and long-term success of the program (Overtree and Collings 1997). Additionally, the Service is developing long range management plans for the National Wildlife Refuges in the Columbia River Gorge (Pierce, Franz and Steigerwald) to support the recovery efforts.

Status within the Action Area and Environmental Baseline

CNDDB (2002) lists 14 pond turtle occurrences in Sacramento County and two pond turtle occurrences in Sutter County. Although no CNDDB occurrences have been recorded in either the Natomas Basin, the species is known to occur there. The species has been observed at Fisherman's Lake (NBHCP EIR 2002) as well as along the Natomas Main Drain (May & Associates 2001). The Natomas Basin probably supports a limited pond turtle population; however, no systematic surveys have been conducted.

Environmental Baseline

The canals and drains throughout the Natomas Basin are considered potential aquatic habitat for pond turtles. The species has been observed at Fisherman's Lake (NBHCP EIR 2002) as well as along the Natomas Main Drainage Canal (May & Associates 2001). Currently, there are about 250 miles of canals and drains in the Basin. Fisherman's Lake is considered high-quality aquatic habitat for the pond turtle and turtles have been observed there. Because most of the basin is developed agricultural land or commercial/ residential development, many of the potential upland breeding habitats have been eliminated. Despite this, a limited amount of potential breeding habitat probably occurs along many of the canals and aquatic habitats.

The Natomas Basin supports approximately 24,691 acres of potential pond turtle habitat (Table 12). Of that, approximately 96 acres are ponds and seasonally wet areas, 22,693 acres are rice, 124 acres are riparian, and 1,778 acres are canals. Although the importance of rice habitat to the turtle has not been documented, rice fields likely provide some foraging opportunities. The Basin's ponds and seasonally wet areas and its extensive system of drainage and delivery canals likely provide more suitable aquatic and upland habitat for the turtle.

Midvalley Fairy Shrimp

The midvalley fairy shrimp is considered a Species of Concern by the Service. The Service is currently conducting a status review of the species, and will issue a 12-month finding to determine if a petition to list it as endangered is warranted (68 **FR** 22724). The midvalley fairy shrimp has not been designated any special status by the State.

Description

The midvalley fairy shrimp (*Branchinecta mesovallensis*) was described by Belk and Fugate in June, 2000. The species was named for its limited range in the Central Valley of California. The type locality is on the Virginia Smith Trust land in Merced County, California (Belk and Fugate 2000). Midvalley fairy shrimp specimens were collected as early as 1989.

Male midvalley fairy shrimp are most similar in appearance to the Conservancy fairy shrimp (Belk and Fugate 2000). These species are distinguished by the shape of the tip of their antennae. The midvalley fairy shrimp's antennae is bent such that the larger hump of two humps possessed by both species is anterior, whereas this same hump is posterior in the Conservancy fairy shrimp. Females of these two species differ in the shape of their brood pouches. The brood pouch of the midvalley fairy shrimp is pyriform and extends to below segments 3 and 4. The brood pouch of the Conservancy fairy shrimp is fusiform and extends to below segments 5 and 7. Midvalley fairy shrimp females also closely resemble the vernal pool fairy shrimp, except that vernal pool fairy shrimp females have a pair of dorsolateral processes on each side of thoracic segment 3, whereas the midvalley fairy shrimp does not have any dorsolateral processes on this thoracic segment.

Historic and Current Range

Although the historic distribution of the midvalley fairy shrimp is unknown, vernal pool habitats in the regions where it is currently known to occur have been dramatically reduced since pre-agricultural times (Holland 1998). The habitat of the midvalley fairy shrimp may have been even more severely reduced than other vernal pool habitats, since it can occur in swales and short-lived pools that may escape detection in dry years or during the dry season (Helm 1999, Belk and Fugate 2000).

The midvalley fairy shrimp is endemic to a small portion of California's Central Valley. Helm (1998) found midvalley fairy shrimp in less than 0.5 percent of the vernal pools he examined. Based on the few known occurrences, the species' distribution is limited to the Southeastern Sacramento, Southern Sierra Foothill, San Joaquin, and Solano-Colusa vernal pool regions. In the Southeastern Sacramento region, most occurrences are clustered around the City of Sacramento and Mather Air Force Base in Sacramento County. In the Southern Sierra Foothills and San Joaquin vernal pool regions, the midvalley fairy shrimp has been documented in the vicinity of the Virginia Smith Trust property in Merced County and from isolated occurrences in San Joaquin, Madera, and Fresno counties. However, because this species was described only

recently, it is likely additional occurrences will be found in the future.

Life History and Reproductive Ecology

The life cycle of the midvalley fairy shrimp is well suited to the unpredictable conditions of vernal pool habitats. The midvalley fairy shrimp can mature and reproduce very rapidly; it has been observed to reach maturity in as little as eight days and reproduction was observed in as few as 16 days after hatching (Helm 1998). Under the culturing conditions described in Helm (1998), the midvalley fairy shrimp lived for 147 days, about as long as other Central Valley species observed. Multiple hatchings of the midvalley fairy shrimp have been observed in a single rainy season as its vernal pool habitat repeatedly fills and dries. Helm (1998) found the midvalley fairy shrimp to be very tolerant of warm water, occurring in pools with water temperatures ranging from 5 to 32˚C . This temperature is higher than that measured for any other Central Valley fairy shrimp collected, except for the California fairy shrimp. Little is known about the midvalley fairy shrimp's tolerance to variations in water chemistry, but it has been found in some relatively alkaline pools (Helm 1998).

Essential Habitat Components

The midvalley fairy shrimp has been found in small, short-lived vernal pools and grass-bottomed swales ranging from 1.2 to 202 m^2 in area and averaging less than 10 cm in depth (Helm 1998). The species has been collected from pools on a volcanic mudflow landform of the Merhten Formation in Pentz Gravelly Loam and Raynor Clay soils. The midvalley fairy shrimp has also been found on San Joaquin Silt Loam soils on the Riverbank formation on Low Terrace landforms. At the time the type specimens were collected, the dominant macrophytes in the pool were the wetland grasses *Lolium multiflorum, Hordeum maximum gussoneanum,* and *Deschampsia danthanoides*, species that are characteristic of extremely short-lived pools and swales.

The midvalley fairy shrimp has only been collected with one other fairy shrimp, the vernal pool fairy shrimp, on three occasions (Eriksen and Belk 1999). It may occupy habitats that are not inundated for a sufficient period of time for other species to inhabit.

Reasons for Decline and Threats to Survival

As with all vernal pool species that occur in the Central Valley, suitable habitat for the midvalley fairy shrimp has declined dramatically over the past century, and pressure to develop remaining lands in the Central Valley are increasing rapidly. Holland (1998) estimated that only 25 percent of vernal pool habitats remain in the Central Valley, including the Southeastern Sacramento Valley and San Joaquin vernal pool regions where the species is currently known to occur.

Because the midvalley fairy shrimp occupies very small pools and was only recently recognized as a separate species, it may actually be at greater risk than the species already protected under the Act. These small depressions require less preparation prior to conversion to urban or agricultural uses because they are already relatively level, and thus may be more attractive to developers. Even during the wet season, they may not contain water continuously, even when nearby larger pools are full. Under these conditions, midvalley fairy shrimp pools may not be surveyed at all, and conversion allowed. Continued conversion of the grassland-vernal pool ecosystem matrix to urban or agricultural uses is the largest threat to survival of the midvalley fairy shrimp. The largest number of known locations is in Sacramento County, around the City of Sacramento, which is growing rapidly. Urban expansion in this area poses a threat to the majority of the midvalley fairy shrimp populations known to exist today.

Environmental Baseline and Status within the Action Area

There are 52 reported occurrences of midvalley fairy shrimp in California, 12 of which are reported from Sacramento County (CNDDB 2002). The midvalley fairy shrimp has not been recorded from Sutter County or the proposed action's action area. However, as stated above, this may be due to the short time that the midvalley fairy shrimp has been recognized as a distinct species. Potential midvalley fairy shrimp habitat occurs in the vernal pools on the east side of the Basin, in grasslands north of Del Paso Road. Additional potential habitat occurs in other ponds and seasonally wet areas in the Basin. No potential midvalley fairy shrimp habitat is located within 76 m (250 ft.) of any of MAP's proposed action activities.

Potential midvalley fairy shrimp habitat of approximately 21.3 acres occurs in the vernal pools on the east side of the Basin, in 886 acres of grasslands primarily north of Del Paso Road. This estimate of vernal pool acreage is based upon assessments of the amount of vernal pool habitat in grasslands in Sacramento County and probably greatly overestimates the actual amount of vernal pool habitat in the Basin (K. Fuller, pers. comm.). Additional potential habitat occurs in 96 acres of other ponds and seasonally wet areas in the Basin. Once again, this estimate greatly overestimates the amount of potential vernal pool habitat in the Basin, as most of the ponds and seasonally wet areas do not have the hydrology sufficient to support vernal pool crustaceans.

Western Spadefoot Toad

The western spadefoot toad was listed as a Category 2 species by the Service in 1994 (Service 1994*b*). Due to a change in policy regarding candidate species, western spadefoot toads are now considered a Species of Concern (Service 1998). The western spadefoot toad was designated a Species of Special Concern by the State in 1994 (Jennings and Hayes 1994, CDFG 1998).

Description

Spadefoot toads are distinguished from the true toads (*Bufo* spp.) by their cat-like eyes (due to vertically elliptical pupils), the single black sharp-edged "spade" on each hind foot, teeth in the upper jaw, and rather smooth skin (Stebbins 1985). The parotid glands (large swellings on the

side of the head and behind the eye) are absent or indistinct on spadefoot toads. Their pupils are vertical in bright light but are round at night. Males may have a dusky throat and dark nuptial pads on the innermost front toes. Amplexus, the copulatory embrace by males, is pelvic (Stebbins 1985).

The western spadefoot toad ranges in size from 3.7 to 6.2 cm snout-vent length. It is dusky green or gray above and often has four irregular light-colored stripes on its back, with the central pair of stripes sometimes distinguished by a dark, hourglass-shaped area. The skin tubercles (small, rounded protuberances) are sometimes tipped with orange or are reddish in color, particularly among young individuals (Storer 1925, Stebbins 1985). The iris of the eye is usually a pale gold. The abdomen is whitish without any markings. Spadefoot toads have a wedge-shaped, glossy black "spade" on each hind foot. The call of western spadefoot toads is hoarse and snore-like, and lasts about one-half to one second (Stebbins 1985).

Historical and Current Range

The western spadefoot toad is nearly endemic to California, and historically ranged from the vicinity of Redding in Shasta County southward to Mesa de San Carlos in northwestern Baja California, Mexico (Stebbins 1985). In California, western spadefoot toads ranged throughout the Central Valley, throughout the Coast Ranges, and the coastal lowlands from San Francisco Bay southward to Mexico (Jennings and Hayes 1994).

The western spadefoot toad is no longer present throughout most of the lowlands of southern California (Stebbins 1985). The species also is believed to be extirpated from many historic locations within the Central Valley (Jennings and Hayes 1994, Fisher and Shaffer 1996). According to Fisher and Shaffer (1996), western spadefoot toads have suffered a severe decline with virtually complete extirpation from the Sacramento Valley, and a reduced density of populations in the eastern San Joaquin Valley. Declines in abundance have been more modest in the Coast Ranges. This species occurs mostly below 900 m (Stebbins 1985), but can occur up to 1363 m (Morey 1988). However, the average elevation of sites where the species still occurs is significantly higher than the average elevation for historical sites; this suggests that declines have been more pronounced in lowlands.

Jennings and Hayes (1994) examined 832 museum and sighting records from 346 locations and concluded that western spadefoot toads occurred in 18 California counties: Alameda, Amador, Butte, Kern, Madera, Mariposa, Monterey, Orange, Riverside, Sacramento, San Benito, San Diego, San Joaquin, San Luis Obispo, Santa Barbara, Stanislaus, Tehama, and Tulare. Based on these same records, they concluded that western spadefoot toads may no longer occur in six counties: Calaveras, Fresno, Los Angeles, San Bernardino, Shasta, and Yolo. Fisher and Shaffer (1996) conducted field surveys of 315 sites in the Sacramento Valley, San Joaquin Valley, and Coast Ranges from 1990 to 1992. These surveys confirmed the presence of western spadefoot toads in Alameda, Calaveras, Glenn, Kern, Madera, Merced, Monterey, Sacramento, San Benito, San Luis Obispo, Santa Barbara, Stanislaus, and Tulare Counties. Western spadefoot toads were not found at sites surveyed in Amador, Butte, Fresno, Mariposa, San

Joaquin, Shasta, Tehama, and Yolo Counties.

Essential Habitat Components

According to Stebbins (1985), western spadefoot toads are primarily a species of lowland habitats such as washes, floodplains of rivers, alluvial fans, playas, and alkali flats. However, they also occur in the foothills and mountains. Western spadefoot toads prefer areas of open vegetation and short grasses, where the soil is sandy or gravelly. They are found in the valley and foothill grasslands, open chaparral, and pine-oak woodlands.

Western spadefoot toads require two distinct habitat components in order to meet life history requirements, and these habitats probably need to be in close proximity. As mentioned previously, spadefoot toads are primarily terrestrial. They require upland habitats for feeding and constructing burrows for their long dry-season dormancy. Typical of amphibians, wetland habitats are required for reproduction. Western spadefoot toad eggs and larvae have been observed in a variety of permanent and temporary wetlands including rivers, creeks, pools in intermittent streams, vernal pools, and temporary rain pools (CDFG 2000). This indicates a degree of ecological plasticity. However, it appears that vernal pools and other temporary wetlands may be more optimal for breeding due to the absence of or at least reduced abundance of both native and non-native predators, many of which require more permanent wetlands.

Western spadefoot toads also have exhibited a capacity to breed in altered wetlands as well as man-made wetlands. Spadefoot toads, including eggs and larvae, have been observed in vernal pools that have been disturbed by activities such as earthmoving, disking, intensive livestock use, and off-road vehicle use. Spadefoot toads, again including eggs and larvae, also have been observed in artificial ponds, livestock ponds, sedimentation and flood control ponds, irrigation and roadside ditches, roadside puddles, tire ruts, and borrow pits (Fisher and Shaffer 1996, CDFG 2000). This again exhibits a degree of ecological plasticity and adaptability. However, although western spadefoot toads have been observed to inhabit and breed in wetlands altered or created by man, survival and reproductive success in these pools have not been evaluated relative to that in unaltered natural pools.

Reproductive ecology

Western spadefoot toads breed from January to May in temporary pools that form following winter or spring rains. Water temperatures in these pools must be between 9 and 30˚C for western spadefoot toads to reproduce (Brown 1966, 1967). During breeding, highly vocal aggregations of more than 1,000 individuals may form (Jennings and Hayes 1994). Breeding calls are audible at great distances, which serves to bring individuals together at suitable breeding sites (Stebbins 1985).

Females deposit their eggs in numerous small irregularly cylindrical clusters of ten to 42 eggs (average = 24) (Storer 1925) and may lay more than 500 eggs in one season (Stebbins 1951). Eggs are deposited on plant stems or pieces of detritus in temporary rain pools, or sometimes

pools in ephemeral stream courses (Storer 1925, Stebbins 1985). Oviposition does not occur until water temperatures reach the required minimum of 9˚C (Jennings and Hayes 1994). Depending on the temperature regime and annual rainfall, oviposition may occur between late February and late May (Storer 1925, Burgess 1950, Feaver 1971, Stebbins 1985).

Depending on temperature, western spadefoot toad eggs hatch in 0.6-6 days (Brown 1967). At relatively high water temperatures (e.g., 21ºC), Storer (1925) noted that about half of the western spadefoot toad eggs had failed to develop, possibly due to a fungus that thrives in warmer water and invades toad eggs. Larval development can be completed in three to 11 weeks (Burgess 1950, Feaver 1971), depending on food resources and temperature. In eight vernal pools examined by Morey (1998), the average duration to complete larval development (hatching to metamorphosis) was 58 days (range 30-79 days). Longer periods of larval development were associated with larger size at metamorphosis. Larval development must be completed before pools dry. Morey (1998) stated that vernal pools must persist for at least five weeks for western spadefoot toads to successfully breed. Pools that persist for longer periods permit longer larval development resulting in larger juveniles with great fat reserves at metamorphosis (Morey 1998), and these larger individuals have a higher fitness level and survivorship (Pfennig 1992). Recently metamorphosed juveniles emerge from water and seek refuge in the immediate vicinity of natal ponds. They spend several hours to several days near ponds before dispersing. Weintraub (1979) reported that toadlets of plains spadefoot toads seek refuge in drying mud cracks, under boards, and under other surface objects including decomposing cow manure. Annual reproductive success probably varies with precipitation levels, success being lower in drier years (Fisher and Shaffer 1996). Metamorphosing larvae may leave the water while their tails are still relatively long (greater than 1 cm) (Storer 1925). Age at sexual maturity is unknown, but considering the relatively long period of subterranean dormancy (eight to nine months), individuals may require at least two years to mature (Jennings and Hayes 1994).

Movements and Habitat Use

Western spadefoot toads are almost completely terrestrial and enter water only to breed (Dimmitt and Ruibal 1980). However, typical of amphibians, toads require a certain level of moisture to avoid dessication, which can be a challenge in the arid habitats occupied by spadefoot toads. Spadefoot toads have behavioral and physiological adaptations that facilitate moisture retention.

During dry periods, spadefoot toads construct and occupy burrows that may be up to 0.9 m (3 ft.) in depth (Ruibal *et al*. 1969). Toads may remain in these burrows for 9-10 months. While in these burrows, they are completely surrounded by soil and appear to enter a state of torpor. Typical of amphibians, spadefoot toads have very permeable skin, which allows them to absorb moisture from the surrounding soil. Spadefoot toads may retain urea to increase the osmotic pressure within their bodies. This prevents water loss to the surrounding soil and even facilitates water absorption from soils with relatively high moisture tensions (Ruibal *et al*. 1969, Shoemaker *et al*. 1969). Spadefoot toads appear to construct burrows in soils that are relatively sandy and friable, as these soil attributes facilitate both digging and water absorption (Ruibal *et al*. 1969).

Spadefoot toads emerge from burrows to forage and breed following rains in the winter and spring. The factors that stimulate emergence are not well understood. In Arizona, spadefoot toads emerged after as little as 0.25 cm of precipitation, which barely wet the soil surface and obviously did not soak down to burrows (Ruibal *et al*. 1969). Sound or vibration from rain striking the ground appears to be the primary emergence cue used by spadefoot toads, and even the vibrations of a motor can cause toads to emerge (Dimmitt and Ruibal 1980). Spadefoot toads may move closer to the surface prior to precipitation and may even emerge to forage on nights with adequate humidity.

Above-ground activity is primarily nocturnal, presumably to reduce water loss. Even when exposed to artificial light, spadefoot toads will immediately move away or begin burrowing underground (Storer 1925, Ruibal *et al*. 1969). During the day, toads dig and occupy relatively shallow burrows 2-5 cm in depth (Ruibal *et al*. 1969) and may even use small mammal burrows. In addition to breeding during periods of above-ground activity, spadefoot toads must acquire sufficient energy resources prior to reentering dormancy (Seymour 1973).

Reasons for Decline and Threats to Survival

The principal factors contributing to the decline of the western spadefoot toad are loss of habitat due to urban development and conversion of native habitats to agricultural lands, the introduction of non-native predators, and stochastic events that particularly impact small, isolated populations (e.g., Morey 1998). The species likely suffered dramatic reductions in the mid to late 1900s when urban and agricultural development was rapidly destroying natural habitats in the Central Valley and southern California (Jennings and Hayes 1994). According to Jennings and Hayes (1994), over 80 percent of the habitat once known to be occupied by the western spadefoot in southern California (from the Santa Clara River Valley in Los Angeles and Ventura counties southward) has been developed or converted to uses that are incompatible with successful reproduction and recruitment. In northern and central California, loss of habitat has been less severe, but nevertheless significant; it is estimated that over 30 percent of the habitat once occupied by western spadefoot toads has been developed or converted (Jennings and Hayes 1994). Regions that have been severely affected include the lower two-thirds of the Salinas River system and much of the areas east of Sacramento, Fresno, and Bakersfield. Many of the remaining suitable rainpool or vernal habitats, which are concentrated on valley terraces along the edges of the Central Valley floor, have disappeared or been fragmented (Jennings and Hayes 1994).

Another reason for decline in the population of western spadefoot toads is the introduction of non-native predators, specifically bullfrogs, crayfish, and fish (Hayes and Warner 1985, Hayes and Jennings 1986, Fisher and Shaffer 1996). All of these were introduced into California in the late 1800s and early 1900s, and through range expansions, additional introductions, and transplants, have become established throughout most of the state. Fisher and Shaffer (1996) reported an inverse relationship between the presence of western spadefoot toads and that of non-native predators. They further reported that non-native predators may have displaced western spadefoot toads at lower elevations resulting in the toads being found primarily at higher

elevation sites where these predators apparently are less abundant.

Habitat loss and fragmentation results in populations that are small in size and increasingly isolated. This reduces movements by individuals and genetic exchange between populations. Small populations are more likely to go extinct due to catastrophic or stochastic events. Isolation reduces the potential for recolonization of areas where toads have disappeared. This results in lower overall abundance and population viability.

Fisher and Shaffer (1996) also discussed the possible role of ultraviolet radiation in the declines of native amphibians in the Central Valley. However, they concluded that there is no evidence that ultraviolet radiation is a significant factor in amphibian declines at this time.

Habitat loss and fragmentation remain significant threats to the vernal pool ecosystems that support western spadefoot toads (Service 1994*a*). This loss is a result of urban, industrial, and agricultural development. Many remaining vernal pools and wetlands are suffering from habitat degradation resulting from disking, intensive livestock grazing and trampling, off-road vehicle use, and contaminant runoff. In addition to contaminant problems, run-off from adjacent developed areas also could change hydrologic regimes by converting temporary pools to more permanent wetlands. This increases the likelihood of invasion and colonization by non-native predators.

The continued presence and proliferation of non-native predators is a significant threat to western spadefoot toads. Western spadefoot toads have evolved with natural predators such as snakes and wading birds. Non-native species may increase predation pressure beyond natural levels, thereby causing western spadefoot toads to decline in abundance.

Fisher and Shaffer (1996) assessed native amphibian populations in the Coast Ranges, Sierra foothills, and Central Valley. They predicted that widespread declines of western spadefoot toads will occur if non-native species continue to spread into low-elevation Coast Range habitats. However, in the San Joaquin Valley, they found that although there were relatively few introduced exotics, native amphibians have still declined significantly. The San Joaquin Valley is intensively farmed and has been subject to extensive habitat loss, degradation, and fragmentation (Service 1998). Adverse impacts from these activities as well as isolation from other western spadefoot toad populations may have caused the observed declines.

Another threat to western spadefoot toads is roads. This threat likely will increase in significance as new roads are built and existing roads are expanded. Roads can result in direct mortality, habitat loss and fragmentation, disturbance, and contaminants, as well as inducing urban growth. Mortality on roads could particularly be a problem during dispersal when toads are more likely to encounter roads. Morey and Guinn (1992) reported road mortality among spadefoot toads in San Joaquin County, and Jennings (1998) reported road mortality at all seven sites that he surveyed in Kings and Alameda Counties. Three CNDDB (2000) occurrences report observations of western spadefoot toads killed by vehicles in San Joaquin, San Luis Obispo, and Santa Barbara Counties. The impact of road mortality on populations of western

spadefoot toads is unknown. Roads can be a barrier to movements and effectively isolate populations. Roads were found to be significant barriers to gene flow among common frogs (*Rana temporaria*) in Germany and this has resulted in genetic differentiation among populations separated by roads (Reh and Seitz 1990). Contaminants from road materials, leaks, and spills also could adversely impact toads by contaminating the water in wetlands.

Activities that produce low frequency noise and vibration in or near habitat for western spadefoot toads may be detrimental to the species. Dimmitt and Ruibal (1980) determined that spadefoot toads were extremely sensitive to such stimuli; toads were caused to break dormancy and emerge from their burrows. Disturbances that cause spadefoot toads to emerge at inappropriate times could result in detrimental effects such as mortality or reduced productivity.

A less-visible but equally important threat to smaller populations of western spadefoot toads is the decrease in vigor and viability sometimes observed in small populations of animals. Small, isolated populations have an increased risk of detrimental effects from stochastic genetic and demographic changes. One such impact is inbreeding, which can result in an increase in incidence of birth defects, slower growth, higher mortality, and lower fecundity.

Status with Respect to Recovery

Vernal pools and other wetlands now are recognized as both sensitive and ecologically important, and efforts are being made to conserve these habitats. A number of sites with suitable habitat for western spadefoot toads already are being protected in national wildlife refuges, state parks, state ecological reserves, private preserves, habitat mitigation banks, and conservation easements. Additionally, 23 vernal pool species are now Federally protected including 18 plants and five animals. This will result in habitat conservation and management efforts that will contribute to the conservation of western spadefoot toads.

Status within the Action Area and Environmental Baseline

The western spadefoot toad has not been reported from within the proposed action's action area or Sutter County (CNDDB 2002). Five occurrences have been reported from eastern Sacramento County; the closest reported occurrence in Sacramento County is approximately 15 miles from the Basin. The closest overall spadefoot occurrence to the Basin is from Placer County and is approximately six miles from the Basin.

Potential toad habitat of approximately 21.3 acres occurs in the vernal pools on the east side of the Basin, in 886 acres of grasslands primarily north of Del Paso Road. This estimate of vernal pool acreage is based upon assessments of the amount of vernal pool habitat in grasslands in Sacramento County and probably greatly overestimates the actual amount of vernal pool habitat in the Basin (K. Fuller, pers. comm.). Additional potential habitat occurs in 96 acres of other ponds and seasonally wet areas in the Basin. Once again, this estimate greatly overestimates the amount of potential vernal pool habitat in the Basin, as most of the ponds and seasonally wet areas do not have the hydrology sufficient to support the toad. No potential toad habitat is

located within 76 m (250 ft.) of any of MAP's proposed action activities. Based upon the toad's limited distribution and distance form the Basin, it is very unlikely that the toad would be found in the Basin (K. Fuller, pers. comm. to C. Aubrey 2003).

California Tiger Salamander

In 1994, the Service issued a 12-month warranted but precluded finding for the California tiger salamander (59 **FR** 18353). Subsequently, the Service issued its final rule listing the Santa Barbara County distinct population segment of the species as endangered (65 **FR** 57242). The Sonoma County distinct population segment of the California tiger salamander was listed as endangered on an emergency basis under the Act on July 22, 2002 (67 **FR** 47726). The California tiger salamander throughout the remainder of its range, including Fresno County, is a Federal candidate species. The Service proposed to list the Central California Distinct Population Segment of the California Tiger Salamander as threatened and reclassify the Sonoma County and Santa Barbara County Distinct Populations of the salamander from endangered to threatened on May 23, 2003 (68 **FR** 28647). The State considers the California tiger salamander a Species of Special Concern.

Description

The California tiger salamander is a large, stocky, terrestrial salamander with a broad, rounded snout. Adults may reach a total length of 207 mm (8.2 in). California tiger salamanders exhibit sexual dimorphism; males tend to be larger than females. Coloration of the California tiger salamander is white or yellowish markings against black. As adults, California tiger salamanders tend to have the creamy yellow to white spotting on the sides with much less on the top, whereas other tiger salamanders have brighter yellow spotting with more on the top.

Historic Range

Historically, the California tiger salamander inhabited low elevation grassland and oak savanna plant communities of the Central Valley, adjacent foothills, and the inner coast ranges in California (Storer 1925, Shaffer *et al.* 1993) from sea level up to about 460 m (1500 ft). Along the coast ranges, the species occurred from the Santa Rosa area of Sonoma County south to the vicinity of Buellton in Santa Barbara County. In the Central Valley and surrounding foothills, the species occurred from northern Yolo County southward to northwestern Kern County and northern Tulare County. Today, the species is found in grasslands and oak savannah in the Sierra Nevada foothills, Central Valley, Bay Area, and the coast ranges in central California. Populations in areas such as Santa Barbara County and Sonoma County are now considered endangered.

Essential Habitat Components

California tiger salamanders require both wetland and adjacent upland habitat to complete their life cycle (Shaffer *et al.* 1993). Subadult and adult California tiger salamanders spend the dry

summer and fall months of the year aestivating (a state of dormancy or inactivity in response to hot, dry weather) in the burrows of small mammals, such as California ground squirrels (*Spermophilus beecheyi*) and Botta's pocket gopher (*Thomomys bottae*) (Storer 1925; Loredo and van Vuren 1996; 1998; Trenham 1998a). During estivation, California tiger salamanders eat very little (Shaffer *et al.* 1993). Once fall or winter rains begin, they emerge from the upland sites on rainy nights to feed and to migrate to the breeding ponds (Stebbins 1985, 1989; Shaffer *et al.* 1993). Historically, the California tiger salamander utilized vernal pools, but it also currently breeds in stockponds. Occurrence of California tiger salamanders is significantly associated with occurrence of ground squirrels (Seymour and Westphal 1994). Active ground burrowing rodent colonies probably are required to sustain California tiger salamanders because inactive burrow systems become progressively unsuitable over time. Loredo *et al.* (1996) found that ground squirrel burrow systems collapsed within 18 months following abandonment by or loss of the mammals; although California tiger salamanders used both occupied and unoccupied burrows, they apparently did not use collapsed burrows. California tiger salamanders cannot persist without upland habitat.

Reproductive Ecology, Life History

Adult California tiger salamanders may migrate up to 2 km (1.2 mi) from their upland sites to the breeding ponds (S. Sweet, University of California, Santa Barbara, *in litt*. 1998), which may be vernal pools, stockponds, or other seasonal water bodies. The distance between the upland sites and breeding pools depends on local topography and vegetation, and the distribution of ground squirrel or other rodent burrows (Stebbins 1989). Males migrate before females (Twitty 1941; Shaffer *et al.* 1993; Loredo and Van Vuren 1996; Trenham 1998b). Males usually remain in the ponds for an average of about six to eight weeks, while females stay for approximately one to two weeks. In dry years, both sexes may stay for shorter periods (Loredo and van Vuren 1996; Trenham 1998b). Marked salamanders have been recaptured at the pond where they were initially captured; in one study, approximately 80 percent were recaptured at the same pond (Trenham 1998b). The rate of natural movement of salamanders among breeding sites depends on the distance between the ponds or complexes of ponds and on the intervening habitat (e.g., salamanders may move more quickly through sparsely covered and more open grassland than densely vegetated lands)(Trenham 1998a). As with migration distances, the number of ponds used by an individual over its lifetime will be dependent on landscape features and environmental factors.

Adult salamanders mate in the breeding ponds, after which the females lay their eggs in the water (Twitty 1941; Shaffer *et al.* 1993; Petranka 1998). Females attach their eggs singly, or in rare circumstances, in groups of two to four, to twigs, grass stems, vegetation, or debris (Storer 1925, Twitty 1941). In ponds with no or limited vegetation, they may be attached to objects, such as rocks and boards on the bottom (Jennings and Hayes 1994). After breeding, adults leave the pool and return to the small mammal burrows (Loredo *et al.* 1996; Trenham 1998a), although they may continue to come out nightly for approximately the next two weeks to feed (Shaffer *et al.* 1993). In drought years, the seasonal pools may not form and the adults can not breed (Barry and Shaffer 1994).

Salamander eggs hatch in ten to 14 days with newly hatched salamanders (larvae) ranging from 11.5 to 14.2 mm (0.45 to 0.56 in) in total length (Petranka 1998). The larvae are aquatic. They are yellowish gray in color and have broad fat heads, possess large, feathery external gills, and broad dorsal fins that extend well onto their back. The larvae feed on zooplankton, small crustaceans, and aquatic insects for about six weeks after hatching, after which they switch to larger prey (J. Anderson 1968). Larger larvae have been known to consume smaller tadpoles of Pacific treefrogs (*Pseudacris regilla*) and California red-legged frogs (*Rana aurora*) (J. Anderson 1968; P. Anderson 1968). The larvae are among the top aquatic predators in the seasonal pool ecosystems. They often rest on the bottom in shallow water, but also may be found at different layers in the water column in deeper water. The young salamanders are wary and when approached by potential predators, will dart into vegetation on the bottom of the pool (Storer 1925).

The larval stage of the California tiger salamander usually last three to six months, as most seasonal ponds and pools dry up during the summer (Petranka 1998). Amphibian larvae must grow to a critical minimum body size before they can metamorphose (change into a different physical form) to the terrestrial stage (Wilbur and Collins 1973). Individuals collected near Stockton in the Central Valley during April varied from 47 to 58 mm (1.88 to 2.32 in) in length (Storer 1925). Feaver (1971) found that larvae metamorphosed and left the breeding pools 60 to 94 days after the eggs had been laid, with larvae developing faster in smaller, more rapidly drying pools. The longer the ponding duration, the larger the larvae and metamorphosed juveniles are able to grow, and the more likely they are to survive and reproduce (Pechmann *et al.* 1989; Semlitsch *et al.* 1988; Morey 1998; Trenham 1998b). The larvae will perish if a site dries before metamorphosis is complete (P. Anderson 1968, Feaver 1971). Pechmann *et al.* (1988) found a strong positive correlation with ponding duration and total number of metamorphosing juveniles in five salamander species. In Madera County, Feaver (1971) found that only 11 of 30 pools sampled supported larval California tiger salamanders, and 5 of these dried before metamorphosis could occur. Therefore, out of the original 30 pools, only six (20 percent) provided suitable conditions for successful reproduction that year. Size at metamorphosis is positively correlated with stored body fat and survival of juvenile amphibians, and negatively correlated with age at first reproduction (Semlitsch *et al.* 1988; Scott 1994; Morey 1998)

In the late spring or early summer, before the pools dry completely, metamorphosed juveniles leave their pools and settle in small mammal burrows at the end of their nightly movements (Zeiner *et al.* 1988; Shaffer *et al.* 1993; Loredo *et al.* 1996). Like the adults, juveniles may emerge from these retreats to feed during nights of high relative humidity (Storer 1925; Shaffer *et al.* 1993) before settling in their selected upland sites for the dry, hot summer months. Juveniles have been observed to migrate up to 1.6 km (1 mi) from breeding pools to upland areas (Austin and Shaffer 1992). An estimated 83 percent of the salamanders rely on rodent burrows for shelter (Petranka 1998). Mortality of juveniles during their first summer exceeds 50 percent (Trenham 1998b). Unseasonable emergence from uplands in hot dry weather occasionally results in mass mortality of juveniles (Holland *et al.* 1990). Juveniles do not typically return to the breeding pools until they reach sexual maturity at several years of age (Trenham 1998b; L. Hunt, *in litt*. 1998). Trenham (1998b) estimated survival from metamorphosis to maturity at his study site at less than five percent (well below an estimated replacement level of 18 percent). Adult survivorship varies greatly between years, but is a crucial determinant of whether a population is a source or sink (i.e., whether net productivity exceeds the level necessary to maintain the population).

Lifetime reproductive success for California and other tiger salamanders is low. Trenham *et al.* (2000) found the average female bred 1.4 times and produced 8.5 young that survived to metamorphosis per reproductive effort. This resulted in roughly 11 metamorphic offspring over the lifetime of a female. Two reasons for the low reproductive success are the preliminary data suggest that most individuals of the California tiger salamanders require two years to become sexually mature, but some individuals may be slower to mature (Shaffer *et al.* 1993); and some animals do not breed until they are four to six years old. While individuals may survive for more than ten years, many breed only once, and in some populations, less than 5 percent of marked juveniles survive to become breeding adults (Trenham 1998b). With such low recruitment, isolated populations are susceptible to unusual, randomly occurring natural events as well as from human caused factors that reduce breeding success and individual survival. Factors that repeatedly lower breeding success in isolated pools can quickly extirpate a population.

Reasons for Decline and Threats to Survival

California tiger salamanders are imperiled by a variety of human activities. Current factors associated with declining populations of the salamander include continued degradation and loss of habitat due to agriculture and urbanization, non-native plants, hybridization with non-native tiger salamanders, and introduced predators. Fragmentation of existing habitat and the continued colonization of existing habitat by non-native tiger salamanders may represent the most significant current threats to California tiger salamanders, although populations are likely threatened by more than one factor. Isolation and fragmentation of habitats within many watersheds have precluded dispersal between sub-populations and jeopardized the viability of metapopulations (broadly defined as multiple subpopulations that occasionally exchange individuals through dispersal, and are capable of colonizing or “rescuing” extinct habitat patches).

Although no systematic, range-wide studies have been conducted, it is known that significant

numbers of California tiger salamanders are killed by vehicular traffic while crossing roads (Hansen and Tremper 1993; S. Sweet, *in litt*. 1993). For example, during a 1-hour period on a road bordering Lake Lagunita on the Stanford University campus, 45 California tiger salamanders were collected, 28 of which had been killed by cars (Twitty 1941). More recently, during one 15-day period in 2001 at a Sonoma County location, 26 road-killed California tiger salamanders were found (D. Cook, pers. comm. 2002). Overall breeding population losses of California tiger salamanders due to road kills have been estimated to be between 25 and 72 percent (Twitty 1941; S. Sweet *in litt*. 1993; Launer and Fee *in litt*. 1996). Mortality may be increased by associated roadway curbs and berms as low as nine to 12 cm (3.5 to 5 in), which allow California tiger salamanders access to roadways but prevent their exit from them (Launer and Fee 1996; S. Sweet *in litt*. 1998).

In a recent study along a 1.05 km (0.7 mi) high-vehicular-use (21,450 vehicles per day) section of the Trans-Canadian Highway in Alberta, Canada, Clevenger *et al.* (2001) recorded 183 road-killed tiger salamanders (*Ambystoma tigrinum*) in 30 days and concluded it was likely that very little of the local population had survived. In California, vehicular-use levels along various State, interstate, and secondary roads commonly far exceed the level of use reported in the Alberta study. Vehicular usage on California roads is also increasing rapidly and directly with human population and urban expansion. During November 2002, California's estimated total vehicular travel on State highway system roads alone was 23 billion km (14.27 billion mi)(this figure and subsequent vehicular-use data from California Department of Transportation's Internet website, January 2, 2003). From 1972 to 2001, State highway system total vehicular usage rose steadily from 108.6 km to 270 km (67.11 to 167.81 billion mi) annually. For the 23 California counties in which the California tiger salamander may occur, State highway system total annual vehicular usage in 1999, 2000, and 2001 was 53.27, 55.85, and 57.21 billion miles (86, 90, and 92.1 billion km), respectively. The steady increase of vehicular use is thus continuing. We believe such figures illustrate (1) the general growth in vehicular usage that has been, and is still, occurring in many parts of the California tiger salamander's range, and (2) that additional increments of road-kill losses, which are already a potentially serious problem for the species, are likely occurring.

The most overwhelming threat to the California tiger salamander is from continuing habitat destruction, degradation, and fragmentation. Secondary threats exist from predation and competition from introduced exotic species; possible commercial overutilization; disease; hybridization with non-native salamanders; various chemical contaminants; road-crossing mortality; and certain unrestrictive mosquito and rodent control operations. The various primary and secondary threats are not currently being offset by existing Federal, State, or local regulatory mechanisms. The California tiger salamander also is vulnerable to chance environmental or demographic events, to which small populations are particularly vulnerable. The combination of its biology and specific habitat requirements makes the animal highly susceptible to random events, such as drought, disease, and other occurrences.

Environmental Baseline, Status within the Action Area

The proposed action is closest to the Central Valley population of the California tiger salamander. This population occupies Yolo County, Solano, Sacramento County south of the Cosumnes River, northeastern Contra Costa County, eastern San Joaquin County, western Amador County, western Calaveras County, western Tuolumne County, eastern Stanislaus County, Merced, western Mariposa County, and northwestern Madera County. Six percent (42) of the known California tiger salamander localities are in this population (CNDDB 2002). Ten localities in Calaveras, Contra Costa, Madera, Merced, Sacramento, Solano, Stanislaus, and Yolo counties are considered extirpated (CNDDB 2002). The species historically occurred as far north as Butte County, but has not recently been documented north of the Cosumnes River. The remaining sites inhabited by the California tiger salamander occur in the low elevation foothills on the eastern side of the Central Valley (Shaffer *et al.* 1993). Urban development and agriculture have eliminated much of the grassland and vernal pools. From 1996 to 1998, 14361 ha (35487 ac) of native habitat were converted to urban and agricultural uses in Yolo, Solano, Contra Costa, Stanislaus, Merced, Sacramento, San Joaquin, Stanislaus, Merced, and Madera counties. There are 361,761 acres of habitat for the California tiger salamander in the Central Valley.

Of 127 California tiger salamander localities where wetland type was identified, 26 percent (33) were in vernal pools. The Central Valley population of California tiger salamanders occurs within the Southeastern Sacramento Valley and Southern Sierra Foothills Vernal Pool Regions (Keeler-Wolf 1998). Vernal pools in both regions are threatened by conversion of grasslands and grazing land to housing developments and intensive agriculture.

California tiger salamander localities in the Central Valley population may be affected by proposed or recently implemented development projects, including a vineyard (Borden Ranch, Launa Creek Partnership), housing developments (Mueller Ranch, Liberty Hills Community), and highway construction (Oakdale Bypass). These development projects would destroy upland estivation habitat and wetland breeding habitat, thereby killing salamanders and reducing the viability of subpopulations at the affected localities. Vineyards planted in areas such as Borden Ranch along the San Joaquin-Sacramento County line have degraded and destroyed habitat for California tiger salamanders (Service files). The now-closed Rancho Seco nuclear power plant site in southeast Sacramento County has been converted to a public park, which could degrade or eliminate potential habitat for the nearby California tiger salamander subpopulation.

In Yolo and Solano counties, the major impacts to California tiger salamander populations have been agricultural. Portions of the California tiger salamander subpopulation at Jepson Prairie in Solano County is protected by the University of California Natural Reserve System and the Solano Land Trust. However, some estivation habitat may have been disrupted by construction of a PG&E natural gas pipeline in the vicinity of the reserve. California tiger salamanders also were found at the proposed Calpine power plants near Jepson Prairie. Vernal pool and upland habitat at this site was partially disced and planted to winter wheat in 1992, potentially killing salamanders and reducing the viability of the habitat (C. Nagano, Service, pers. obs).

In Stanislaus County, California tiger salamanders were considered extirpated until they were found by biologists surveying a potential route for the Oakdale Bypass near Oakdale (California Department of Transportation 2001). This route threatens the only known population of California tiger salamanders in the Oakdale area.

A total of 671 California tiger salamander species occurrence have been recorded in California (CNDDB 2002). Of these, eight occurrence have been recorded in Sacramento County. No salamanders have been recorded in either Sutter County generally or within the proposed action's action area. The closest salamander record is from Yolo County and is approximately 12 miles from the Basin. However, this location is considered extirpated. The closest extant occurrence is from Yolo County, approximately 20 miles west of the Basin.

Legenere

The Service classifies legenere as a Species of Concern. The species has no special state status. It has been included on California Native Plant Society lists of rare and endangered species for 25 years (Powell 1974) and is currently on List 1B because it is "endangered throughout its range" (Skinner and Pavlik 1994).

Description

Legenere is an inconspicuous annual. The entire plant is hairless. The main stems are 10 to 30 cm (3.9 to 11.8 in.) long and decumbent, although many branches are erect. Extra roots often arise from the lower nodes. The leaves, which are produced underwater, are 1 to 3 cm (0.4 to 1.2 in.) long and narrowly triangular; they fall off the plant before flowers appear. The egg-shaped or oval bracts are 6 to 12 mm (0.24 to 0.47 in.) long and remain throughout the flowering period. A single flower arises above each bract. Legenere flowers may or may not have corollas, and a single plant can produce both types of flowers. When present, the corollas are white or yellowish, 3.5 to 4 mm (0.14 to 0.16 in.) long, and two-lipped. The upper two corolla lobes are narrower than the lower three, and the corolla tube is slit on the upper side. The stamens are joined to form a tubular structure. The flower stalks are very slender and elongate as the fruit matures, reaching a final length of as much as 3 cm (1.2 in.). Legenere has a cylindrical capsule 6 to 10 mm (0.24 to 0.39 in.) long, which splits open only at the tip. Each capsule contains up to 20 seeds, which are approximately 1 mm (0.04 in.) long, brown, smooth, and shiny (McVaugh 1943, Mason 1957, Abrams and Ferris 1960, Holland 1984, Morin 1993). The chromosome number of legenere has not been determined.

The genera most likely to be confused with legenere are *Howellia, Downingia*, *Lobelia,* and *Porterella*. Both *Howellia* and *Downingia* have capsules that split along the sides, whereas legenere's capsule opens at the tip. Moreover, *Downingia* flowers are not stalked. The *Lobelia* species in California have either red or blue flowers and spherical fruits, as opposed to the whitish flowers and cylindrical fruits of legenere. *Porterella* has showy blue flowers with yellow or white marks at the base of the corolla lobes, and it occurs at higher elevations than legenere (Morin and Niehaus 1977, Holland 1984, Morin 1993).

Historical and Current Range

Between 1890 and 1984, legenere had been reported from 12 sites in eight counties encompassing six vernal pool regions. The historical counties of occurrence were Solano (three sites, including the type locality), Lake and Sacramento (two sites each), and Napa, Placer, San Mateo, Sonoma, and Stanislaus counties (one site each) (Hoover 1937, Mason 1957, Rubtzoff and Heckard 1975, Holland 1984). These sites were located in the Central Coast, Lake-Napa, Santa Rosa, Solano-Colusa, Southeastern Sacramento Valley, and Southern Sierra Foothills vernal pool regions (Keeler-Wolf *et al*. 1998). As of 1984, the only three populations believed to remain extant were in Napa, Placer, and Sacramento counties (Holland 1984).

Since 1984, legenere has been rediscovered at several historical sites and has been found at numerous new locations. During that time, the type locality and six other occurrences have been extirpated. Among the 42 occurrences presumed to be extant, 20 are in Sacramento County, including nine in the vicinity of Elk Grove and six in the vicinity of the former Mather Air Force Base. Another area of concentration, with ten extant occurrences, is near Dozier in Solano County. Other counties where this species is presumed to remain are Lake, Napa, Placer, San Joaquin, San Mateo, Shasta, and Tehama (Skinner and Pavlik 1994, CNDDB 2000).

The vernal pool regions (Keeler-Wolf *et al*. 1998) where legenere remains extant are Lake-Napa, Northeastern Sacramento Valley, Northwestern Sacramento Valley, Santa Rosa, Solano-Colusa, and Southeastern Sacramento Valley. It has been extirpated from the Southern Sierra Foothills Vernal Pool Region. The Central Coast Vernal Pool Region occurrence in San Mateo County has not been rediscovered since 1906 but is presumed to be extant because suitable habitat remains in the area (CNDDB 2000).

Reproductive Ecology and Demography

Legenere seeds germinate between late February and April. The specific conditions necessary for seed germination are unknown. The plants grow through the standing water; as the water evaporates or recedes, legenere stems may collapse onto the lake bottom or become caught on taller, stronger plants (Holland 1984). Legenere flowers during April, May, or June (Morin and Niehaus 1977, Holland 1984, Skinner and Pavlik 1994). Pollination in legenere has not been studied, but the small, inconspicuous flowers suggest that it may be self-pollinated (Holland 1984). By late June, each plant typically produces six to ten capsules containing several hundred seeds each. Seed dispersal agents are unknown but may include gravity, water, and waterfowl. Most populations contain densities of less than one plant per square meter (10.8 $ft.^2$) (Holland 1984). Legenere is even more variable than are other vernal pool annuals; entire populations have disappeared for decades, then reappeared (Holland 1984, CNDDB 2000). Thus, a persistent soil seed bank most likely exists. Survival rates and other aspects of demography have not been investigated.

Habitat and Community Associations

Legenere grows in a variety of habitats including vernal pools, vernal marshes, artificial ponds, and floodplains of intermittent streams. Occupied vernal pool types include Northern Basalt Flow, Northern Claypan, Northern Hardpan, Northern Volcanic Ashflow, and Northern Volcanic Mudflow (Sawyer and Keeler-Wolf 1995). The surrounding plant community may be grassland,

open woodland, or hardwood forest containing oaks (*Quercus* spp.) or California buckeye (*Aesculus californica*). At one site, legenere grows in both a vernal pool and the adjacent grassland (CNDDB 2000). The vernal pools and lakes supporting legenere vary in size from approximately 4 m^2 (43 $ft.^2$) to 41 hectares (100 acres) (Holland 1984, CNDDB 2000). When it occurs in large pools and vernal lakes, legenere grows only in the shallower areas (less than 20 cm [8 in.] deep) (Holland 1984). Substrates in occupied areas may have been deposited by streams or volcanic flows. Soils underlying the pools themselves typically are shallow, acidic clays with few stones (Holland 1984). Legenere has been reported from elevations ranging from 3 m (10 ft.) in Solano County to 884 m (2,900 ft.) in Lake County (CNDDB 2000).

Legenere occurs most often with smooth goldfields and pale spikerush, and to a lesser extent with Boggs Lake hedge-hyssop and dwarf downingia (CNDDB 2000 and unprocessed data).

Reasons for Decline and Threats to Survival

Of the four occurrences of legenere known to be extirpated, two were destroyed by conversion to agriculture, one by changes in hydrology, and one by urban development (Holland 1984, CNDDB 2000). Several sites where the species still occurs have been degraded by discing or other agricultural practices, inappropriate livestock grazing, dirt biking, and trash dumping (CNDDB 2000). The San Mateo County site has been subjected to logging and hydrological changes; legenere has not been observed there in over 90 years (Holland 1984). Legenere occurred at Boggs Lake in the 1950's but has not been seen there since (Rubtzoff and Heckard 1975, Holland 1984, CNDDB 2000), even though suitable habitat remains.

Approximately one-third of the extant occurrences of legenere are in areas slated for commercial or residential development (Holland 1984, CNDDB 2000). In fact, some of the populations extant in 1983 already may have been destroyed by development, but they have not been visited since that time. More than one-third of populations are subject to livestock grazing (CNDDB 2000), but few appear to be declining. Holland (1984) indicated that “light” grazing during the winter and early spring did not seem to be detrimental to legenere. Competition from lippia (*Lippia* spp.) is a threat at one Solano County site (CNDDB 2000).

Status with Respect to Recovery

Holland (1984) conducted a status survey of legenere in 1983 with funding from the County of Sacramento, R.C. Fuller Associates, and The Nature Conservancy. He confirmed that several historical populations no longer persisted. New populations of this species were discovered during pre-project surveys and during searches by The Nature Conservancy volunteers (Holland 1984, CNDDB 2000).

Sixteen occurrences of legenere are (or were) on nature preserves or publicly-owned lands. Five occurrences are known currently from the Jepson Prairie Preserve in Solano County, two from the nearby Calhoun Cut Ecological Reserve, and two from the Dales Lake Ecological Reserve. Legenere was known from Boggs Lake before the preserve was established, but it has not been rediscovered in that area for over 40 years (Holland 1984). Two occurrences, at Hog Lake and on the Stillwater Plains, are on property administered by the U.S. Bureau of Land Management. Sacramento County owns land supporting three occurrences of legenere; one is at a wastewater treatment plant, and the other two are in county parks. Finally, one occurrence is on land owned

by the Sacramento Municipal Utility District (CNDDB 2000). However, mere occurrence on public land is not a guarantee of protection. Only the preserves and the U.S. Bureau of Land Management occurrences are managed to promote the continued existence of legenere and other rare species. As of 1991, one Sacramento County developer had plans to preserve several pools containing legenere when he developed the property (CNDDB 2000).

Status within the Action Area and Environmental Baseline

A review of CNDDB (2002) revealed that legenere had been reported 57 times in California. Legenere has not been recorded from Sutter County or the Basin. However, it has been reported 20 times from Sacramento County. The closest reported Legenere occurrence to the Basin is approximately two miles away.

The Natomas Basin supports limited amounts of potential Legenere habitat. Potential legenere habitat of approximately 21.3 acres occurs in the vernal pools on the east side of the Basin, in 886 acres of grasslands primarily north of Del Paso Road. This estimate of vernal pool acreage is based upon assessments of the amount of vernal pool habitat in grasslands in Sacramento County and probably greatly overestimates the actual amount of vernal pool habitat in the Basin (K. Fuller, pers. comm.). Additional potential habitat occurs in 96 acres of other ponds and seasonally wet areas in the Basin. Once again, this estimate greatly overestimates the amount of potential vernal pool habitat in the Basin, as most of the ponds and seasonally wet areas do not have the hydrology sufficient to support legenere. No potential legenere habitat is located within 76 m (250 ft.) of any of MAP's proposed action activities.

Boggs Lake Hedge-Hyssop

Boggs Lake hedge-hyssop has no federal listing status. It was listed as endangered in California in 1978 (CDFG 1991) and is a candidate for listing in Oregon (Skinner and Pavlik 1994). It was included in the first California Native Plant Society list of rare and endangered plants (Powell 1974) and is now on List 1B (Tibor 2001). The U.S. Forest Service formerly considered Boggs Lake hedge-hyssop to be "sensitive" but has reclassified it as a "special interest plant" because it is more abundant than previously thought (Corbin in litt. 2000). The U.S. Bureau of Land Management classifies Boggs Lake hedge-hyssop as a "special status" species (Corbin *et al*. 1994).

Description

Boggs Lake hedge-hyssop is a an erect annual with hollow stems two to ten cm (0.8 to 3.9 in.) tall. The stems are mostly hairless, except for a few glandular hairs in the inflorescence. The leaves are opposite and have entire margins. Leaves near the base of the stem are 1 to 2 cm (0.4 to 0.8 in.) long and lance-shaped, but the leaves become shorter, wider, and blunt-tipped farther up on the stem. The 6 to 8 mm (0.23 to 0.31 in.) long flowers are borne singly in the upper leaf axils. Each corolla has two lips; the tube and upper lip are yellow, whereas the lower lip is white. However, the flowers appear yellow from a distance. The calyx is 4 to 6 mm (0.16 to 0.24 in.) long and has five sepals of differing lengths and shapes, giving rise to the specific epithet, heterosepala (meaning different sepals). The upper three sepals are united for approximately one-third of their length; the center sepal is longer than the others. The two lower sepals are separate and have notched tips, in contrast to the blunt tips of the upper sepals. The fruit of Boggs Lake

hedge-hyssop is a small, dry, pear-shaped capsule that is approximately the same length as the calyx. The tiny seeds are oblong and have narrow lengthwise ridges (Mason and Bacigalupi 1954, Mason 1957, Wetherwax 1993).

Boggs Lake hedge-hyssop is most similar to bractless hedge-hyssop (*G. ebracteata*). However, in bractless hedge-hyssop, the sepals are longer, pointed, and are separate almost all the way to their bases; all five corolla lobes are white; and the seeds have both lengthwise and crosswise ridges. The other California species, common American hedge-hyssop (*G. neglecta*), has bracts below the calyx, purplish corolla lobes, and a corolla at least twice as long as the calyx (Mason 1957, Wetherwax 1993).

Historical and Current Range

Boggs Lake hedge-hyssop was first collected in Lake County in 1923. The exact collection site is uncertain, but probably was Boggs Lake, where the species also was collected in 1929 and 1953 (Mason and Bacigalupi 1954). Another site was found in Madera County in 1961, then one in Sacramento County in 1977 (CNDDB 2000). During the 1980's, 20 additional occurrences were discovered in California, plus one in Lake County, Oregon (CDFG 1987). These additional California occurrences included nine in Shasta County; three each in Fresno, Placer, and Sacramento counties; and one each in Lake and Modoc counties (CNDDB 2000). Thus, the historical range included the Lake-Napa, Modoc Plateau, Southeastern Sacramento Valley, and Southern Sierra Foothills vernal pool regions (Keeler-Wolf *et al*. 1998).

Currently, Boggs Lake hedge-hyssop is known from 86 extant occurrences in California (CNDDB 2002) plus one in Oregon. Only one of the historical occurrences is believed to have been extirpated; it was in Sacramento County. In addition to the four vernal pool regions where it was known historically, Boggs Lake hedge-hyssop is now known from the Northeastern and Northwestern Sacramento Valley and the Solano-Colusa vernal pool regions (Keeler-Wolf *et al*. 1998). Additional counties of occurrence are Merced, San Joaquin, Solano, and Tehama (CNDDB 2000, Witham in litt. 2000).

Reproductive Ecology and Demography

Most of the life history information regarding Boggs Lake hedge-hyssop comes from an intensive study of the Oregon population by Kaye *et al*. (1990). California plants are morphologically similar to those in Oregon and grow in similar habitats; therefore, the life history of Boggs Lake hedge-hyssop is presumed to be similar in the two states.

The seeds of Boggs Lake hedge-hyssop most likely germinate in response to autumn or winter rains (Kaye *et al*. 1990, Corbin *et al*. 1994). By the time the water recedes the plants already are in bud or in flower; flowering can begin when as much as 5 cm (2.0 in.) of water remains (Kaye *et al*. 1990, Corbin *et al*. 1994). Throughout the range of the species flowers are open between April and August, with those at the highest elevations flowering later (Corbin *et al*. 1994). Each plant typically produces only one or two flowers (Kaye *et al*. 1990, Corbin *et al*. 1994), which mature into fruits within one to two weeks after flowering begins. The plants disappear quickly after seed-set (Corbin *et al*. 1994).

Kaye *et al*. (1990) determined that Boggs Lake hedge-hyssop is self-compatible and does not require insects for pollination. During their one-season study in Oregon, plants set equal amounts of seed whether or not insects were excluded. Moreover, insects were not observed visiting the flowers in natural settings (Kaye *et al*. 1990). The Oregon population averaged approximately 150 seeds per fruit, but the number of fruits per plant was not reported. The fruits showed no insect damage (Kaye *et al*. 1990). Seed dispersal agents are not known, and seed longevity in the soil has not been tested. However, seeds in one population on the Lassen National Forest (Shasta County) apparently remained dormant for three years, which was the interval between observations of growing plants (Corbin *et al*. 1994).

California populations of Boggs Lake hedge-hyssop range in size from only a few individuals to over one million (CNDDB 2000). As observed with other vernal pool annuals, population numbers fluctuate greatly from year to year (Corbin *et al*. 1994). The Boggs Lake population declined from 1,000 individuals in 1981 to zero in 1989 and remained at zero (Serpa 1993, CNDDB 2000) until 1997, when five plants were found (R. Bittman personal communication). The plants were widely scattered at Boggs Lake historically, with individuals growing isolated from each other (Mason and Bacigalupi 1954). At the one Vina Plains occurrence, the density of Boggs Lake hedge-hyssop was 67.4 plants per square meter (6.3 per square foot) in 1995 (Alexander and Schlising 1997).

Habitat and Community Associations

Boggs Lake hedge-hyssop occurs in vernal pools and in marshy areas on the margins of reservoirs and lakes, as well as in man-made habitats such as borrow pits and cattle ponds (Kaye *et al*. 1990, Corbin *et al*. 1994, CNDDB 2000). It has been found in several types of vernal pools, including Northern Basalt Flow, Northern Claypan, Northern Hardpan, Northern Volcanic Ashflow, and Northern Volcanic Mudflow (Sawyer and Keeler-Wolf 1995). Occupied wetlands are amongst annual grassland, oak woodland, juniper (*Juniperus* spp.) woodland, or conifer forest (CDFG 1987, Kaye *et al*. 1990, Corbin *et al*. 1994, CNDDB 2000).

Although Boggs Lake hedge-hyssop most often occurs on the margins of lakes and pools where water does not become too deep (Corbin *et al*. 1994), it also has been found in the beds of deeper vernal pools (CNDDB 2000). Clay is the most frequently encountered soil underlying occupied habitats, although loam and loamy sand also have been noted. Most sites are underlain by an impermeable layer (Corbin *et al*. 1994, CNDDB 2000). Kaye *et al.* (1990) noted that in juniper woodlands, Boggs Lake hedge-hyssop occurred on acidic soils with a pH of approximately 5. Some northern California sites are on slightly acidic soils, but soil pH has not been tested in other areas (Corbin *et al*. 1994). Known Boggs Lake hedge-hyssop sites in California range in elevation from 8 m (25 ft.) in Solano County to at least 1,576 m (5,170 ft.) in Modoc County (CNDDB 2000, Corbin in litt. 2000). A reported occurrence of Boggs Lake hedge-hyssop at North Emerson Lake Modoc County is at 2,400 m (7,900 ft.) in elevation (CNDDB 2000), but several species experts have revisited the site and found only bractless hedge-hyssop (Corbin in litt. 2000, Schoolcraft in litt. 2000). The elevation of the Lake County, Oregon, occurrence is 1,634 m (5340 ft.) (Kaye *et al*. 1990).

The most frequent associate of Boggs Lake hedge-hyssop is bractless hedge-hyssop (CNDDB 2000); the latter may form dense colonies containing only a few individuals of Boggs Lake hedge-hyssop (Mason and Bacigalupi 1954). Other typical associates, in order of frequency, are

vernal pool popcorn flower, two-horned downingia (*Downingia bicornuta*), slender Orcutt grass, and pale spikerush (CNDDB 2000, Corbin in litt. 2000).

Reasons for Decline and Threats to Survival

Habitat conversion for housing was responsible for the extirpation of one Boggs Lake hedge-hyssop population in Sacramento County (CNDDB 2000). Cattle trampling destroyed many immature plants at the Oregon occurrence (Kaye *et al*. 1990). Four occurrences have been disturbed but not extirpated by hydrological alterations such as excavation and damming, and another three by surface disturbances such as discing and grading (CNDDB 2000).

Urban growth through residential development, shopping center construction, and landfill expansion threatens seven of the populations in Placer and Sacramento counties (CNDDB 2000). Competition from medusahead (*Taeniatherum caput-medusae*) potentially threatens the species at five sites on the Modoc Plateau (Corbin *et al*. 1994). Nine of the extant occurrences contain fewer than 100 individuals at their maximum, and several are undergoing rapid declines (CNDDB 2000). These populations are sufficiently small that they are in danger of extirpation from chance events (Menges 1991).

Livestock grazing may or may not pose a threat to the survival of Boggs Lake hedge-hyssop. Although 48 California occurrences are subject to grazing by cattle, sheep, horses, or feral pigs (Corbin *et al*. 1994, CNDDB 2000, Corbin in litt. 2000), only 6 of those were reported to have heavy grazing or severe trampling (CNDDB 2000). Trampling and herbivory can be detrimental if they occur before seed set or if use is concentrated in a small area. However, moderate grazing is believed to be a compatible use if it occurs after Boggs Lake hedge-hyssop sets seed (Mason and Bacigalupi 1954, CDFG 1987). Directed research is necessary to establish appropriate use levels and seasons. The 47 occurrences administered by the U.S. Forest Service and the U.S. Bureau of Land Management potentially are subject to disturbance or destruction from livestock grazing and trampling, activities associated with logging, assorted recreational uses, hydrological alterations, road construction, fire suppression, weed competition, and herbicide drift (Corbin *et al*. 1994, California Natural Diversity Data Base 2000). However, management guidelines proposed by the agencies (Corbin *et al*. 1994) would mitigate such disturbances.

Status with Respect to Recovery

Twelve (14 percent) of the known occurrences of Boggs Lake hedge-hyssop are in nature reserves. Seven of those are on ecological reserves operated by CDFG, including four at Dales Lake in Tehama County, two at Thomes Creek in Tehama County, and one at Big Table Mountain in Fresno County. Nature reserves owned by private conservation organizations support another five occurrences, including two at Big Table Mountain Preserve in Fresno County (one of which is partially on federal land) and one each at Boggs Lake Preserve in Lake County, Vina Plains Preserve in Tehama County, and Jepson Prairie Preserve in Solano County. When The Nature Conservancy managed the Boggs Lake Preserve, they erected fences around colonies of Boggs Lake hedge-hyssop to keep out horses and deer (Serpa 1993). Volunteers conduct annual monitoring and searches for Boggs Lake hedge-hyssop and other rare plants at the Boggs Lake, Jepson Prairie, and Vina Plains preserves (Baldwin and Baldwin 1991, California Natural Diversity Data Base 2000).

Forty-seven (57 percent) of Boggs Lake hedge-hyssop occurrences are on federal land, which does not necessarily mean that they are protected from disturbance. Among the occurrences on federal land, 32 are on the Lassen and Modoc National Forests in Lassen, Modoc, and Shasta counties. Two of these are in areas with special designations, the Murken Botanical Special Interest Area and the South Warner Wilderness, where many uses are restricted (Corbin *et al*. 1994). Another 15 occurrences are at least partially on lands administered by the U.S. Bureau of Land Management in five different resource areas. These include six occurrences in Tehama County, five in Shasta County, two in Fresno County (one of which is partially on a private nature reserve), and one each in Lassen County, California, and Lake County, Oregon (Kaye *et al*. 1990, Corbin *et al*. 1994, California Natural Diversity Data Base 2000, Corbin in litt. 2000). Four of the occurrences on U.S. Bureau of Land Management property are in wilderness study areas (Corbin *et al*. 1994) and may be afforded additional protection if Congress designates those areas as official wilderness.

The U.S. Forest Service and the U.S. Bureau of Land Management developed a formal conservation strategy for Boggs Lake hedge-hyssop (Corbin *et al*. 1994) on lands they administer in northeastern California. Their goal was to protect 90 percent of the plants and sites from direct disturbance and hydrological alterations over a ten-year period. Additional conservation measures identified in the plan were comparisons of grazed and control areas, monitoring, surveys, and acquisition through land exchanges. However, due to funding priorities and the reclassification from "sensitive" status, intensive monitoring has been discontinued (Corbin in litt. 2000). The agencies have fenced several sites in northeastern California (Corbin *et al*. 1994, Corbin in litt. 2000) and in Fresno County (CDFG 1991, Franklin in litt. 1993) to prevent cattle from trampling Boggs Lake hedge-hyssop. Boggs Lake hedge-hyssop also may benefit from a grazing-management experiment being conducted at Big Table Mountain in Fresno County.

Status within the Action Area and Environmental Baseline

A review of CNDDB (2002) revealed that Boggs Lake hedge-hyssop had been reported 86 times in California. Boggs Lake hedge-hyssop has not been recorded from Sutter County, Area or the Basin. However, it has been reported eleven times from Sacramento County. The closest reported Boggs Lake hedge-hyssop occurrence to the Basin is approximately three miles away. However, that occurrence is presumed extirpated; the site has been developed). The next closest reported occurrence is from Sacramento County, approximately 12 miles from the Basin.

The Natomas Basin supports limited amounts of potential Boggs Lake hedge-hyssop habitat. Potential Boggs Lake hedge-hyssop habitat of approximately 21.3 wetted acres occurs in the vernal pools on the east side of the Basin, in 886 acres of grasslands primarily north of Del Paso Road. This estimate of vernal pool acreage is based upon assessments of the amount of vernal pool habitat in grasslands in Sacramento County and probably greatly overestimates the actual amount of vernal pool habitat in the Basin (K. Fuller, pers. comm.). Additional potential habitat occurs in 96 acres of other ponds and seasonally wet areas in the Basin. Once again, this estimate greatly overestimates the amount of potential vernal pool habitat in the Basin, as most of the ponds and seasonally wet areas do not have the hydrology sufficient to support vernal pool plants. No potential Boggs Lake hedge-hyssop habitat is located within 76 m (250 ft.) of any of MAP's proposed action activities.

Sanford's Arrowhead

The Service considers Sanford's arrowhead a Species of Concern and the California Native Plant Society includes it on List 1B (Tibor 2001). The State has not designated the species any special status.

Description, Reproductive Ecology

Sanford's arrowhead is a perennial herbaceous plant belonging to the water-plantain family (Alismataceae). It is one of five species of arrowhead and is endemic to California. Sanford's arrowhead plants are immersed aquatic plants that grow from underground tubers or heavy rhizomes. When mature, three-sided, erect, lance-shaped leaves develop to a height of 30.5 to 99 cm (12 to 39 in.) (Mason 1957). White flowers occur in several small whorls and appear from May through October (Tibor 2001). The lower flowers are female, occur in a group of three at a node and rarely have functional stamens. The upper flowers are usually male, recurved, and subtended by a triangular bract. Seedling establishment is rarely observed, as this species normally reproduces asexually from tubers.

Historic and Current Range, Habitat Types

Sanford's arrowhead was historically found throughout California, from Tehama and Shasta County in the north to Ventura and Orange County in the south. It is now extirpated from southern California and is rare throughout the rest of its range. Sanford's arrowhead is currently found from Shasta to Kern County (Tibor 2001).

Sanford's arrowhead occurs in slow, shallow assorted freshwater habitats, such as marshes and swamps in the Central Valley. Many populations have been lost to urban development and conversion to agriculture (Tibor 2001). No information regarding ecological niche requirements, genetics, pollinators, competition with other aquatic plants, or potential transplant site suitability criteria is available.

Reasons for Decline and Threats to Survival

Populations of Sanford's arrowhead are variously threatened by application of herbicides, competition from non-native plants, urban development, foot traffic and trampling, improper livestock grazing, surface water diversion and channel alteration, and illegal dumping (CNDDB 2001, Tibor 2001).

Environmental Baseline and Status within the Action Area

In 1980, a status review was conducted of the 36 historical sites in the Central Valley containing Sanford's arrowhead. Only five extant populations were found and 31 populations were determined to be extirpated due to habitat losses from urban development or agricultural practices. This review prompted future additional searches for the species. Currently, Sanford's arrowhead is known from 50 populations in Butte, Del Norte, Fresno, Kern, Madera, Merced, Sacramento, San Joaquin, and Tehama counties. The species is extirpated from Orange and Ventura counties. Sanford's arrowhead is known from two populations in San Joaquin County, one last seen in 1994 and the other last seen in 1940. The location of the population found in

1940 was revisited in 1980 but no plants were found. The single relocated population of Sanford's arrowhead covers an estimated area in excess of 46.5 m^2 (500 $ft.^2$) within a 5 acre-area of private land. Although occurring along the shoreline of an eroding island 1.5 m (5 ft.) above sea level, the extant population is considered to be in excellent condition and the condition of the other one is unknown. No status or trend information is available for any population of Sanford's arrowhead (CNDDB 2001).

A review of CNDDB (2002) revealed that Sanford's arrowhead had been reported 50 times in California. It has not been recorded from Sutter County or the Basin. However, it has been reported 27 times from Sacramento County; one record is less than one mile from the Basin. Several records are from along the American River within the City of Sacramento's City Limits.

Habitat classes identified in the EIR that may support Sanford's arrowhead in the Basin include ponds and seasonally wet areas (96 acres) and canals (1,778 acres)(Table 15). Of the total ponds and seasonally wet areas, seven acres are in the City's proposed Permit Area, four acres are in MAP's Permit Area, and ten acres are in Sutter's Permit Area. Of the total canals, 117 acres are in the City's proposed Permit Area, 72 acres are in MAP's Permit Area, and 215 acres are in Sutter's Permit Area.

Delta Tule Pea

Species description and life history

Delta tule pea is perennial herbaceous vine-like plant in the pea family (Fabaceae). Delta tule pea plants are entirely smooth (lacking hairs) and generally robust. Semi erect to prostrate stems arise from underground rootstocks. The stems have a flattened appearance due to the broad wings along the margins of the stems. Tangled masses of stems can grow as a group from 1.0-2.5 m (39-98 in.) tall. The compound leaves are composed of ten to 14 lance-like to semi-elliptical leaflets. Individual plants are difficult to distinguish from one another when growing in masses. Clusters of ten to 20 crimson to rose-purple flowers appear in May and June. Delta tule pea occupies slough edges and marsh lands and can form colonies on the slightly drier uplands sites, typically 0-2.7 m (0-9 ft.), adjacent to freshwater and brackish marshes. Little to no information is available regarding reproductive strategy, ecological niche requirements, salt tolerance, competitors, pollinators, genetics or why the species occurs as many small patches even though apparent suitable habitat is available for expansion.

Reasons for decline

Agricultural land conversion, bank protection (rip-rap), improper livestock grazing, recreational uses, accelerated soils erosion, use of herbicides, and competition from non-natives variously threaten the species (CNDDB 2001).

Distribution, Status Within the Action Area, and Environmental Baseline

Delta tule pea is known from numerous locations in freshwater and brackish marshes throughout much of the San Francisco Bay and upper delta. Although the total population and occupied habitat of Delta tule pea has been reduced historically by extensive diking and draining of wetlands, the species is known from 119 populations in Contra Costa, Napa, Sacramento, San

Joaquin, and Solano counties (CNDDB 2002). Delta tule pea has also been reputed to occur in Alameda, Fresno, Marin, San Benito, San Mateo, Santa Clara, and Tulare counties. The material from these counties is not currently considered to be delta tule pea. The Service has no information of any populations from these seven counties. Over half of the known populations are in Solano County. Land ownership where populations of Delta tule pea occur are mostly unknown. CDFG owns four populations, California Department of Parks and Recreation owns two populations, the Department of Defense owns seven populations.

Delta tule pea is known from nine locations in southern Sacramento County (none north of Paintersville), all of them presumed to be extant (CNDDB 2002). The species is not known from Sutter County or the Basin. The closest occurrence to the Basin is in southern Sacramento County, approximately 20 miles south of the Basin. The species is not anticipated to be in the Basin (see effects analysis). However, if the species were found in the Basin, habitat classes identified in the EIR that may support the species in the Basin include ponds and seasonally wet areas (96 acres) and canals (1,778 acres)(Table 15). Of the total ponds and seasonally wet areas, seven acres are in the City's proposed Permit Area, four acres are in MAP's Permit Area, and ten acres are in Sutter's Permit Area. Of the total canals, 117 acres are in the City's proposed Permit Area, 72 acres are in MAP's Permit Area, and 215 acres are in Sutter's Permit Area.

Although CDFG, the California Department of Parks and Recreation, the Department of Defense, and the Service have populations of Delta tule pea under their ownerships and management, most populations occur on private lands and are unprotected. Little has been accomplished on the ground to promote the survival or enhance populations of Delta tule pea.

Effects of the Proposed Action

The effects of the issuance of the proposed ITPs to the City, Sutter, and Conservancy are analyzed below. The effects of the issuance of an ITP to MAP were analyzed in the January 16, 2002, biological opinion for that project (Service File # 1-1-01-F-0302). However, because the development authorized by the MAP project is considered part of the total 17,500 acres considered in the NBHCP, development authorized by MAP is considered in this effects analysis. Some differences may exist between the acreage totals used in this biological opinion as compared to the MAP biological opinion. However, after completing the effects analysis, these acreage differences do not change any determinations regarding jeopardy to any of the proposed Covered Species.

The NBHCP proposes to investigate the possible intentional (re)introduction of several Covered Species (i.e., California tiger salamander, delta tule pea, Sanford's arrowhead, Bogg's Lake hedge-hyssop, Sacramento Orcutt grass, slender Orcutt grass, Colusa grass, legenere) that are not currently found in the proposed action's action area. Reintroduction, as defined in the NBHCP, is not the intentional introduction of Covered Species into the Basin from outside the Basin. Instead, it refers to the relocation of Covered Species from either: (1) one Conservancy reserve to another; or (2) from an urban development site to a Conservancy reserve. The effects analyses also consider potential colonization of the Basin by several species (i.e., Sanford's arrowhead, Bogg's Lake hedge-hyssop, Sacramento Orcutt grass, slender Orcutt grass, Colusa grass, legenere). In these cases, the Service believes that the species are in close enough proximity to the Basin for dispersal to the Basin to occur. The Service does not believe that either the

California tiger salamander or the delta tule pea have the potential to occur in the Basin (discussed below).

Direct and Indirect Effects

Direct effects are the immediate effects of the proposed project on the species or its habitat and include the effects of interrelated actions and interdependent actions. Interrelated actions are those actions that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those actions that have no independent utility apart from the proposed action (50 CFR §402.02). Indirect effects are those effects that are caused by or will result from the proposed action and are later in time, but are still reasonably certain to occur (50 CFR §402.02).

Threatened Vernal Pool Fairy Shrimp, Endangered Vernal Pool Tadpole Shrimp, and Midvalley Fairy Shrimp

Issuance of the proposed ITPs to the City, Sutter, and Conservancy will likely have minimal adverse effects on covered vernal pool crustaceans. Suitable potential habitat exists in the Permit Areas and the vernal pool fairy shrimp and vernal pool tadpole shrimp have been identified in the Basin. The midvalley fairy shrimp has not been identified in the proposed action's action area. However, the species has been identified approximately 11 miles southeast of the Basin in Sacramento County (and consequently, likely close enough for dispersal by birds) and has only recently been recognized as being a distinct species. So, the midvalley fairy shrimp may either already exist in the action area or may reasonably occur during the life of the proposed Permits. Furthermore, the midvalley fairy shrimp appears to inhabit pools that would not stay inundated long enough to support other vernal pool crustaceans, which may make the small vernal pools characteristic of the eastern Natomas Basin more likely to support the species. When present in the proposed Permit Areas, vernal pool crustaceans will likely be taken through the destruction of their habitat by development activities.

As stated in the species descriptions, the applicants did not quantify the amount of suitable vernal pool crustacean habitat in the Basin. The Basin is not known to contain substantial numbers of vernal pools and is not considered to be essential to recovery of the shrimp species by the Service; the proposed action's action area is not included in the Service's proposed vernal pool critical habitat rule (67 FR 59884). The vernal pool fairy shrimp and vernal pool tadpole shrimp have only been identified once in the Basin. The midvalley fairy shrimp has not been identified there. Based upon estimates derived from data gathered in Sacramento County (see Environmental Baseline for details), the Basin's 886 acres of grasslands would contain at the most 21.3 acres of vernal pools. Additionally, some portion of the Basin's 96 acres of ponds and seasonally wet areas may be suitable for vernal pool crustaceans. However, this estimate greatly overestimates the actual amount of vernal pool habitat in the Basin because grasslands in the Basin have a lower density of vernal pools than surrounding areas of Sacramento County (see Environmental Baseline) and most of the ponds and seasonal wetlands do not have appropriate hydrology to support covered vernal pool species. Of the total 886 acres of grasslands in the Basin, 427 are in the City's Permit Area and 134 are in Sutter's Permit Area (Table 14). This equates to 10.2 and 3.26 acres of vernal pools in the City and Sutter's Permit Areas, respectively. Of the total 96 acres of ponds and seasonally wet areas in the Basin, seven are in the City's Permit Area, four are in the MAP Permit Area, and ten are in Sutter's Permit Area (Table 14). Most of the potential

habitat that will be lost is located in the eastern portion of the City's Permit Area. As stated above and in the species descriptions, ponds and seasonally wet area acreages almost certainly vastly overestimate the actual potential vernal pool crustacean acreage in the Basin, as most of the ponds and seasonally wet areas do not have the appropriate hydrology to support vernal pool-associated species. Ponds and seasonally wet areas located in the MAP Permit Area do not have the appropriate hydrology to support vernal pool crustaceans and no other potential habitat is located within 76 m (250 ft.) of any of MAP's proposed action activities (Service 2002).

Issuance of the proposed ITP to the Conservancy will likely have little effect on vernal pool crustaceans in the Natomas Basin. The majority of potential suitable habitat is located in the Land Use Agencies' Permit Areas and therefore, will not likely be acquired by the Conservancy. Any other potential suitable habitat in the Basin that the Conservancy may acquire would likely be considered potential foraging habitat for the Swainson's Hawk (because vernal pools are often found in upland areas such as grasslands) and therefore, most-likely not considered for conversion to other land uses such as managed marsh. The most likely forms of direct effects caused by the Conservancy would be management activities such as grazing and invasive plant control. However, if done properly, these activities should actually benefit vernal pool species.

The conservation measures proposed by the Permittees will minimize the effects of the proposed ITPs on vernal pool crustaceans. If potential vernal pool crustacean habitat is located within a proposed development site in the City's or Sutter's Permit Area, applicants will be required to survey for vernal pool crustaceans. If covered vernal pool crustaceans are observed, measures have been proposed to avoid, minimize and mitigate the impacts to the species. Applicants will be required to consult with the Service to determine how to best avoid and minimize the take of vernal pool crustaceans. Measures that will be applied as appropriate are: (1) preserving the occupied pool(s) and surrounding uplands on site; (2) temporary avoidance and relocation of resources; or (3) payment into a Service-approved conservation bank. Off-site mitigation lands require mitigation ratios different from those used for other Covered Species (i.e., 0.5:1 used for snake, hawk, etc...)(see Table 3). If the vernal pool tadpole shrimp is identified within a proposed development site, the Wildlife Agencies may require the developer to avoid and preserve the vernal pool resource. In these cases, the Conservancy would be tasked with managing the vernal pools. Management activities such as grazing and invasive plant control could likely affect vernal pool crustaceans. For example, disturbance to wetted vernal pools could affect water quality and therefore, any vernal pool crustaceans in the water. However, the SSMPs developed by the Conservancy would be designed to protect the species and their vernal pool habitat.

Indirect effects to Covered vernal pool crustaceans may occur if upland areas surrounding potential crustacean habitat is altered. For example, if the upland area adjacent to an occupied vernal pool is graded, the hydrology of the vernal pool could be changed, thereby affecting the crustaceans that inhabit it. However, given the limited extent of vernal pool habitat, the extremely limited documented occurrences of Covered vernal pool crustaceans in the permit areas and the take avoidance and minimization measures in the plan, the level of indirect impacts to the three vernal pool shrimp species will be low to non-existent.

Overall, the proposed action should have little effect on the vernal pool fairy shrimp, vernal pool tadpole shrimp, and midvalley fairy shrimp. The vernal pool fairy shrimp and vernal pool tadpole shrimp have only been identified once in the Basin and the midvalley fairy shrimp has not been identified there. There is very little suitable habitat and the Permittees have proposed

suitable measures that minimize mitigate the impacts. The Natomas Basin represents a small portion of the range of these three species and does not contain habitat essential for the recovery of the species. Because the proposed action is unlikely to have much, if any, effect on the species locally, it is not anticipated to affect either the Southeastern Sacramento Valley Vernal Pool Region (as defined by Keller-Wolf *et al.* 1998) or the species as a whole.

Threatened Giant Garter Snake

The giant garter snake is found throughout the proposed action's action area and suitable snake habitat exists in each of the proposed permit areas. Implementation of the proposed action will have direct effects on the snake throughout the project's action area by authorizing the City, Sutter, Conservancy, and MAPPOA[4] to participate in and authorize activities that directly result in the disturbance, wounding, and death of snakes throughout the Permit Areas and on the Conservancy's reserves. In addition, project-related activities will likely result in the take of the snake through the destruction of 8,512 acres of its habitat (Table 4). This is approximately one-third of the existing snake habitat in the Basin (total = 24,567 acres) and much of the habitat that will be affected is likely important to the snake in the Basin because it is used for movement, foraging, or important activities. Examples of possible direct effects on the snake caused by the proposed action include: (1) injury and death of snakes as a result of being crushed or entombed during construction activities; (2) injury and death of snakes as a result of vehicles striking snakes while accessing construction sites; (3) displacement of snakes from their habitat to areas of less suitable habitat; and (4) loss of prey items on or downstream of the project sites due to silting, fill, or spill of oil or other contaminants. However, there are numerous conservation measures incorporated into the plan that will minimize the effects of the proposed action on the snake such as construction work windows, surveys, and dewatering requirements.

Issuance of an ITP to the City of Sacramento. Issuance of the proposed ITP to the City will result in the loss of 1,094 acres of potential snake habitat (7 acres of ponds and seasonally wet areas, 970 acres of rice, and 117 acres of canals). Some snake habitat in geographic Areas 2 and 3 (southwest and east, respectively) (Figure 5), as described by Brode and Hansen (1992), will be lost. The most important snake habitat in Area 2 to be affected is Fisherman's Lake. Numerous CNDDB (2002) records are known from Fisherman's Lake and the City's Permit Area abuts the eastern side of the lake. The Conservancy has already acquired reserves (i.e., Natomas Farms and Cummings tracts) on the western side of Fisherman's Lake. Additionally, an as yet to be determined buffer between development in the City's Permit Area along the eastern side of the lake and the lake will likely minimize some of the effects of development near the lake. This buffer will: (1) minimize human intrusion into the habitat; (2) help minimize the number of domestic animals that prey upon snakes; (3) reduce the effects of run-off from urban development; and (4) reduce the disturbance of snakes from surrounding development. However, since it appears that the buffer will be a multiple-use area (i.e., accessible by local residents for walking, etc.), the effectiveness of the buffer for the snake will be less than that if the area were

[4]Reminder: Activities associated with the MAP project were analyzed and authorized under the biological opinion (Service File no. 1-1-01-F-0302) for that project. However, because the development authorized by the MAP project is included in the total 17,500 acres considered in the NBHCP, development authorized by MAP is considered in this effects analysis. Therefore, although the effects of the MAP project are re-analyzed here, activities associated with MAP have already been authorized.

isolated from all entry. By allowing the area to be accessed by the public, snakes will likely still be disturbed (although to a lesser extent) on an on-going basis. Although the buffer likely will provide some benefit, its ability to protect snakes will be limited because the area will not be solely managed for the benefit of snake or other Covered Species and the buffer may not include all of the snake's upland habitat. The majority of the City's effects on snake habitat in Area 3 occur in the northern portion of the City's Permit Area and will mostly result from the conversion of rice fields and their associated drainage/irrigation canals to development.

Development as a result of issuing the proposed ITP to the City will likely have little effect on the connectivity between Area 2 and Areas 1 and 3 (see Figure 5). With regard to movement between Areas 1 and 2 (northwest and southwest), although some delivery and drainage canals crossing under I-5 and SR-99/70 will likely be affected (especially east of Fisherman's Lake), other canals with the potential to provide movement corridors for the snake between the two geographic areas will remain after the issuance of the proposed ITP to the City. With regards to movement between geographic Areas 2 and 3 (southwest and east), it is unlikely that direct movement between these two geographic areas exists even today. The most probable movement corridor between Areas 2 and 3 would be the East Drainage Canal, which is surrounded by development. There is little or no upland buffer for the snake in this area and it is unlikely that the snake uses this canal as a movement corridor. Therefore, additional development along the East Drainage Canal will have little effect on the connectivity between Areas 2 and 3, as there is already considerable development along the canal that likely precludes its use by snakes. Other canals between geographic areas 2 and 3 probably provide for only very limited movement and dispersal between areas and may not represent a true movement corridor for the snake between geographic areas. It is unlikely that snakes would traverse through these types of culverts because of lack of suitable habitat within the culverts over several hundred feet or more. The culverts are extremely long, often do not have emergent vegetation near their entrances, and have little clearance (i.e., distance between the water's surface and the top of the culvert) during the snake's active season (May 1-October 1); the culverts lack the 2-3 foot clearance described by Brode and Hansen (1992) as typical for culverts that allow for snake passage. The use of larger culverts or free-standing bridges (best) that contain some of the minimum habitat characteristics of the snake (i.e., emergent vegetation up to the culvert entrances, burrows, prey) should provide improved passage opportunities for the snake.

Issuance of an ITP to Sutter County. Most of Sutter's proposed Permit Area is potential snake habitat and issuance of the ITP to Sutter will result in the loss of 5,802 acres of potential snake habitat (10 acres of ponds and seasonally wet areas, 5,577 acres of rice, and 215 acres of canals). As a result, development in Sutter's Permit Area will have a greater direct effect on the snake than development in the City's Permit Area. Some snake habitat in geographic Areas 1 and 3 (northwest and east, respectively) (see Figure 5), as described by Brode and Hansen (1992), will be lost. In Area 1, development will encompass portions of the North and East Drainage Canals and much of their extensive system of associated rice fields. In Area 3, development will occur in the northern portion of "Snake Alley," by encompassing the northern half of the North Main Canal and its system of associated rice fields and irrigation canals in the southeastern portion of the Permit Area. In addition, portions of the East Drainage Canal and the canal that parallels the east side of SR 99/70 between Elverta Road and the northern end of Snake Alley will also be lost. These areas were identified by Brode and Hansen (1992) as being important for the snake in the Basin. In addition, Wylie *et al.* (2002) described much of these areas as good snake habitat.

Sutter County drainage improvements associated with the proposed South Sutter County Specific Plan include expanding two existing drainage channels outside of the proposed Permit Area; the Montna Drain and the Natomas East Drain (East Drainage Canal) (Figure 2 and 3). These drainage improvements are included in the proposed action and widening these canals will likely directly affect the snakes. Both of these canals were described by Wylie *et al.* (2002) as good snake habitat and snakes have been observed in close proximity to where activities will occur. Based upon observations of Hansen and Brode (1993), it will take at least 3-5 years for the canals to be inhabited by snakes, if ever, following the improvements. The Montna Drain and the Natomas East Drain parallel the North Main Canal (commonly referred to as "Snake Alley") to the east and west, respectively, but will not affect Snake Alley outside of Sutter's Permit Area, except where the East Drainage Canal crosses Snake Alley at Elverta Road. It is anticipated that the proposed Sutter County drainage improvements will convert approximately 16.5 acres of existing agricultural land (rice) to drainage channel. This acreage is included in Sutter's total permitted acreage.

Issuance of the proposed ITP to Sutter will have no direct effect on the movement of snakes between Area 2 and Areas 1 and 3 because Area 2 is located completely within Sacramento County and is removed from Sutter County (Figure 5). However, issuance of the ITP to Sutter will affect the movement of snakes within Area 1 and may affect the movement of snakes between Areas 1 and 3. The Sutter Permit Area divides the available snake habitat in Area 1 in half. Some canals in Sutter's Permit Area that are likely used by the snake for connectivity in Area 1 will be lost. However, other opportunities for movement (e.g., canals) will be available if the proposed ITP is issued. For example, suitable movement corridors will remain in the Swainson's Hawk Zone west of Sutter's Permit Area. Sutter has committed in the NBHCP that the County will not allow development in the Swainson's Hawk Zone. In addition, Sutter will provide protective measures for the snake, such as fencing along the East and North Drainage Canals in its Permit Area to help ensure that snakes are able to move through these canals.

Some of the movement opportunities for snakes between Areas 1 and 3 will likely be affected by the issuance of the proposed ITP to Sutter because some canals will be closed or otherwise made unavailable to snakes. However, issuance of the proposed ITP to Sutter will not prevent movement of snakes between the two geographic areas because some connectivity corridors will remain. Protective measures (e.g., fencing and gaited access) have been provided for the North and East Drainage Canals where they traverse through Sutter's Permit Area and additional connectivity corridors will remain south of Sutter's Permit Area, in northern Sacramento County.

Issuance of an ITP to the Metro Air Park Property Owners Association. The effects of the issuance of an ITP to MAP were analyzed in the January 16, 2002, biological opinion for that project (Service File # 1-1-01-F-0302). Issuance of the ITP to MAPPOA will result in the loss of 1,617 acres of potential snake habitat (4 acres of ponds and seasonally wet areas, 1,541 acres of former rice lands, and 72 acres of canals). Some snake habitat in Area 1 (Figure 5), as described by Brode and Hansen (1992), will be lost. Numerous CNDDB (2002) snake records are known from the canals within and adjacent to MAP. Wylie *et al.* (2002) identified good snake habitat on site. Although MAP development will affect the snake and its habitat, extensive areas of snake habitat will remain in Area 1 following implementation of the proposed action.

As stated in the January 16, 2002, biological opinion for the MAP project, issuance of the MAP ITP will not affect the connectivity between Areas 1 and 2. Although the potential for Lone Tree

Canal to fully function as snake habitat will be reduced, it will remain suitable for foraging and passage to upstream and downstream areas. MAPPOA will install a snake road deterrent on Lone Tree Road and is required to maintain at least 12 inches of water in the canal between April and October. The connection between the Lone Tree Canal and the southwestern zone presently exists as a culvert beneath Interstate 5. This passage is currently ineffective, and will not be improved or worsened as a result of the activities within MAP or by the Conservancy. A snake-excluding fence will be constructed along Lone Tree Canal so that snake mortality in adjacent areas is not increased.

Issuance of an ITP to the Natomas Basin Conservancy. Issuance of an ITP to the Conservancy will result in both significant beneficial and only minor detrimental effects to the snake. Restoration, enhancement, maintenance, and farming activities that take place on Conservancy lands inhabited by snakes may directly result in the injury or death of snakes on those lands. As stated in the NBHCP, the Conservancy will be responsible for the preservation of 8,750 acres of land. Three quarters (6,562.5 acres) of the total acreage will be managed as either marsh (2,187.5 acres) or rice habitat (4,375 acres). All of the marsh and rice habitat is likely to be inhabited by snakes in the future. As there is very little existing marsh habitat in the project's action area, almost all of the marsh habitat managed by the Conservancy will be created through habitat enhancement and creation activities. Since most of the lands available for preservation are currently rice fields considered to be inhabited by snakes and the soils underlying rice fields are typically the best for managed marsh enhancement, habitat restoration and creation activities on these lands will likely result in injury and death of snakes. After habitat restoration and enhancement activities are completed, on-going maintenance activities will likely result in some injury to and death of snakes as a result of activities such as change/repair of water control structures and levee repairs. Management of Conservancy lands as rice fields will also likely result in the injury to and death of snakes. The remaining 2,187.5 acres of land that are not managed as marsh or rice fields will be managed as uplands. Although the uplands will be managed for the hawk and other upland-associated Covered Species, irrigation canals or ditches traversing the uplands and uplands within 61.0 m (200 ft.) of the aquatic resources could be inhabited by or used by snakes. Therefore, habitat restoration, enhancement, and maintenance activities in these upland areas could also result in the disturbance, harm, and death of these snakes.

The Conservancy plans to annually fallow 10 percent of its ricelands. Therefore, 10 percent (437.5 acres) of the total 4,375 acres of rice habitat will not be available to the snake each year. However, the actual loss of snake habitat due to rice field fallowing is likely to be much less than 400 acres per year because: (1) the extensive system of canals traversing the rice fields will still be available to the snake; and (2) the portions of fallowed rice fields within 61.0 m (200 ft.) of the snake's aquatic habitat will serve as upland habitat (although marginal) for the snake during the active season.

The adaptive management provisions of the NBHCP allow for the habitat management ratio to be increased from 25 percent marsh/ 50 percent rice/ 25 percent upland to up to 75 percent marsh/ 25 percent upland. If this occurs, then up to 6,562.5 acres of Conservancy lands may be restored, enhanced, and managed as marsh. However, since: (1) the ratio change is applied prospectively; (2) the Service has not issued a final recovery plan for the snake; and (3) the Conservancy has already acquired over 2,750 acres of land, the total amount of potential marsh habitat created would be much less than 6,562.5 acres.

Effects of the Proposed Conservation Measures on the Snake. The Land Use Agencies and the Conservancy have proposed a number of conservation measures that minimize the effects of the proposed action on the snake (see NBHCP, sections V.A.5. and V.B.4.). These measures are similar to those included in Appendix C of the Service's November 13, 1997, *Programmatic Formal Consultation for U.S. Army Corps of Engineers 404 Permitted Projects with Relatively Small Effects on the Giant Garter Snake within Butte, Colusa, Glenn, Fresno, Merced, Sacramento, San Joaquin, Solano, Stanislaus, Sutter and Yolo Counties, California* (Snake Programmatic Consultation). Examples of conservation measures include, but are not limited to: (1) construction windows (i.e., limiting construction to periods when snakes are least likely to be injured or killed); (2) dewatering; (3) snake surveys to minimize the potential that snakes are located on the project site when construction activities occur; and (4) environmental awareness training. These measures will all minimize direct effects to snakes. Additional conservation measures include provisions such as protecting the North and East Drainage Canals with fencing to ensure some connectivity remains between and within the system of habitat reserves.

The most important conservation measure proposed in the NBHCP is the development of a system of habitat reserves. Once complete, the Conservancy will have acquired/restored/ enhanced a minimum of 2,187.5 acres of marsh and 4,375 acres of rice habitat to be managed for the snake and other Covered Species in perpetuity. Managed marsh is at least equivalent and likely greater in habitat quality to the canals, ponds, and seasonally wet areas that will be destroyed as a result of issuing the ITPs to the Land Use Agencies. As such, a total of 2,187.5 acres of marsh will created and preserved for the 425 acres of canals, ponds, and seasonally wetted areas lost. This is equivalent to approximately five acres of habitat preserved for every acre habitat lost. Much of the uncertainty regrading the ability of created marsh habitat no longer exists. Data gathered by BRD on the Conservancy's reserves and at the Colusa National Wildlife Refuge demonstrate that snakes use created marsh habitat (Wylie and Martin 2002, Wylie *et al.* 2003). In fact, Wylie *et al.* (2003) stated that the enhanced areas at the Colusa Nation Wildlife Refuge are occupied by a healthy population of snakes. Managed marsh habitat, because it is interlaced with meandering channels, has lots of edge habitat. The snake often travels and hunts along these edges. They are also directly adjacent to upland habitat, where they can go to escape from predators. Snake rice habitat lost as a result of issuing the ITPs to the Land Use Agencies will be preserved at rate of approximately one acre for every two acres of rice lost. Additional benefits will be gained for the snake on Conservancy rice lands through the use of wildlife-friendly practices such as minimizing mowing on rice checks, berms, and other water control structures.

In order to mitigate for the loss of 1,094 acres of snake habitat resulting from the issuance of the proposed ITP to the City, the Conservancy will provide (with fees acquired by the City) 3018.8 acres of habitat for the snake. Of that, 1006.2 acres will be managed marsh and 2012.5 acres will be rice fields. However, as stated above, 10 percent of the total rice field habitat will be fallowed annually; therefore, the total acreage of rice field habitat is actually 1811.2 acres. In order to mitigate for the loss of 5,802 acres of snake habitat resulting from the issuance of the proposed ITP to Sutter, the Conservancy will provide (with fees acquired by Sutter) 2800.1 acres of snake habitat for the snake. Of that, 933.4 acres will be managed marsh and 1866.8 acres will be rice fields. However, as stated above, 10 percent of the total rice field habitat will be fallowed annually; therefore, the total acreage of rice field habitat is actually 1680.1 acres. In order to mitigate for the loss of 1,617 acres of snake habitat resulting from the issuance of the proposed ITP to MAPPOA, the Conservancy will provide (with fees acquired by MAPPOA) 743.6 acres of

snake habitat for the snake. Of that, 247.9 acres will be managed marsh and 743.6 acres will be rice fields. However, as stated above, 10 percent of the total rice field habitat will be fallowed annually; therefore, the total acreage of rice field habitat is actually 669.3 acres.

After implementation of the proposed action, the Conservancy will have acquired/restored/ enhanced a minimum of 2,187.5 acres of marsh and 4,375 acres of rice habitat to be managed for the snake and other Covered Species in perpetuity. Although this amount is less than that being impacted by the proposed action, the NBHCP adequately protects the snake because the effective mitigation ratio is greater than 0.5:1. Managed marsh habitat on the Conservancy's reserves is more valuable to the snake than the existing habitat in the Basin because: (1) the habitat will be protected in perpetuity; (2) the habitat is monitored and actively managed for the benefit of the snake and other Covered Species; (3) the habitat will not be subject to continuos disturbance caused by farming or canal maintenance activities; (4) the habitat will be available for the snake year-round whereas the Basin's rice habitat is only available during a portion of the year; (5) the habitat will not be periodically made unavailable to the snake as occurs with canal maintenance activities; and (6) the habitat will be relatively free of human intrusion. In short, managed marsh preserves will provide high-quality habitat that is not subject to most of the impacts that routinely adversely affect the snake and its existing habitat throughout the rest of the Basin. With regard to the Conservancy's rice reserves, Conservancy rice lands will be more advantageous for the snake because rice production practices will be more "snake-friendly." For example, the Conservancy will maintain rice checks, berms, and other water-control structures in as natural a state as practicable and maintain prey species (e.g., mosquito fish) in or near the rice fields. These rice fields will also be consistently available, regardless the market for water transfers, unlike non-Conservancy rice habitat in the Basin, which is available for water transfers.

Summary/Discussion of Direct Effects on the Snake. The proposed action is likely to directly affect the snake throughout much of the Basin. Some areas that have historically been known to be occupied by large numbers of snakes will be developed. In addition, some potential connectivity corridors between the Basin's three geographic areas will be compromised. However, after implementation of the proposed action, much of the potential snake habitat in the Basin will remain. Of over 24,000 acres of potential snake habitat in the Basin, over 16,000 acres will remain after implementation of the proposed action. These lands include areas in both Sutter and Sacramento County that are designated in land use plans as either agriculture or open space and are anticipated to be so in the future. Up to 6,500 acres of the remaining snake habitat in the Basin will be protected and enhanced as part of the Conservancy's system of reserves. Additionally, much of the habitat that has historically been and is currently known to be important for the snake will not be affected. For example, much of Snake Alley (the North Main Canal and its important surrounding matrix of irrigation/drainage canals and rice fields) will not be directly affected by the proposed action because it lies south of Sutter's proposed Permit Area in unincorporated Sacramento County. This area is designated as agricultural cropland and as discussed in the cumulative effects section (below), is not anticipated to change in the foreseeable future. Based upon the adopted land use plans for the area and the fact that much, if not all, of Snake Alley is located within the 100 year floodplain, Snake Alley is expected to remain in agricultural use and rice would be the most appropriate crop. Because rice farming is expected to persist, many of the irrigation canals are expected to persist. Because Based upon the historical literature (e.g., Brode and Hansen 1992), the observed density of snakes, and the amount, configuration, and quality of suitable snake habitat in the area (e.g., Wylie and Martin 2002; Wylie *et al.* 2002), Snake Alley appears to be important for the continuation of the snake in the

Basin. In another example, portions of the North Drainage Canal in the western Basin will not be affected because they are outside of Sutter's proposed Permit Area. Although development will get as close, or closer, than 61.0 m (200 ft.) to it, Fisherman's Lake, an important snake habitat area in Area 2, will be mostly protected. The Conservancy has already purchased lands on Fisherman's Lake's west bank (Figure 6) and the east bank will be partially protected from development. Lands in the northwestern corner of the Basin support snakes, will not be developed, and have been targeted by the Conservancy for some mitigation land acquisitions. Lastly, lands in northern Sacramento County between Snake Alley and the North Drainage Canal will not be developed because it is unincorporated land in Sacramento County which is outside the urban services boundary. These lands will allow movement between Snake Alley to the western and northwestern portions of the Basin.

Implementation of the proposed action will likely have some negative effects on connectivity. For example, development will surround the North and East Drainage Canals and other canals connecting the three geographic Areas will be lost. However, connectivity corridors will remain for the snake. Canals are required for flood control in the Basin and agriculture (which requires irrigation water) is anticipated to continue through the life of the Permits. The Land Use Agencies, through their adopted general plans, community plans, and specific plans, will promote compact urban development within limited portions of the Natomas Basin. Under the NBHCP, the Land Use Agencies are required to ensure connectivity (see NBHCP, Section IV.C.1.d.) and the Plan includes measures to help maintain connectivity. The Conservancy will consolidate reserve acquisitions during the 50-year life of the permits in order to build larger blocks of habitat reserve lands. Reducing the number of blocks reduces the number of connections to be maintained. Specific measures identified in the NBHCP to ensure viability of the reserve system include: (1) relocating reserve components; (2) MOAs; (3) easements; and (4)s outright purchases of land, which would be designed to ensure connectivity for the snake between Conservancy reserves. The NBHCP does not include the closure of canals as a Covered Activity and the Water Agencies have not applied for ITPs at this time. Therefore, in the event of a proposed canal closure, the Water Agency (or project sponsor for canal closure) would be required to comply with the Act.

The NBHCP requires that an annual assessment of connectivity within and between reserves be conducted. If an annual assessment determines that connectivity has been lost, it then must be reestablished. Otherwise, the Conservancy could have its permit suspended or revoked. Because the Conservancy, as the plan operator, acts on behalf of the Land Use Agencies, the agencies could also have their Permits suspended or revoked if connectivity is lost. Therefore, it is in the City's and Sutter's best interest to ensure connectivity for the snake in the Basin. The Final EIS/EIR provides detailed discussion regarding connectivity in the Basin.

Indirect Effects. Implementation of the proposed action is likely to have several indirect effects on the snake. Snakes displaced as a result of development activities could: (1) encounter intraspecific and interspecific competition in their new habitats; (2) be more susceptible to predation in their new, unfamiliar habitats; and (3) experience lower survivorship as they hunt in unfamiliar habitat. Development adjacent to snake habitat could: (1) result in decreased water quality in the snake's aquatic habitat through the introduction of pesticides, herbicides, petroleum products, heavy metals, polynuclear aromatic hydrocarbons, and other organic compound and nutrients in run-off; (2) introduce new snake predators (i.e., cats) to the snake's habitat; (3)

disrupt snake activities and behavior through noise and other disturbances; and (4) disturb the snake by increasing the number of snake-human interactions.

Perhaps the most important indirect effect potentially caused by the proposed action is the availability of irrigation/drainage canals for the snake. However, Natomas Mutual is a long-established privately held water company and as the Conservancy becomes a major land owner within the Basin, it will require substantial water deliveries that will assist Natomas Mutual with remaining an economically viable company. Additionally, substantial agricultural interests are anticipated to remain within the Natomas Basin throughout the life of the Permit(s). The NBHCP represents all reasonably foreseeable development in the Basin and except for some airport lands, adopted land use plans and policies designate the remaining areas of the Basin as either open space or agriculture. Natomas Mutual has provided irrigation water for over 80 years and there are no plans to discontinue service. As long as agricultural activities continue in the Basin, there will be a demand for Natomas Mutual's services. So, even if Natomas Mutual ceases to operate, there will likely be a demand for irrigation water, which would be met by some other provider. In addition to irrigation canals provided by Natomas Mutual, it is anticipated that drainage canals will remain throughout the life of the Permits. Figure 17 of the NBHCP identifies drainage channels within the Natomas Basin that are considered likely to be retained for flood control purposes for both existing agricultural uses and for Planned Development. Regardless of the type of uses within the Basin, whether agricultural or urban, major flood control channels are required to convey water through the Basin. These canals and their surrounding rice fields will continue to provide habitat and movement corridors for the snake.

Issuance of the proposed permits to the Permittees will provide the conditions necessary for the permanent maintenance of a stable, protected snake population in the Basin (and, consequently, for the continued viability of the snake in the Basin) for the following reasons: (1) the measures proposed by the City and Sutter, including pre-construction surveys and dewatering and fencing of important canals, will minimize the impacts to the snake; (2) the protection and enhancement/ restoration/creation 6,562.5 acres of higher quality managed marsh and rice reserves, and in particular, the creation of a minimum 2187.5 acres of managed marsh habitat in place of 425 acres of canals, ponds and other seasonally wetted areas that will be lost and that will result in an effective mitigation ratio of approximately 5 to 1 for this key snake habitat, will effectively mitigate the impacts resulting from the conversion of 8,512 acres (including MAP) of varying quality snake habitat to urban development; (3) essential connectivity among the Basin's three geographic areas will remain following project build-out; (4) after implementation of the proposed action, over 16,000 acres of snake habitat will remain, including many areas that are recognized as important to the viability of the snake in the Basin; and (5) the creation of year round, protected snake habitat that is specifically managed to benefit the snake will substantially reduce mortality sources such as farming activities (e.g., field preparation, harvest) and canal maintenance activities. The proposed action will not adversely affect snakes outside of the Natomas Basin. Therefore, because the proposed action will not affect the viability of the snake in the Basin or affect the snake outside the Basin, the viability of the American Basin population and the entire species will not be compromised.

Threatened Valley Elderberry Longhorn Beetle

Implementation of the proposed action will likely affect the beetle by authorizing the City, Sutter, Conservancy, and MAPPOA to participate in and authorize activities that result in direct effects

to any beetles inhabiting the Permit Areas or on the Conservancy's reserves. Although the beetle has not been observed in the Basin, it has been observed in close proximity to the Basin (i.e., across the Sacramento River from the Basin). Suitable beetle habitat is known to occur in the Basin and the Permittees have requested incidental take authorization in case beetles or their habitat is found in the Permit Areas. Take could be in the form of injury, or death of beetles. For example, beetles could be adversely affected if the elderberry shrub they inhabit is relocated. This is the most likely form of direct effects and would presumably injure or kill some beetles. The January 16, 2002, biological opinion that evaluated the potential effects of the proposed Metro Air Park project (Service File # 1-1-01-F-0302) found that the proposed action would not directly affect the beetle, as no elderberry shrubs were located on-site. However, suitable beetle habitat could grow in the MAP project site by time development occurs and therefore, incidental take coverage for direct effects to the beetle was granted.

The Conservancy's management and restoration activities may have a minor adverse effect on the beetle. Management activities may include mechanical treatment and removal of non-native shrubs and limited excavation to establish new plants. The Conservancy will avoid impacts to elderberry shrubs to the maximum extent practicable. However, it is reasonable to expect that in some instances, the Conservancy will have to conduct activities that affect the elderberry shrubs, and as a consequence, the beetles that inhabit them. For example, a berm on which an elderberry shrub is located could need repair. There may also be potential direct effects associated with the need to relocate shrubs that become established outside of riparian restoration areas, such as along irrigation ditches. However, because of the small number of elderberry shrubs in the Basin and Conservancy's goal to minimize impacts to the species, direct effects of the Conservancy's management activities on the beetle should be minimal.

As stated in the Environmental Baseline for the species, the amount of potential beetle habitat in the proposed action's action area has not been quantified. However, beetle habitat is more likely to be located in some habitat classes than others. Within the Basin, the habitat classes most likely inhabited by the beetle include oak groves, riparian, and tree groves. Of the total 98 acres of oak groves in the Basin, eight acres (City = 6, MAP = 2) will be lost (Table 13). Of the total 124 acres of riparian habitat in the Basin, 24 acres (City = 24) will be impacted. However, much of the 24 acres of affected riparian areas are located on the east side of Fisherman's Lake and will not be developed. Therefore, 24 acres overstates the actual amount of riparian habitat that will be lost. Of the total 106 acres of tree groves in the Basin, 33 acres (City = 10, MAP = 23) will be lost. It must be emphasized that: (1) loss of oak groves and riparian habitat overstates the amount of potential beetle habitat lost; (2) elderberry shrubs are likely located in some additional isolated areas of the Basin; and (3) there are no documented occurrences of the beetle in the basin.

The conservation measures proposed by the Land Use Agencies and the Conservancy will effectively minimize and mitigate the potential effects of the proposed action on the beetle. The Permittees will conduct surveys for the beetle and its habitat. When possible, Permittees will avoid beetle habitat. When this is not possible, shrubs will be transplanted during their dormant season (to minimize any potential adverse effects on the shrub and consequently, the beetle) and replacement seedlings will be planted. Beetles have observed emerging from shrubs after they were transplanted to conservation areas (B. Cordone, pers. comm. to Craig Aubrey, 2003) and beetles have been observed emerging from replacement seedlings in conservation areas (G. Sutter, pers. comm. to Craig Aubrey, 2003). The Land Use Agencies and Conservancy have

agreed to adhere to the Service's Beetle Guidelines, or any updated Guidelines, as they are updated in the future. This provision will help ensure that the NBHCP's beetle conservation strategy is consistent with the Service's most current conservation strategy for the species.

Indirect effects of the proposed action on the beetle should be minimal. The most likely potential indirect effect is the removal of elderberry shrubs with stems less than one inch diameter at ground level. When development activities occur, these shrubs will not be considered suitable beetle habitat (because their stems are not yet large enough) and will therefore, not be protected. Left alone, they would presumably grow to become suitable beetle habitat. Construction activities would preclude these shrubs from becoming suitable habitat for the beetle.

Overall, the effects of the proposed action on the beetle should be minimal. There are few elderberry shrubs in the Basin, limited areas where elderberry shrubs would be likely to occur, and the beetle has never been observed in the Basin. Impacts to the beetle are unlikely to occur on either a frequent or large-scale basis. The Permittees have proposed measures that minimize and mitigate the impacts such as requiring land owners/developers to mitigate according to the Service's Beetle Guidelines. Therefore, the proposed action is minimized and unlikely to affect the survival of the beetle in the Basin. Furthermore, because of the proposed action's minimal effects on the beetle and the Basin represents only a small portion of the beetle's current range, the proposed action is not likely to affect the survival or recovery of the species overall.

Threatened Colusa Grass, Threatened Slender Orcutt Grass, Endangered Sacramento Orcutt Grass, Legenere, and Boggs Lake Hedge-Hyssop

Issuance of the proposed ITP's to the City, Sutter and the Conservancy may adversely affect Colusa grass, slender Orcutt grass, Sacramento Orcutt grass, legenere, and Boggs Lake hedge-hyssop. The species have been reported from the vicinity of the proposed action's action area and potential habitat may occur in the proposed action's action area. However, none of these species has been observed in the Basin and the potential habitat is likely not suitable for three of the species: Colusa grass, slender Orcutt grass, and Sacramento Orcutt grass. The three species are known to occur inhabit large vernal pools that remain inundated for long periods of time. The Basin's vernal pools are typically small and do not remain inundated for long periods of time. In addition, because of the very limited amount of vernal pool resources in the proposed action's action area, the proposed action is likely to have very little, if any, effect on the five vernal pool species. MAPPOA did not request coverage for the Colusa grass, slender Orcutt grass, Sacramento Orcutt grass, legenere, or the Boggs Lake hedge-hyssop and it does not appear that suitable habitat for any of these species exists on the proposed MAP project site. Although four acres of ponds and seasonally wet areas exist on the proposed MAP project site, these wetlands do not appear to support vernal pool-associated species.

The most likely direct effect to Colusa grass, slender Orcutt grass, Sacramento Orcutt grass, legenere, and Boggs Lake hedge-hyssop resulting from the Land Use Agencies' activities would be direct mortality or destruction of the seed bank as a result of development, should any plants be found to exist in the permit areas, as a result of development. For example, construction equipment may kill plants by crushing them when it runs over them. Seeds could be destroyed or rendered unable to germinate when seasonal wetland areas they occupy are partially or wholly filled.

As stated in the species descriptions, the actual amount of suitable vernal pool habitat in the Basin was not quantified. The Basin is not known to contain substantial numbers of vernal pools and is not considered essential to the species' recovery or included in the Service's proposed vernal pool critical habitat rule (67 **FR** 59884). Based upon estimates in southern Sacramento County, the Basin's 886 acres of grasslands would contain at the most 21.3 acres of vernal pools. Additionally, some portion of the Basin's 96 acres of ponds and seasonally wet areas may be suitable for vernal pool plants. However, this estimate greatly overestimates the actual amount of vernal pool habitat in the Basin because grasslands in the Basin have a lower density of vernal pools than surrounding areas of Sacramento County (see Environmental Baseline) and most of the ponds and seasonal wetlands do not have correct hydrology to support covered vernal pool species. Of the total 886 acres of grasslands in the Basin, 427 are in the City's Permit Area and 134 are in Sutter's Permit Area (Table 14). This equates to 10.2 and 3.26 acres of vernal pools in the City and Sutter's Permit Areas, respectively. Of the total 96 acres of ponds and seasonally wet areas in the Basin, seven are in the City's Permit Area, four are in the MAP Permit Area, and ten are in Sutter's Permit Area (Table 14). Most of the potential habitat that will be lost is located in the eastern portion of the City's Permit Area. As stated in the species descriptions, ponds and seasonally wet areas acreages almost certainly vastly overestimate the actual potential vernal pool acreage in the Basin, as most of the ponds and seasonally wet areas do not have the correct hydrology to support vernal pool-associated species. Ponds and seasonally wet areas located in the MAP Permit Area do not have the correct hydrology to support vernal pool plants and no other potential habitat is located within 76 m (250 ft.) of any of MAP's proposed action activities (Service 2002).

Issuance of the proposed ITP to the Conservancy may result in the loss of Colusa grass, slender Orcutt grass, Sacramento Orcutt grass, legenere, and Boggs Lake hedge-hyssop, should any of these species be found on reserve lands. Plants could be harmed or killed during reserve restoration or maintenance activities. For example, plants could be crushed by construction equipment creating habitat on the Conservancy's reserves or grazed by cattle used for invasive weed abatement. However, because the plants have not been observed in the Basin and there is very little, if any, suitable habitat in the Basin, the chance of the Conservancy impacting the species is very small.

Implementation of the proposed conservation measures will minimize the potential effects of the proposed action on the Colusa grass, slender Orcutt grass, Sacramento Orcutt grass, legenere, and Boggs Lake hedge-hyssop. The Land Use Agencies have proposed to require developers to survey, using a Service-approved protocol, for vernal pool plants in potential habitat. If vernal pool plants are identified, developers will be required to avoid impacts or mitigate for any effects on the plants. Possible strategies include: (1) on-site avoidance and preservation of the vernal pool resource; (2) payment into a Service-approved conservation bank; or (3) relocation of vernal pool resources (another potential direct effect related to development).

Indirect effects to Covered vernal pool plants may occur if upland areas surrounding potential vernal pool plant habitat are altered. For example, if the upland area adjacent to an occupied vernal pool is graded, the hydrology (i.e., depth, frequency and length of inundation, etc.) of the vernal pool could be changed, thereby affecting the plants that inhabit it. However, the Land Use Agencies have proposed conservation measures that either avoid or minimize indirect effects to vernal pool species. For example, if either Sacramento Orcutt grass, slender Orcutt grass, or Colusa grass are identified on-site, the Wildlife Agencies may require the landowner/developer to

preserve the vernal pool resource. In other cases, the landowner/developer will be required to mitigate for the effects according to the Service's current vernal pool guidelines.

Overall, the proposed action should have little to no effect on the Colusa grass, slender Orcutt grass, Sacramento Orcutt grass, legenere, and Boggs Lake hedge-hyssop. There is very little (if any) suitable habitat in the Basin and none of the species have been identified there. The plan contains avoidance, minimization, and mitigation measures to eliminate or offset any impacts to this species should any be discovered during pre-construction surveys required under the plan. The proposed action will not adversely affect the species outside the Basin. Therefore, the proposed action will not affect the viability of the Colusa grass, slender Orcutt grass, Sacramento Orcutt grass, legenere, and Boggs Lake hedge-hyssop in the vicinity of the Natomas Basin or as species.

Swainson's Hawk

The Swainson's hawk is a common inhabitant of the Natomas Basin. In 2001, active hawk nests were located in the City's, MAPPOA's, and Conservancy's proposed permit areas. Although no nests were located in Sutter's proposed permit area, nests were located close (< 1 mile) from the permit area. The overwhelming majority of the Basin's hawk nests are in mature trees situated either on the banks of or near the Sacramento River. Suitable hawk foraging habitat exists throughout the Basin in each of the proposed permit areas and is well within the known foraging range of the hawk. Implementation of the proposed action will likely affect the hawk throughout the action area by authorizing the City, Sutter, Conservancy, and MAPPOA to participate in and authorize activities that result in adverse effects to hawks through loss of habitat within the Permit Areas and on the Conservancy's reserves. Hawks will be disturbed through the removal of their nest trees and foraging habitat.

Effects to Nesting Habitat

The majority of the Basin's potential nesting habitat will not be directly affected by the issuance of the ITPs to the Permittees. Most known hawk nests and potential nest trees are located in unincorporated Sacramento County along the Sacramento River and outside of the proposed Permit Areas. Additional nest sites are located on lands within the City adjacent to the Sacramento River. These areas, which are located within the one mile-wide swath of land abutting the Sacramento River in the Basin known as the Swainson's hawk zone, constitute the core nesting habitat for the hawk within the Basin. With the exception of 252 acres previously approved for development by the City within the Swainson's hawk zone, ,the Permittees have committed to avoid development within this area. Following implementation of the proposed action, at least 263 of the Basin's total 328 acres (80.1 %) of potential nesting habitat will remain. However, it is likely that closer to 287 acres (87.5 %) of nesting habitat will remain, as the riparian habitat bordering Fisherman's Lake will not be removed.

Issuance of the proposed ITP to the City will likely result in effects on 40 acres of potential Swainson's nesting habitat (Table 5). Most of the potential nesting habitat is comprised of riparian areas (24 acres). Other nesting habitat types include oak groves (6 acres) and tree groves (10 acres). Much of the 24 acres of affected riparian areas is located on the east side of Fisherman's Lake and will not be developed. Although this habitat will not be destroyed, indirect effects are still likely (see below).

According to Figure 13 of the NBHCP, six Swainson's hawk nest trees are located in the City's proposed Permit Area (excluding the nests adjacent to Fisherman's Lake). A seventh tree was removed in 1998. Four of the six nests were inactive in 2002 (Estep 2002). At least two of these are in areas that have already been developed. In addition to the six nests that are located in the City's proposed Permit Area, a single nest is located just west of the City's proposed Permit Area, north of El Camino and west of I-80 (Estep 2002). This nest was active in 2002 and will likely be indirectly affected (described below) by the issuance of the proposed ITP to the City. Hawks could be also be disturbed by construction noise or daily activities once the City's Permit Area is developed.

Issuance of the proposed ITP to Sutter will not result in the direct loss of any potential nesting habitat (Table 5). Additionally, there are no Swainson's nests in Sutter's proposed Permit Area.

The effects of issuing the proposed ITP to the MAPPOA were analyzed in the January 16, 2002, biological opinion for that project (Service File # 1-1-01-F-0302). Issuance of the ITP to MAPPOA has or will result loss of 25 acres of potential hawk nesting habitat (tree groves = 23 acres, oak groves = 2 acres). A single hawk nest tree will be removed. This tree was active in 2001 (NBHCP 2002) and inactive in 2002 (Estep 2002). Another inactive nest is located on Powerline Road between the airport and MAP (Estep 2002). Sufficient information was not available to determine if the nest tree will be removed by the MAP project. However, at the very least, because of its proximity to MAP, hawks in the nest tree will likely be disturbed by construction activities or by daily activities once MAP is completed. A single active nest tree is also located directly south of the MAP Permit Area (Estep 2002) and will likely be directly affected by the issuance of the proposed ITP to MAPPOA. For example, hawks nesting in the tree could be disturbed by construction activities or disturbed as the site is used once it is developed. Hawks in nest trees in urban areas have been shown to have lower reproductive success than those in rural areas (England *et al.* 1995) (see indirect effects section below). To mitigate for the loss of the nest tree on the MAP site and other Swainson's hawk habitat, MAPPOA will secure 200 contiguous acres, in perpetuity, via fee title or conservation easement and turn the lands over to the Conservancy to manage for the benefit of Swainson's hawk nesting. The nest tree conservation lands will be secured entirely within the Natomas Basin in the Swainson's hawk one-mile zone along the Sacramento River, or in the eastern portion of the Natomas Basin, including, but not limited to, areas near the levees and Natomas East Main Drain. Acquisition will focus on sites that provide upland foraging habitat, have potential for additional acquisition of adjoining properties, and are surrounded by agricultural lands. The nest tree conservation lands will be planted with a minimum of fifteen trees. MAPPOA will provide funding sufficient for monitoring the success of replacement trees for a period of 3 years and plant additional replacement trees at the rate of one additional replacement tree for every replacement tree lost prior to the end of the 3 year monitoring period. Trees planted to replace trees lost, will be monitored for an additional 3 year period to ensure survival until the end of the monitoring period.

The NBHCP requires that the City and Sutter replace any nest trees directly impacted by the proposed action. Therefore, in order to mitigate for impacts to hawk nesting habitat (effects on four nest trees not located in existing development), the City has proposed to plant 60 trees (5 gallon size) at a ratio of 15:1 within 14 months of the issuance of the proposed Permit (see section V.A.5.b. of the NBHCP). Trees will be maintained, monitored, and as needed, replaced, in accordance with section V.A.5.b. of the NBHCP. Although the City has not yet provided

funding for planting the 60 nest trees, the Conservancy has planted potential nesting habitat on its Betts, Kismat, and Sliva, Bennet South preserves. Additional plantings are planned for Bennet North and Lucich South in 2003. Sutter does not propose to plant additional nest trees if the proposed ITP is approved, as no nest trees will be affected within their proposed Permit Area.

The conservation measures that the Land Use Agencies have proposed will mitigate the proposed action's impacts to nest trees. Very few documented nest trees will be directly impacted by the proposed action and there appears to be a surplus of Swainson's nest trees in the Basin. According to Estep (2002), only 43 of the Basin's 70 nest territories were active in 2002.[5] The NBHCP and associated EIR/EIS also document the amount of potential nesting habitat lost. Although it appears that approximately 20 percent of the Basin's total 328 acres of potential nesting habitat will be lost, in actuality, this value is closer to 13 percent.

Based upon Estep (2002), even if all six nest trees located in the City's Permit Area become unsuitable following issuance of the proposed ITPs, sufficient nest trees will remain for the Basin's hawks. In addition, replacement nest trees are being planted at a ratio of 15:1 to replace the four nest trees to be impacted by new development. This indicates that sufficient nesting habitat will be available for the hawk both in the short- and long-term. In addition, the Conservancy is already conducting nest tree plantings in its reserve system. Loss of nesting habitat is not a concern of implementing the NBHCP.

Effects to Foraging Habitat

In contrast to the small loss of Swainson's nesting habitat, issuance of the proposed ITPs will result in a larger loss of foraging habitat. Approximately 40 percent, or 9,188 acres, of the Basin's total 22,051 acres of potential foraging habitat will be lost as a result of issuing the proposed ITPs to the City, Sutter, and MAPPOA. However, while the amount of potential foraging habitat that will be lost is substantial, the location and quality of that existing habitat reduces the impacts of its loss on the hawk. Almost all of this habitat is considered moderate-quality habitat and, importantly, is not available for foraging during the majority of the hawk's nesting season. As discussed in the April 2003, Technical Addendum, the amount of usable foraging habitat available to the hawk in the Basin varies considerably during the hawk's time in the Basin. While available foraging habitat is abundant in some periods such as late summer or early fall, much less habitat is available in April, May, and July. Swainson's hawks lay eggs in April; young fledge in July. Therefore, much less foraging habitat is available during the hawk's nesting period. Based upon the results of Estep (1989) and Bechard (1982), this lack of available foraging habitat during the nesting period likely leads to larger foraging ranges. The overwhelming majority of foraging habitat lost to urban development is also greater than one mile (the distance from nest to foraging considered by CDFG [1994] to be of most importance to the hawk) from the majority of the Basin's Swainson's nest trees. Studies have shown that reproductive success decreases as the distance required to forage from the nest increases (Woodbridge 1991, England *et al.* 1997). The effects of the loss of foraging habitat on the hawk are lessened because plentiful foraging habitat west of the Sacramento River is currently, and in

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[5] Estep's (2002) data included nest trees on both sides of the waterways [i.e., Sacramento River, American River, Natomas East Main Drainage Canal and Natomas Cross Canal] surrounding the Natomas Basin.

the future will remain, available to and used by Swainsons' hawks nesting in the Basin (discussed below).

Issuance of the proposed ITP to the City will likely result in the loss of 6,925 acres (31.4 percent) of the Basin's total foraging habitat (Table 5). Of that total, 675 acres are considered high-quality habitat, 5,098 acres are considered moderate-quality habitat, and 1,152 acres are considered low-quality habitat. Issuance of the proposed ITP to Sutter will likely result in the loss of 1,860 acres (8.4 percent) of the Basin's total foraging habitat. Of that, eight acres are considered high-quality habitat and 1,852 acres are considered moderate-quality habitat. Issuance of the ITP to MAPPOA will likely result in the loss of 403 acres (1.8 percent) of the Basin's total foraging habitat. Of that 50 acres are considered high-quality habitat, 349 acres are considered moderate-quality habitat, and four acres are considered low-quality habitat. An additional 119 acres of potential foraging habitat will be affected by construction of off-site drainage, sewer, and roadway improvement related to the MAP project. In addition to reductions in potential Swainson's foraging habitat for the habitat types listed above, implementation of the proposed action will result in the loss of approximately 8,000 acres of rice. When fallowed or otherwise not flooded, rice fields provide potential marginal to moderate-quality foraging habitat for hawks. Therefore, issuance of the proposed ITPs to the Permittees will likely result in a further loss of rice foraging habitat.

Indirect Effects of Urban Development

In addition to the direct effects posed by the proposed ITPs, implementation of the proposed action will indirectly affect the hawk. The most likely indirect effect is a potential decrease in reproductive performance associated with development in proximity to nest trees. In these instances, nest trees would not be removed, but nearby foraging habitat would be converted to non-appropriate Swainson's foraging habitat types. For example, three nest trees located along Fisherman's Lake will not be removed as a result of the proposed action. However, they will be located in close proximity (250 ft. or less along the eastern edge of the lake) to urban development. Swainson's nesting success in developed areas has been shown to be reduced in comparison to rural areas (England *et al*. 1995). In another example, seven Swainson's hawk nest trees (3 active) are currently either located in or directly adjacent to existing development. Issuance of the proposed ITP will allow further development near these nest trees, thereby decreasing the amount of available foraging habitat nearby. The increased energy required to forage over greater distances could lead to a decrease in reproductive performance, as described in England *et al.* (1995). For the same reasons discussed above, Swainson's hawks using two nest trees adjacent to MAP will likely have reduced reproductive success in comparison to hawks nesting in rural areas.

Effect of Issuing the Proposed ITP to the Conservancy

Issuance of the proposed ITP to the Conservancy will have negligible negative effects on the hawk. Nesting and foraging hawks could be disturbed as a result of the Conservancy's reserve restoration and management activities. However, these effects are temporary, and should be minimal since the Conservancy will manage the mitigation lands for the benefit of the Covered Species. Perhaps the largest potential negative effect of the Conservancy's activities on the hawk could be the destruction of hawk foraging habitat during the construction of wetland reserves. However, this is unlikely, given the fact that lands suitable for wetland restoration will most

likely be either rice or existing wetlands. The creation of wetlands from rice may remove some marginal hawk foraging habitat, but of the potential foraging habitat types affected in the Basin, rice is least beneficial to the hawk (Estep 1989). The upland component of the managed marsh reserves will continue to provide suitable foraging and nesting habitat for the hawk.

The main positive benefit of the issuance of the proposed ITP to the Conservancy will be the development of the Conservancy's reserve system. After implementation of the proposed action, 2,187.5 acres of high-quality upland foraging habitat will be created and/or preserved and protected in perpetuity for the hawk. As described in the NBHCP, the upland foraging habitat will be managed for the hawk and will include both nesting and foraging habitat. Proposed acquisition criteria will help ensure that these upland areas are in close proximity to nesting hawks.

In addition to the Conservancy's upland reserves, the hawk will benefit somewhat from the Conservancy's managed marsh reserves and rice habitat. Rice fields will provide foraging habitat after they have been drained and before they are filled. The Conservancy will also fallow ten percent of its rice fields annually, which will provide up to 437.5 acres of fallow rice habitat in any given year. Managed marsh reserves contain between 20 and 30 percent uplands, which will provide between 437.5 and 656.25 acres of additional upland habitat. Rice fields and managed marsh uplands will likely be less beneficial for the hawk than habitats in upland reserves because upland reserves will be managed to maximize the amount of available hawk prey.

In order to mitigate for its effects to 6,925 acres of mostly moderate-quality foraging habitat, the City will provide 1,509.3 acres of potential foraging habitat. Of that, 1006.2 acres will be high-quality foraging habitat on the Conservancy's upland reserves; 201.2 acres will be moderate-quality habitat provided in the form of fallowed rice habitat on the Conservancy's rice lands; and up to 301.9 acres of moderate-quality uplands will be provided in the upland component of the managed marsh reserves. In order to mitigate for its effects to 1,860 acres of Swainson's mostly moderate-quality foraging habitat, Sutter will provide up to 1400.1 acres of foraging habitat. Of that, 933.4 acres will be potential high-quality foraging habitat on the Conservancy's upland reserves; 186.7 acres will be provided in the form of moderate-quality fallowed rice habitat on the Conservancy's rice lands; and up to 280.0 acres of moderate-quality uplands will be provided in the upland component of the managed marsh reserves. In order to mitigate for its effects to 502 acres (403 acres from project footprint and 199 acres from off-site improvements) of mostly moderate-quality Swainson's foraging habitat, MAPPOA will provide up to 371.9 acres of potential foraging habitat. Of that, 247.9 acres will be high-quality foraging habitat on the Conservancy's upland reserves; 49.6 acres will be provided in the form of moderate-quality fallowed rice habitat on the Conservancy's rice lands; and up to 74.4 acres of moderate-quality uplands will be provided in the upland component of the managed marsh reserves. An additional 200 acres of high-quality foraging habitat will be provided by MAPPOA to mitigate for the loss of a Swainson's hawk nest tree and surrounding foraging habitat.

When the potential effects of the proposed action on potential foraging habitat and proposed mitigation are considered together, the proposed action may cause a net decrease of between 7,000.5 and 9,188 acres of potential foraging habitat in the Basin. The exact amount will be determined by the existing use of upland reserves at the time of acquisition. For example, if a reserve is acquired that already provides suitable habitat for the hawk, no new habitat is created. If, on the other hand, a reserve is acquired that does not provide habitat for the hawk and is

restored/managed so that it provides habitat for the hawk, then new habitat is created. Therefore, if only existing upland habitat is preserved, the net loss will be 9,188 acres. In contrast, if all preserved upland habitat is created following acquisition by the Conservancy, there will be a net decrease of 7,000.5 acres of foraging habitat.

Benefits obtained through the creation of the Conservancy's upland reserves are actually greater than those described in the preceding paragraph. The majority of the Basin's existing Swainson's foraging habitat (e.g., sugar beets, tomatoes, melons, etc.) is moderate in quality and is not available throughout the hawk's nesting season. In contrast, the Conservancy's upland reserves will be high-quality habitat that is available throughout the time hawks are in the Natomas area. Because of the priorities established for the acquisition of upland reserves, there will be an increase in the amount of high-quality foraging habitat in the vicinity of the majority of the Basin's hawk nesting territories which will be available to the hawks during the nesting season, which should result in a decrease in the distance required for hawks to forage and a potential increase in reproductive success.

Even though there will be a net loss of available foraging habitat in the basin, the Conservancy's reserve system will have several advantages over existing foraging opportunities in the Basin. These include: (1) the Conservancy's uplands will be managed for the hawk and other upland species in perpetuity; (2) priorities for acquiring upland reserves will help ensure that managed uplands are in close proximity to the majority of the Basin's nests thus increasing the amount of foraging habitat in close proximity to nests during the critical nesting season; (3) upland reserves and the upland component of managed marsh reserves will provide opportunities for the establishment of new nest trees; (4) the upland component of managed marsh reserves will provide additional moderate-quality potential foraging habitat in perpetuity; (5) Conservancy rice fields will provide additional moderate-quality potential foraging habitat in perpetuity; (6) the amount of high-quality hawk foraging habitat will increase; (7) foraging habitat will be made available for Swainson's hawks throughout their time in the Basin; and (8) no development will occur in the one-mile wide Swainson's Hawk Zone, except for a small amount of acreage previously authorized for development in the City's proposed Permit Area. These factors will help avoid, minimize, and mitigate the effects of the proposed action on the hawk's nesting and foraging habitat.

Effect of the Proposed Conservation Measures

Implementation of the proposed conservation measures (see Sections V.A.1-3 and V.A.5.b of the NBHCP) will minimize the potential adverse effects of the proposed action on the hawk. Except for lands approved for urban development in the North Natomas Community Plan in 1994, the City and Sutter will not approve development permits within the one-mile-wide Swainson's Hawk Zone, which is adjacent to the Sacramento River. MAP is not located within the Swainson's Hawk Zone. If the City or Sutter seek to expand development into the Swainson's Hawk Zone beyond that described above, granting of such coverage would require an amendment to the NBHCP and ITPs, which would be subject to review and approval by the Service and the CDFG in accordance with all applicable statutory and regulatory requirements. Approval of any Urban Development within the Swainson's Hawk Zone beyond that described above would constitute a significant departure from the Plan's OCP and would trigger a new effects analysis, potential amendments and/or revisions to the Plan and Permits, a separate conservation strategy and issuance of ITPs to the permittee for that additional urban development, and/or possible

suspension or revocation of the City's and/or Sutter's Permits. Neither the City nor Sutter control lands in the Swainson's Hawk Zone within the unincorporated portion of Sacramento County. However, on December 10, 2002, the City and Sacramento County entered in to the "Joint Vision," a Memorandum of Understanding, in which they acknowledged no future growth may occur in the Basin without first analyzing the impacts to protected species (see Cumulative Effects section below). Therefore, the City, Sutter, and Sacramento County have acknowledged that no additional development may occur in the Swainson's Hawk Zone without environmental review.

In addition to not developing in the Swainson's Hawk Zone, additional measures will minimize and mitigate the potential effects of the proposed action on the hawk. Potential disturbance of active nests will be minimized through the use of pre-construction surveys, avoidance buffers (until the young have fledged), timing restrictions, and monitoring (see Section V.D.5.b of the NBHCP). These measures will ensure that disturbance of active nesting hawks is minimized. The loss of nest trees will be minimized by preserving large trees wherever possible and avoiding construction activities near active nests. In addition, the Land Use Agencies will mitigate the loss of nest trees in its proposed Permit Area by replacing lost trees at a rate of 15:1. The City will plant 60 replacement trees within 14 months of issuance of the proposed ITPs. By planting these trees up front and selecting trees that are likely to become suitable for the hawk relatively quickly (accomplished through species selection, management, and size at planting), the City will minimize the potential temporal effects of removing nest trees.

Implementation of the proposed conservation measures by the Conservancy will also help minimize the effects of the proposed action on the hawk. The Conservancy's measures include: (1) minimizing disturbance of active nests; (2) minimizing the number of nest trees lost; (3) mitigating loss of nest trees; (4) maximizing the foraging potential of upland reserves; and (5) maximizing the amount of available nesting habitat in the Basin. In addition, criteria established for the acquisition of upland reserves will help maximize their potential benefit to the hawk. All of these benefits will have the effect of making the mitigation lands more valuable to the hawk than if the lands were simply preserved.

Discussion

Following implementation of the proposed action, between 13,000 and 15,000 acres of potential Swainson's foraging habitat (including high-quality mitigation lands) will remain in the Basin. Most of the foraging habitat remaining after implementation of the proposed action will be moderate-quality habitat, but as shown in Table 5, most of the Basin's existing potential foraging habitat is moderate-quality habitat. Both the City and Sutter have committed to not developing lands in the Swainson's Hawk Zone (without conducting additional analyses and obtaining appropriate permits) if the proposed ITPs are approved. Because of its proximity to the majority of the Basin's hawk nests, this area is critical for the area's hawks. This is also where much of the high-quality foraging habitat that is expected to produce prey throughout the hawk's nesting season will be created on the Conservancy's upland reserves because the upland reserve acquisition criteria have been established so that much of the upland reserves are acquired in the Swainson's Hawk Zone. In addition to the continuing availability of foraging lands in the Basin, large expanses of foraging habitat are available in Yolo County on the west side of the Sacramento River. In fact, according to the Technical Addendum, Yolo County supports more than 200,000 acres of non-rice agricultural crops, 40,000 acres of which are planted in alfalfa.

Much of Yolo County's available foraging habitat is within the Swainson's flight distance. Much of this habitat is located in the Yolo and Sutter bypasses and because the bypasses are flood control structures that are subject to annual flooding and the State Reclamation Board's floodway restrictions, is very likely to never be developed. It is very likely that hawks nesting in or adjacent to the Basin currently forage in Yolo County. Even with the loss of potential foraging habitat that will result from implementation of the proposed action, a large amount of foraging habitat will remain available to support the Basin's hawks.

The proposed action is not likely to affect the viability of the hawk in the Basin, Central Valley, or as a species. Overall, the proposed action is likely to result in a shift in the timing and quality of Swainson's foraging habitat and an increase in the amount of suitable nest trees. Although approximately 9,000 acres (including MAP) of mostly moderate-quality foraging habitat will be lost, approximately 13,000 acres of mostly moderate-quality foraging habitat will not be affected. Almost all of the lost habitat will be outside the 1-mile Swainson's Hawk Zone and therefore, more than one mile away from the majority of the Basin's nest trees. In addition, a total of 2,387.5 acres (including extra 200 acres for MAP) of high-quality foraging habitat will be enhanced/ managed for the benefit of the hawk. This habitat will help offset the effects of the proposed action on Swainson's foraging by providing a consistent source of abundant prey for hawks, including times of the year (e.g., nesting season) when foraging habitat is limited in the Basin and much of it will be in close proximity to the majority of the Basin's nest trees. Additional Swainson's foraging opportunities will be gained from the 10 percent of the Conservancy's rice reserves that will be fallowed annually (437.5 acres) and the 20-30 percent of managed marsh reserve habitat that will be comprised of upland habitat (437.5-656.2 acres). Tens of thousands of acres of foraging habitat are also available just across the Sacramento River in Yolo County; which will not be developed in the foreseeable future. Very few Swainson's nest trees will be affected by the proposed action and almost 40 percent of the available hawk nest territories are not being used (Estep 2002). This surplus of nest territories will minimize the temporal loss of those nest trees that are directly affected. Nest trees that are affected will also be replaced at a ratio of 15:1. This, in conjunction with other tree plantings on the Conservancy's reserves, will result in a substantial increase in the number of nest trees in the Basin. Because of the avoidance, minimization and mitigation measures proposed by the applicants, and the habitat conditions within and outside the Basin after implementation of the proposed action, the proposed action should not result in the significant injury or death of hawks that nest and forage in the Basin. The primary impact of the proposed action will be a net loss of potential Swainson's hawk foraging habitat; however, because of the varying quality of that habitat and its limited availability to the species during the nesting season, this loss will not result in significant adverse effects to the hawks in the basin. Substantial amounts of foraging habitat will remain in the basin as well as abundant foraging habitat in nearby Yolo County, and the proposed action will result in the addition of high-quality foraging habitat managed specifically to benefit the hawk (i.e., located in close proximity to nest trees, managed to produce mots of hawk prey, available throughout the hawk's time in the Basin, etc.). The environmental baseline combined with the conservation measures provided under the plan should continue to support a viable Natomas Basin Swainson's hawk population. Because significant adverse effects to the species are not anticipated locally, the Service does not anticipate adverse effects to either the Central Valley population or the species as a whole.

Aleutian Canada Goose

Implementation of the proposed action will likely affect the goose throughout the action area by authorizing the City, Sutter, Conservancy, and MAPPOA to participate in and authorize activities that directly result in the disturbance of geese throughout the Permit Areas and on the Conservancy's reserves. The goose is known to occasionally occur in the Basin during the winter and suitable goose foraging habitat will be altered/destroyed by each of the Permittees. Loud noises produced by construction activities on or adjacent to the goose's habitat in the winter will likely disturb geese.

In addition to disturbing the goose, implementation of the proposed action may result in minimal impacts to the goose through the destruction of 14,751 acres of potential winter habitat (Table 6). Although the total number of acres of goose habitat that will be lost is greater than that for species such as the snake, the goose is not constrained by such factors as connectivity and is only an occasional visitor to the Basin. Issuance of the ITP to the City will result in the loss of 4,663 acres of non-rice crops, 23 acres of pasture, and 970 acres of rice habitat. Issuance of the ITP to Sutter will result in the loss of 1,529 acres of non-rice crops, 101 acres of pasture, and 5,577 acres of rice habitat. The effects of the issuance of an ITP to MAP were analyzed in the January 16, 2002, biological opinion for that project (Service File # 1-1-01-F-0302). Issuance of the ITP to MAPPOA will result in the loss of 325 acres of non-rice crops, 22 acres of pasture, and 1,541 acres of rice habitat.

Issuance of an ITP to the Conservancy will have both beneficial and deleterious effects on the goose. Construction activities conducted in the goose's wintering habitat (e.g., non-rice crops) when the goose is in the Basin may disturb geese. The construction of up to 2,187.5 acres of managed marsh will further decrease the amount of available foraging habitat for the goose. However, the managed marsh may be used as loafing or roosting habitat. Hunting is being considered on Conservancy reserves and may also directly affect the goose. Geese may be injured or killed by hunting activities. However, hunting is not a covered activity and this should only happen rarely. Given the goose's limited use of the Basin, the fact that the species ranges from southern Oregon through the San Joaquin Valley, and the healthy increasing population, hunting's effects on the goose in the Basin should be negligible.

Implementation of the proposed goose conservation measures will minimize impacts to the goose. Most importantly, the establishment of the Conservancy's system of reserves will help provide a stable system of winter habitat for the goose. All of the Conservancy's 8,750 acres of rice reserves and 2,187.5 acres of upland reserves will serve as potential habitat for the species and uplands within the managed marsh reserves may be used as loafing or roosting habitat. In order to mitigate the loss of the 5,656 acres of goose habitat resulting from the issuance of the proposed ITP to the City, 2012.5 acres of rice habitat and 1006.2 acres of uplands will be preserved and managed in perpetuity. In order to mitigate the loss of the 7,207 acres of goose habitat resulting from the issuance of the proposed ITP to Sutter, 1866.8 acres of rice habitat and 933.4 acres of uplands will be preserved and managed in perpetuity. In order to mitigate the loss of the 1,888 acres of goose habitat resulting from the issuance of the proposed ITP to the MAPPOA, 495.8 acres of rice habitat and 247.9 acres of uplands will be preserved and managed in perpetuity. Additional potential foraging and loafing acreage will be gained through the development of the 2,187.5 acres of managed marsh reserves.

In addition to the Conservancy's reserves, disturbance effects of the proposed action on geese in rice fields will be minimized by the use of the May 1-October 1 snake construction window. Because of the work window, no geese should be in rice fields when construction activities occur.

Overall, the effects of the proposed action on the goose should be minimal. Considering the goose's limited use of the Basin, the very small amount of the goose's total wintering range occupied by the Basin, the overall health of the subspecies, and the abundant habitat throughout the Central Valley, the loss of habitat resulting from the proposed action is practically inconsequential to the goose. This subspecies most often winters in other areas of the Sacramento Valley, including the Sacramento, Colusa, Butte Sink, and Sutter National Wildlife Refuges and the agricultural fields that surround them. Outside of the Natomas Basin, there are hundreds of thousands of acres (just considering rice fields) of potential winter foraging habitat for the goose. Furthermore, the amount of foraging habitat does not appear to be a factor limiting the number of geese in the Basin and the Conservancy's reserve system will increase the amount of available loafing and roosting habitat. Based upon the baseline habitat of the goose, its use of the Basin, the health of goose populations, and benefits acquired from the Conservancy's reserve system, the amount of development planned in Natomas will not affect the viability of the goose in the Basin, Central Valley, or species as a whole.

Burrowing Owl

Implementation of the proposed action will likely affect the owl by authorizing the City, Sutter, Conservancy, and MAPPOA to participate in and authorize activities that result in direct effects to owls throughout the Permit Areas and on the Conservancy's reserves. The owl is known to occur in the proposed action's action area, nesting owls have been observed in each of the proposed permit areas, and suitable habitat will be altered/destroyed by each of the Permittees. Take could be in the form of disturbance, injury or death of owls. Examples of possible owl take include, but are not limited to: (1) owls could be disturbed by noise produced by construction activities or humans working within the owl's habitat; (2) owls could be killed if burrows are destroyed while inhabited by owls; (3) owls could be displaced if their burrows are destroyed while they are not in them; and (4) development conducted in foraging habitat adjacent to an owl's burrow could cause the owl to venture further for food or move to another burrow.

Approximately 700 acres of potential burrowing owl foraging habitat (alfalfa, grassland, pasture) (Table 7) and 64.5 (35.4 percent) of the total 246.8 miles of canals in the Basin will be lost as a result of the proposed action. Berms, banks, and levees bordering the canals are often used by ground squirrels and therefore, offer burrows for the owl. Some canals not lost as a result of development will also become unsuitable for the owl because they will be surrounded by development and therefore, no longer in proximity to suitable foraging habitat. On the other hand, some of the canals are surrounded by rice habitat (not suitable foraging habitat) and are therefore probably less likely to be inhabited by owls.

Issuance of the proposed ITP to the City will result in the development of 427 acres of grassland and 23 acres of pasture, which constitute suitable owl foraging habitat (Table 7). In addition, at least 19.3 miles of canals whose banks may be inhabited by ground squirrels (whose burrows are often used by owls) will be lost. Issuance of the proposed ITP to Sutter will result in the development of 134 acres of grassland and 101 acres of pasture, which constitute suitable owl foraging habitat. In addition, approximately 33.6 miles of canals whose banks may be inhabited

by ground squirrels will be lost. The effects of issuance of the ITP for the MAP project were analyzed in the January 16, 2002, biological opinion for that project. Issuance of the proposed ITP to the MAPPOA will result in the development of 22 acres of pasture, which constitute suitable owl foraging habitat. In addition, 11.6 miles of canals whose banks may be inhabited by ground squirrels will be developed.

Upon implementation of the proposed action, the Conservancy will create/restore and protect in perpetuity 8,750 acres of habitat preserves. Of that, approximately 2,187.5 acres will would be maintained as upland habitat and would be potential foraging habitat for the burrowing owl. However, the burrowing owl exhibits strong site fidelity and may not readily find newly created suitable habitat. Additional habitats made available to the owl as a result of implementing the Conservancy's reserve system include upland foraging habitat within the managed marsh component of the reserve system and irrigation/drainage canals on reserve lands. Approximately 20-30 percent (437.5-656.2 acres) of the total 2,187.5 acres of managed marsh reserves will be managed as dryland pasture or grasslands. In addition, those irrigation/drainage canals located on Conservancy lands not operated by Natomas Mutual or RD 1000 will be managed in a more ground squirrel-friendly manner, which should provide more burrows for the owl. Contiguity of marsh upland reserves will be important to help maintain larger groups of burrowing owls. In 1999, the Conservancy acquired the Betts-Kismat-Silva property, which is "probably home to the largest concentration of burrowing owls in the Natomas Basin" (Wildlands 2000). The Conservancy has also acquired the Ayala tract, which is inhabited by owls. These two reserves represent the only known owl occurrences within the Basin that are outside of the proposed Permit Areas.

In order to mitigate the loss of 450 acres of potential owl foraging habitat resulting from the issuance of the proposed ITP to the City, 1006.2 acres of potential upland foraging habitat will be created on the Conservancy's upland reserves. In addition, between 201.2 and 301.9 acres of potential upland foraging habitat will be created on the Conservancy's managed marsh reserves. In order to mitigate the loss of 235 acres of potential owl foraging habitat resulting from the issuance of the proposed ITP to Sutter, 933.4 acres of potential upland foraging habitat will be created on the Conservancy's upland reserves. In addition, between 186.7 and 280.0 acres of potential upland foraging habitat will be created on the Conservancy's managed marsh reserves. In order to mitigate the loss of 22 acres of potential owl foraging habitat resulting from the issuance of the proposed ITP to the MAPPOA, 247.9 acres of potential upland foraging habitat will be created on the Conservancy's upland reserves. In addition, between 49.6 and 74.4 acres of potential upland foraging habitat will be created on the Conservancy's managed marsh reserves.

As described in the effects analysis for the giant garter snake, a decrease or change in demand for irrigation water may lead to a change or decrease in the number of canals in the Basin. Canals removed from use may no longer support mammals such as the ground squirrels, whose burrows are used by owls in the Basin. Additionally, if canals are modified or moved, the burrows in the banks of the existing canals may be destroyed.

Implementation of the proposed conservation measures will avoid, minimize, and mitigate the effects of the proposed action on the owl. The Land Use agencies will not permit owls to be disturbed during the nesting season and owl relocation efforts will be made during the rest of the year. Studies are currently being conducted to evaluate the effectiveness of passive owl relocations (D. Gifford, pers. comm.). Relocation efforts in Canada and California have been

somewhat successful (Haug *et al.* 1993) and management efforts using artificial nets boxes in burrows in Sacramento County have led to habitual use by burrowing owls (SRCSD 2002). Conservation measures employed by the Conservancy will also minimize the effects of the proposed action on the owl.

The NBHCP's acquisition strategy and the SSMPs it develops for each of the reserves will reflect the needs of the owl and should provide effective measures to offset impacts to the owl resulting from development in the Permit areas. The Conservancy will consider the habitat and management requirements of burrowing owls when developing management plans for the upland reserves and upland components of managed marsh reserves.

Although burrowing owls will be impacted by the proposed action, proposed action activities will not affect the viability of the subspecies. Although owls in the Basin will be impacted, the Permittees have proposed conservation measures that mitigate the impacts. For example, relocation will be used to move owls from areas to be developed to Conservancy reserves. Once on the Conservancy's reserves, the owls will benefit from the stability of high-quality foraging and burrow habitat. The Conservancy's proposed conservation measures include measures to provide burrow and foraging habitat for the owl as well as minimize impacts to burrowing animals such as ground squirrels (whose burrows are used by the owl). In contrast, much of the Basin's existing potential habitat is subject to frequent disturbance that lessens its value to the species. The conservation measures provided under the plan should provide for the continued viability of the owl in the basin. In addition, because the Natomas Basin represents a very small portion of both the subspecies' and Central Valley population's population and range, and any negative impacts to the owl resulting from the proposed action will not compromise the viability of the Central Valley population, the subspecies, or the species as a whole.

Loggerhead Shrike

Implementation of the proposed action will likely affect the loggerhead shrike throughout the proposed project's action area by authorizing the City, Sutter, Conservancy, and MAPPOA to participate in and authorize activities that may result in the disturbance, injury or death of shrikes throughout the Permit Areas and on the Conservancy's reserves. The shrike is a non-migratory resident of the Natomas Basin, is known to breed in the Basin, and is observed regularly throughout Natomas Basin (Thomas Reid Associates 2000). Suitable shrike habitat will be altered/destroyed by each of the Permittees. In addition to disturbance, take of shrikes will likely occur in other forms. For example, shrike mortalities could occur as a result of increased vehicular traffic.

Habitat conversion will likely be the greatest effect to the shrike as a result of the proposed action. Land converted from compatible to incompatible habitat types will likely result in the displacement of birds, decreased nesting and foraging habitat and increased competition. Based on the habitat and land use analysis, potential shrike habitat would decline by about 9,000 acres. However, most of the potential habitat that would be lost would be nonrice crops which provide relatively poor habitat for loggerhead shrike because the shrike feeds predominantly on insects and intensive management of agricultural lands strives to reduce insect pests. Further, insecticides are used to control insect pests, and insecticide use is believed to contribute to the decline of loggerhead shrike populations (Kaufman, 1996).

Issuance of the proposed ITP to the City will result in the loss of 427 acres of grassland habitat, 4,663 acres of non-rice crop habitat, six acres of oak groves, 13 acres of orchards, 23 acres of pasture, seven acres of ponds and seasonally wet areas, 24 acres of riparian habitat, 1,137 acres of ruderal areas, 46 acres of rural residential, ten acres of tree groves, and 117 acres of canals (Table 8). Issuance of the proposed ITP to Sutter will result in the loss of 134 acres of grassland habitat, 1,539 acres of non-rice crop habitat, 101 acres of pasture, 10 acres of ponds and seasonally wet areas, 88 acres of ruderal areas, and 215 acres of canals. The effects of issuance of the ITP for the MAP project were analyzed in the January 16, 2002, biological opinion for that project. Issuance of the proposed ITP to the MAPPOA will result in the development of 325 acres of non-rice crop habitat, two acres of oak groves, 22 acres of pasture, four acres of ponds and seasonally wet areas, six acres of ruderal areas, ten acres of rural residential, 23 acres of tree groves, and 72 acres of canals.

Issuance of the proposed ITP to the Conservancy will have both beneficial and deleterious effects on the shrike. Potential negative effects include, but are not limited to: (1) construction activities conducted in or near the shrikes's foraging habitat may disturb shrikes; and (2) conversion of habitat on Conservancy reserves may inadvertently make that habitat less suitable for shrike nesting or foraging. However, since the Conservancy must consider the needs of all Covered Species when designing SSMPs, adverse effects should be minimal. Once completed, the Conservancy's habitat reserves will provide 2,187.5 acres of high-quality upland habitat for the shrike in perpetuity. This habitat will be more stable in quality and location and may encourage the establishment and long-term persistence of a breeding population in the Natomas Basin. Specifically to attract and maintain loggerhead shrikes, the Conservancy will encourage development and maintenance of perching and nesting sites on habitat reserves. Riparian habitat and some of the managed marsh on the reserves may provide additional nesting opportunities and foraging perch sites.

In order to mitigate the loss of potential shrike foraging habitat resulting from the issuance of the proposed ITP to the City, 1006.2 acres of potential foraging habitat will be created on the Conservancy's upland reserves. In order to mitigate the loss of potential shrike foraging habitat resulting from the issuance of the proposed ITP to Sutter, 933.4 acres of potential upland foraging habitat will be created on the Conservancy's upland reserves. In order to mitigate the loss of potential shrike foraging habitat resulting from the issuance of the proposed ITP to the MAPPOA, 247.9 acres of potential upland foraging habitat will be created on the Conservancy's upland reserves.

Implementation of the proposed conservation measures will minimize the adverse effects of the proposed action on the shrike. Active shrike nests will be avoided by at least 30.5 m (100 ft.), thereby decreasing disturbance of nesting shrikes. The use of pre-construction surveys should also minimize the take of shrikes.

Loss of canal habitat (see snake discussion) and predation are two potential indirect effects of the proposed action. Development authorized as a result of this HCP could result in the future loss of irrigation/drainage canals in the Basin. As stated in the species description, suitable shrike nesting habitat may grow along canals. Cats are known to prey upon the San Clemente Loggerhead Shrike. Indirect effects of predation will be minimized by acquiring preserves no closer than
800 feet from development.

Issuance of the proposed ITPs to the Permittees is not likely affect the viability of the shrike in the Basin, Central Valley, or as a species. After implementation of the proposed action, over 14,000 acres of shrike foraging habitat will remain in the Basin and additional nesting and perching opportunities will be available. Continued use of the Basin by the shrike is very likely. The species is not considered to be subject to any identifiable threat in the State and populations in the western United States appear to be stable. Shrikes are common throughout lowland California and the Natomas Basin represents a very small fraction of the species' range.

Tricolored Blackbird

Implementation of the proposed action will likely affect the tricolored blackbird throughout the project's action area by authorizing the City, Sutter, Conservancy, and MAPPOA to participate in and authorize activities that directly result in the disturbance of blackbirds throughout the Permit Areas and on the Conservancy's reserves. Tricolor nesting colonies occur in the Basin and suitable tricolor habitat (especially foraging habitat) will be altered/destroyed by each of the Permittees. Displacement of tricolors will also result from loss of potential nesting and foraging habitat.

A total of 449 acres of potential nesting habitat (404 acres of canals, 21 acres of ponds and seasonally wet areas, and 24 acres of riparian) would be converted to urban development as a result of implementing the proposed action (Table 9). However, the actual acreage of nesting habitat lost may be lower than this because: (1) most of the 24 acres of riparian habitat lost is actually located within the buffer area adjacent to Fisherman's Lake (it is not known whether the limited buffer provided at the Lake will fully protect the tricolor); and (2) much of the canal acreage is open water and therefore, not nesting habitat. Nesting habitat would likely be limited to the vegetated margins of the canals. Implementation of the proposed action would result in the loss of 15,311 acres of potential tricolor foraging habitat (non-rice crops = 6,517 acres, grassland = 560 acres, pasture = 147 acres, and rice = 8,087 acres)(Table 9).

Issuance of the proposed ITP to the City would result in the loss of approximately 148 acres of potential tricolor nesting habitat (ponds and seasonally wet areas = 7 acres, riparian = 24 acres, canals = 117 acres) and 6,083 acres of potential tricolor foraging habitat (non-rice crops = 4,663 acres, grassland = 427 acres, pasture = 23 acres, and rice = 970 acres) (Table 9). Issuance of the proposed ITP to Sutter would result in the loss of 225 acres of potential nesting habitat (ponds and seasonally wet areas = 10 acres and canals = 215 acres) and 7,341 acres of potential foraging habitat (non-rice crops = 1,529 acres, grassland = 134 acres, pasture = 101 acres, and rice = 5,577 acres). The effects of issuance of the ITP for the MAP project were analyzed in the January 16, 2002, biological opinion for that project. Issuance of the proposed ITP to the MAPPOA would result in the loss of 76 acres of potential nesting habitat (ponds and seasonally wet areas = 4 acres, canals = 72 acres) and 1,888 acres of potential foraging habitat (non-rice crops = 325 acres, pasture = 22 acres, and rice = 1,541 acres).

Issuance of the proposed ITP to the Conservancy will have both beneficial and deleterious effects on the tricolor. Potential adverse effects include, but are not limited to: construction activities conducted in or near the tricolor's foraging and nesting habitat may disturb tricolors. However, overall, the beneficial effects of issuing the ITP to the Conservancy will far out-weigh the deleterious effects.

Once completed, the Conservancy's habitat reserves will provide up to 8,750 acres of habitat for the tricolor in perpetuity. Potential nesting habitat will be created in the 2,187.5 acres of managed marsh. With the limited amount of marsh habitat currently available in the Basin, this is a substantial increase the amount of potential nesting habitat available to the Basin's tricolors. Potential foraging habitat will also be created on the Conservancy's 4,375 acres of rice and 2,187.5 acres of upland reserves. The NBHCP's requirement that the Conservancy consolidate reserves will help ensure that abundant potential foraging habitat is in close proximity to nesting habitat. According to DeHaven (2003, pers. comm, with Craig Aubrey), suitable insect prey bases in close proximity to breeding substrates is important for the tricolor.

In order to mitigate the loss of potential tricolor foraging habitat resulting from the issuance of the proposed ITP to the City, 3018.8 acres of potential foraging habitat (rice and uplands) will be created/managed on the Conservancy's upland and rice reserves. In order to mitigate the loss of tricolor nesting habitat resulting from the issuance of the proposed ITP to the City, 1006.25 acres of potential nesting habitat will be created on the Conservancy's managed marsh reserves. In order to mitigate the loss of potential tricolor foraging habitat resulting from the issuance of the proposed ITP to Sutter, 2,800.1 acres of potential foraging habitat (rice and uplands) will be created on the Conservancy's upland and rice reserves. In order to mitigate the loss of potential tricolor nesting habitat resulting from the issuance of the proposed ITP to the City, 933.4 acres of potential nesting habitat will be created on the Conservancy's managed marsh reserves. In order to mitigate the loss of potential tricolor foraging habitat resulting from the issuance of the proposed ITP to the MAPPOA, 743.7 acres of potential foraging habitat (rice and uplands) will be created on the Conservancy's upland and rice reserves. In order to mitigate the loss of tricolor nesting habitat resulting from the issuance of the proposed ITP to the MAPPOA, 247.9 acres of potential nesting habitat will be created on the Conservancy's managed marsh reserves.

Implementation of the proposed conservation measures will minimize the adverse effects of the proposed action on the tricolor. The Land Use Agencies and Conservancy will avoid active tricolor nests by at least 152 m (500 ft.), thereby decreasing disturbance of nesting tricolors and preventing the destruction of active nests. The use of pre-construction surveys should also minimize the take of tricolors. The Conservancy has also proposed to avoid, to the maximum extent possible, foraging habitat in the vicinity of currently or historically active nests, which may help increase survivorship of young. Lastly, the tricolor should indirectly benefit from conservation measures proposed or the snake such as: (1) timing restrictions; (2) dewatering requirements; and (3) vegetation control management because these measures should minimize the disturbance of tricolors.

Potential indirect effects of the proposed action is the loss of canal habitat (see snake discussion) and predation by feral or domestic animals. Development authorized as a result of this HCP could result in the future loss of irrigation/drainage canals in the Basin, which may result in additional losses of potential nesting habitat. Indirect effects of predation will be minimized by acquiring preserves no closer than 800 feet from development.

Overall, the tricolor should benefit from the Plan. Construction of the Conservancy's managed marsh reserves will increase tricolor nesting habitat in proximity to foraging habitat, which is currently limited in the Basin and the Central Valley as a whole. Even though over 15,000 acres of foraging habitat will be converted to urban uses as a result of issuing the ITPs, over 25,000 acres of foraging habitat will remain after issuance of the proposed ITPs. This remaining

foraging habitat, coupled with the created high-quality nesting habitat should increase the value of the Basin to the tricolor. As stated earlier, tricolor numbers have declined in Sacramento County. An increase in nesting habitat and numbers of tricolor in the Basin could result in a small boost (given the species' range and population size) to the species overall.

White-Faced Ibis

Implementation of the proposed action will likely affect the white-faced ibis throughout much of the proposed action's action area by authorizing the City, Sutter, Conservancy, and MAPPOA to participate in and authorize activities that directly result in the disturbance of wintering ibis throughout the Permit Areas and on the Conservancy's reserves. Although the ibis does not nest in the Basin (there is a lack of potential nesting habitat), the species does winter and forage there and suitable foraging habitat will be altered/destroyed by each of the Permittees.

The greatest source of potential take associated with the implementation of the proposed action is the loss of approximately one-third (8,512 acres) of the available potential foraging and wintering habitat in the Basin, the overwhelming majority of which is comprised of rice. Of the total ibis habitat lost in the Basin, 95 percent (8,087 acres) is rice, 0.25 percent (21 acres) is ponds and seasonally wet areas, and 4.75 percent (404 acres) is canals (Table 10).

Issuance of the proposed ITP to the City will result in the loss of 1,097 acres of potential ibis habitat (Table 10). Of that, 970 acres will be rice, seven acres will be ponds and seasonally wet areas, and 117 acres will be canals. Issuance of the proposed ITP to Sutter will result in the loss of 5,802 acres of potential ibis habitat. Of that, 5,577 acres will be rice, ten acres will be ponds and seasonally wet areas, and 215 acres will be canals. The effects of issuance of the ITP for the MAP project were analyzed in the January 16, 2002, biological opinion for that project. Issuance of the proposed ITP to the MAPPOA will result in the loss of 1,617 acres of potential ibis habitat. Of that, 1,541 acres will be rice, four acres will be ponds and seasonally wet areas, and 72 acres will be canals.

Issuance of the ITP to the Conservancy will have both negative and positive direct effects on the ibis. Examples of possible negative effects on the ibis include, but are not limited to: (1) disturbance as a result of construction and maintenance activities on Conservancy reserves; and (2) the loss of rice foraging habitat due to conversions to other habitat types. However, the Conservancy's overall effects on the ibis will be almost overwhelmingly positive. Rice production practices on Conservancy lands should prove to be more "ibis friendly" and more importantly, the development of the managed marsh component of the reserve system should provide nesting and roosting opportunities for the ibis, which are currently limited in the Central Valley and virtually non-existent in the Natomas Basin. The potential benefit of the managed marsh as nesting and roosting habitat should increase through time, as the reserve system increases in size and individual reserves are consolidated.

In order to mitigate the loss of potential ibis foraging habitat (alfalfa, ponds and seasonally wet areas, rice canals) resulting from the issuance of the proposed ITP to the City, 2012.5 acres of potential rice foraging habitat (rice and uplands) will be managed by the Conservancy in perpetuity. In addition, 1006.2 acres of potential foraging, nesting, and roosting habitat will be created on the Conservancy's managed marsh reserves. In order to mitigate the loss of potential ibis foraging habitat (alfalfa, ponds and seasonally wet areas, rice canals) resulting from the

issuance of the proposed ITP to Sutter, 1866.8 acres of potential rice foraging habitat (rice and uplands) will be managed by the Conservancy in perpetuity. In addition, 933.4 acres of potential foraging, nesting, and roosting habitat will be created on the Conservancy's managed marsh reserves. In order to mitigate the loss of potential ibis foraging habitat (alfalfa, ponds and seasonally wet areas, rice canals) resulting from the issuance of the proposed ITP to the MAPPOA, 495.8 acres of potential rice foraging habitat (rice and uplands) will be managed by the Conservancy in perpetuity. In addition, 247.9 acres of potential foraging, nesting, and roosting habitat will be created on the Conservancy's managed marsh reserves.

Implementation of the proposed conservation measures by the Permittees should minimize the effects of the proposed action on the ibis. Avoidance of developed areas by at least 244 m (800 ft.) by the Conservancy's reserves will help minimize exposure of ibis to development-related effects. Measures included for the avoidance of active ibis nests should benefit the ibis, if and when ibis use lands in the Basin for nesting. Lastly, the ibis should benefit from conservation measures proposed for the snake. For example, limiting construction activities in snake habitat to the snake's active season will limit the destruction of ibis wintering habitat to times when the majority of ibis are not in the Basin.

Potential indirect effects of the proposed action include predation and the additional closure of canals. Development authorized as a result of this HCP could result in the future loss of irrigation/drainage canals in the Basin (see snake discussion), which may result in additional losses of potential nesting habitat. Indirect effects of predation will be minimized by acquiring preserves no closer than 800 feet from development.

Issuance of the proposed ITPs to the Permittees should benefit the ibis. Although about 1/3 of the ibis' foraging habitat in the Basin will be converted to urban uses, over 16,000 acres of ibis foraging habitat will remain after implementation of the proposed action. More importantly, the Conservancy's system of managed marsh reserves will provide potential nesting habitat for the ibis. Ibis nesting habitat is limited throughout the Central Valley; foraging habitat is not. The species is precluded from nesting in the Basin because no nesting habitat occurs there. Therefore, although there will be an overall decrease of foraging habitat in the Basin, the species should benefit because of the opportunities created for the breeding portion of its life cycle.

Bank Swallow

Implementation of the proposed action will likely affect the bank swallow throughout the project's action area by authorizing the City, Sutter, Conservancy, and MAPPOA to participate in and authorize activities that directly result in the disturbance of swallows throughout the Permit Areas and on the Conservancy's reserves. Although the swallow does not nest in the Basin, the species does nest nearby and could forage in the Basin. Potential foraging habitat will be altered/ destroyed by each of the Permittees. In addition to disturbance, once completed, implementation of the proposed action will result in the conversion of approximately 15,760 acres of potential swallow foraging habitat.

Issuance of the proposed ITP to the City will result in the loss of 6,231 acres of potential swallow foraging habitat. Effected habitat types include: grassland (427 acres), nonrice crops (4,663 acres), pasture (23 acres), ponds and seasonally wet areas (7 acres), rice (970 acres), riparian

(24 acres), and canals (117 acres) (Table 11). Issuance of the proposed ITP to Sutter will result in the loss of 7,566 acres of potential swallow foraging habitat. Effected habitat types include: grassland (134 acres), nonrice crops (1,529 acres), pasture (101 acres), ponds and seasonally wet areas (10 acres), rice (5,577 acres), and canals (215 acres). The effects of issuance of the ITP for the MAP project were analyzed in the January 16, 2002, biological opinion for that project. Issuance of the proposed ITP to the MAPPOA will result in the loss of 1,964 acres of potential swallow foraging habitat. Effected habitat types include: nonrice crops (325 acres), pasture (22 acres), ponds and seasonally wet areas (4 acres), rice (1,541 acres), and canals (72 acres).

Issuance of the proposed ITP to the Conservancy would have both positive and negative effects on the swallow. Swallows could be disturbed by construction or management activities on Conservancy reserves. Additionally, swallow foraging habitat may be temporarily disturbed or converted to other types during the implementation of SSMP's. Although some negative effects would likely occur to the swallow as a result of issuance of the proposed ITP to the Conservancy, the overall effects of issuing the ITP to the Conservancy would be overwhelmingly positive. Construction of the Conservancy's reserves would ensure a permanent source of swallow foraging habitat in the Basin. In addition, the diversity of habitat types on the Conservancy's reserves would help provide varying prey types at different times of year.

All of the Conservancy's rice, managed marsh, and upland reserves will provide potential foraging habitat for the swallow. In order to mitigate the loss of potential swallow foraging habitat resulting from the issuance of the proposed ITP to the City, 4025 acres of potential foraging habitat will be created on the Conservancy's managed marsh, rice, and upland reserves. In order to mitigate the loss of potential swallow foraging habitat resulting from the issuance of the proposed ITP to Sutter, 3733.5 acres of potential foraging habitat will be created on the Conservancy's managed marsh, rice, and upland reserves. In order to mitigate the loss of potential swallow foraging habitat resulting from the issuance of the proposed ITP to MAPPOA, 991.5 acres of potential foraging habitat will be created on the Conservancy's managed marsh, rice, and upland reserves.

If swallows begin to nest in the Basin (unlikely, given the absence of suitable nesting habitat), implementation of the proposed conservation measures by the Permittees will help minimize direct effects to the bank swallow. In addition, the Conservancy is proposing to use CDFG's swallow recovery plan, which should assist the Conservancy's efforts to manage the species on its lands.

Potential indirect effects of the proposed action include predation and the additional closure of canals (see snake discussion). Development authorized as a result of this HCP could result in the future loss of irrigation/drainage canals in the Basin, which may result in additional losses of potential nesting habitat. Indirect effects of predation will be minimized by acquiring preserves no closer than 800 feet from development.

Overall, the impacts of issuance of the proposed ITPs to the Permittees should be negligible. Although the vast majority of California's bank swallows are found on the Sacramento River, most nesting colonies are found upstream of the confluence of the Sacramento and Feather Rivers (Garrison *et al.* 1987, Laymon *et al.* 1988) and there is little potential nesting habitat (i.e., vertical banks) in the vicinity of the Natomas Basin (R. DeHaven, pers. comm., to Craig Aubrey, 2003). Much of the river bank in the vicinity of Sacramento and the Natomas Basin is covered in riprap

or otherwise is not suitable for bank swallow nesting habitat. Although about one-third of the Basin's potential foraging habitat will be converted to urban uses, over 27,000 acres (not considering the Conservancy's reserves) will remain after implementation of the proposed action. Development is precluded from the Swainson's Hawk Zone, which is the portion of the Basin closest to the Sacramento River (where swallow nesting colonies would occur). This is especially important during the breeding season, when swallows forage in close proximity to their nests. Because of the upland reserve acquisition criteria, much of the lands in close proximity to the river will be protected in perpetuity after implementation of the proposed action.

Northwestern Pond Turtle

Implementation of the proposed action will likely affect the turtle throughout the proposed action's action area by authorizing the City, Sutter, Conservancy, and MAPPOA to participate in and authorize activities that directly result in the death, harm, or injury of turtles throughout the Permit Areas and on the Conservancy's reserves. The turtle is known to occur throughout the Basin and each of the Permittees will destroy potential turtle habitat within their Permit Areas. Take of turtles is likely to result from each of the Permittees actions and the greatest potential source of direct effects is the loss of approximately 8,500 acres of potential turtle aquatic and upland habitat (ponds and seasonally wet areas = 21 acres, rice = 8,087 acres, riparian = 24 acres, canals = 404 acres)(Table 12). Additionally, turtles could be disturbed, injured, or killed by construction activities. For example, grading activities could crush turtles or their nests. The construction of new roads could present a barrier to turtle movements.

Issuance of the proposed ITP to the City will result in the loss of 1,118 acres of potential turtle habitat. Of that, 970 acres will be rice, seven acres will be ponds and seasonally wet areas, 24 acres will be riparian, and 117 acres will be canals. Issuance of the proposed ITP to Sutter will result in the loss of 5,802 acres of potential turtle habitat. Of that, 5,577 acres will be rice, ten acres will be ponds and seasonally wet areas, and 215 acres will be canals. The effects of issuance of the ITP for the MAP project were analyzed in the January 16, 2002, biological opinion for that project. Issuance of the proposed ITP to the MAPPOA will result in the loss of 1,617 acres of potential turtle habitat. Of that, 1,541 acres will be rice, four acres will be ponds and seasonally wet areas, and 72 acres will be canals. Based solely upon the fact that more rice habitat is in Sutter's Permit Area than any of the other permit areas, issuance of the proposed ITP to Sutter will result in the majority of the direct effects to the turtle.

In order to mitigate the loss of potential turtle habitat resulting from the issuance of the proposed ITP to the City, 1006.25 acres of potential foraging/nesting/basking/overwintering habitat will be created/managed on the Conservancy's managed marsh reserves. In addition, 2012.5 acres of rice foraging habitat will be preserved/managed in perpetuity. In order to mitigate the loss of potential turtle habitat resulting from the issuance of the proposed ITP to Sutter, 933.4 acres of potential foraging/nesting/basking habitat will be created/managed on the Conservancy's managed marsh reserves. In addition, 1866.8 acres of rice foraging habitat will be preserved/managed in perpetuity. In order to mitigate the loss of potential turtle habitat resulting from the issuance of the proposed ITP to the MAPPOA, 247.9 acres of potential foraging/nesting/basking habitat will be created/managed on the Conservancy's managed marsh reserves. In addition, 495.8 acres of rice foraging habitat will be preserved/managed in perpetuity. Conservancy upland reserves in proximity (less than 2 km) to turtle aquatic habitat may provide additional nesting and overwintering opportunities for the turtle.

Issuance of the ITP to the Conservancy will have both negative and positive direct effects on the turtle. Examples of possible negative effects on the turtle include, but are not limited to disturbance by construction activities on Conservancy reserves or the loss of rice habitat due to conversions to other habitat types. However, the Conservancy's overall effects on the turtle will be almost overwhelmingly positive. Rice production practices on Conservancy lands should prove to be more "turtle friendly" and more importantly, the development of the managed marsh component of the reserve system should provide foraging, nesting, overwintering, and basking opportunities for the turtle. Most importantly, habitat reserves will provide upland habitat opportunities for the turtle. Upland habitat is currently limited for the turtle in the Basin and most of that which currently exists is regularly disturbed.

The turtle will likely benefit from conservation measures proposed by the Permittees for the snake. For example, dewatering of habitat prior to construction should encourage turtles to seek suitable aquatic habitat elsewhere. Limiting construction activities in suitable snake habitat to between May 1 and October 1 should help minimize turtle mortalities, since they often overwinter underground in a manner similar to the snake. Avoidance of Fisherman's Lake by at least 61 m (200 ft.) will help protect much of the turtle's aquatic and upland habitat there. The NBHCP's connectivity assurances will also help preserve connectivity for the turtle throughout the Basin.

Predation by domestic and feral animals, increased vehicular strikes, and the additional closure of canals (see snake discussion) are three potential indirect effects of the proposed action. Under the Proposed Action, habitat reserves would be located at least 244 m (800 ft.) from urban areas and areas designated for urban development (unless a smaller distance is approved by CDFG and the Service on a case-by-case basis) and a buffer at least 9 m (30 ft.) wide established within the reserve between marsh habitat and roadways. By locating habitat reserves away from urban areas, the potential for death or injury to turtles from vehicle strikes and predation should be reduced, although not eliminated.

Overall, the proposed action is likely to benefit the turtle. Most of the potential habitat that will be lost as a result of the proposed action is rice. Its value to the turtle is questionable because there is little associated upland habitat for basking, nesting, and other upland-associated activities. In contrast, the Conservancy's system of managed marsh reserves will provide both suitable aquatic and upland habitat. Additionally, the Conservancy's upland reserves may provide potential turtle nesting and overwintering habitat. Therefore, the proposed action should increase the viability of the turtle in the Basin. As stated earlier, the Basin currently supports limited numbers of turtles. Because of the wide range of both the subspecies and species, the limited number of turtles in the Basin, and the limited amount of good-quality turtle habitat in the Basin, the Natomas Basin is probably not essential to the turtle's recovery.

Western Spadefoot Toad

Issuance of the proposed ITP's to the City, Sutter, and the Conservancy may result in limited direct effects to the western spadefoot toad. Although the toad has not been observed in the proposed action's action area, it has been observed approximately six miles from the Basin and suitable toad habitat may exist in the Basin (including the City's and Sutter's Permit Areas).

Development activities proposed by the Land Use agencies may result in the disturbance, injury, or deaths of toads. Toads could be injured or killed by construction activities when they are

crushed by construction equipment in their aquatic and upland habitats. Low frequency noises caused by heavy earth moving equipment could cause toads to come out of dormancy and emerge at inappropriate times. This disturbance could then indirectly result in the harm or death of toads. For example, vibrations could cause toads to emerge from their burrows during the summer months, thereby making them more susceptible to dessication.

As stated in the species descriptions, the amount of suitable toad habitat in the Basin was not quantified. The Basin is not known to contain substantial numbers of vernal pools and is not considered essential to recovery; the proposed action's action area is not included in the Service's proposed vernal pool critical habitat rule (67 FR 59884). The toad has not been identified in the Basin. Based upon estimates derived from data gathered in Sacramento County (see Environmental Baseline for details), the Basin's 886 acres of grasslands would contain at the most 21.3 acres of vernal pools. Additionally, some portion of the Basin's 96 acres of ponds and seasonally wet areas may be suitable for the toad. However, this estimate greatly overestimates the actual amount of vernal pool habitat in the Basin because grasslands in the Basin have a lower density of vernal pools than surrounding areas of Sacramento County (see Environmental Baseline) and most of the ponds and seasonal wetlands do not have correct hydrology to support covered vernal pool species. Of the total 886 acres of grasslands in the Basin, 427 are in the City's Permit Area and 134 are in Sutter's Permit Area (Table 14). This equates to 10.2 and 3.26 acres of vernal pools in the City and Sutter's Permit Areas, respectively. Of the total 96 acres of ponds and seasonally wet areas in the Basin, seven are in the City's Permit Area, four are in the MAP Permit Area, and ten are in Sutter's Permit Area (Table 14). Most of the potential habitat that will be lost is located in the eastern portion of the City's Permit Area. As stated in the species description, ponds and seasonally wet areas acreages almost certainly vastly overestimate the actual potential toad in the Basin, as most of the ponds and seasonally wet areas do not have the correct hydrology to support vernal pool-associated species. Ponds and seasonally wet areas located in the MAP Permit Area do not have the correct hydrology to support the toad and no other potential habitat is located within 76 m (250 ft.) of any of MAP's proposed action activities (Service 2002).

Issuance of the proposed ITP to the Conservancy may have some minimal detrimental effects on the toad on Conservancy reserve lands, if the toad ever occurs in the Basin and Conservancy reserve lands. Toads could be disturbed, harmed, or killed during construction and maintenance activities on Conservancy lands, especially managed marsh reserves and surrounding grasslands. Toads could be crushed in their burrows by heavy equipment, disturbed by heavy equipment, disturbed by people performing vegetation management, etc. The Conservancy's managed marsh reserves will likely provide some potential habitat for the toad. However, the species appears to be more successful in seasonally inundated environments such as vernal pools. Managed marsh reserves will likely not have large amounts of wetlands seasonally flooded in the winter; therefore, the toad will not benefit greatly from the reserves. However, the Conservancy has proposed to periodically consult with toad experts and investigate the possibility of creating potential toad habitat on its reserves.

The Land Use Agencies did not propose take avoidance and minimization measures specific to the toad because of the low likelihood of the species to occur in the Basin. However, they will require toad surveys. If toads are found, the Land Use Agencies will require the developers to consult with the Wildlife Agencies on how to avoid and minimize take. In addition, the toad may benefit from conservation measures proposed for other vernal pool Covered Species. For

example, if vernal pool crustaceans are identified, developers will be required to minimize their impacts according to current Service guidelines. Therefore, the toad may indirectly benefit from conservation measures proposed for the crustaceans. If toads are found in the Basin, the Conservancy will be required to provide suitable habitat for them on its reserves. Therefore, any take of toads is both minimized and mitigated.

Two potential indirect effects of the proposed action include predation and vehicular strikes. For example, the number of toads killed or injured by automobiles will likely increase as automobile traffic increases in the Basin. Vehicle mortalities has been identified as a source of toad mortalities. Under the Proposed Action, habitat reserves would be located at least 244 m (800 ft.) from urban areas and areas designated for urban development (unless a smaller distance is approved by CDFG and the Service on a case-by-case basis) and a buffer at least 9.1 m (30 ft.) wide established within the reserve between marsh habitat and roadways. By locating habitat reserves away from urban areas, the potential for death or injury to toads (if toads eventually inhabit the Basin) from vehicle strikes and predation should be reduced, although not eliminated.

Overall, the proposed action is likely to have little to no adverse effects on the toad. The toad has not been observed in the Basin and is very unlikely to occur there (K. Fuller, pers. comm. to C. Aubrey, 2003). In addition, very little suitable toad habitat exists in the Basin. In the remote event toads are discovered in the Basin, the Permittees would implement measures to minimize and mitigate the take. For example, a breeding pond could be avoided altogether or not filled until after the pond had dried and toads no longer inhabited it. Therefore, the proposed action will not impact the species as a whole.

California Tiger Salamander

The closest known occurrence of California tiger salamander is 11 miles from the proposed action's action area. There is a limited amount of potential habitat in the proposed action's action area and it seems likely that the Service would know if salamanders occurred there. The species is readily identifiable when its breeding ponds are surveyed and the species' presence in an area is often discovered when individuals are struck by cars while migrating to the breeding ponds. The Service is also unaware of any likely natural dispersal mechanism that would cause the salamander to occur in the proposed action's action area in the future. Therefore, issuance of the proposed ITPs to the City, Sutter, and Conservancy is not likely to result in any effects to the salamander.

In the very unlikely event salamanders are discovered in the future, the Permittees have proposed conservation measures to minimize and mitigate the impacts. For example, if a developer discovers salamanders on their property, they must consult with the Service to determine how to avoid and minimize impacts to the species. The Conservancy would then be required to provide salamander-conducive habitat in its reserves.

Sanford's Arrowhead

Issuance of the proposed ITP to the City, MAPPOA, Sutter and the Conservancy may adversely affect Sanford's arrowhead. Although the species has not been identified in the proposed action's action area, it is known to occur less than one mile from the Basin and suitable habitat exists in the proposed action's action area. The most likely potential source of direct effects to Sanford's

arrowhead is the death of plants during activities that alter the habitat of Sanford's arrowhead. For example, if a canal inhabited by the species is filled, plants inhabiting the canal could be crushed or otherwise destroyed by construction equipment. Additionally, the plants could be adversely affected if the canal is filled so that habitat is destroyed or sufficient water is no longer provided to the plants.

Issuance of the proposed ITP to the City is likely to destroy 124 acres of potential Sanford's arrowhead habitat (Table 14). Of this, seven acres are ponds and seasonally wet areas and 117 acres are canals. Issuance of the proposed ITP to Sutter is likely to destroy 225 acres of potential Sanford's arrowhead habitat. Of this, ten acres are ponds and seasonally wet areas and 215 acres are canals. The effects of issuance of the ITP for the MAP project were analyzed in the January 16, 2002, biological opinion for that project. Issuance of the proposed ITP to the MAPPOA is likely to destroy 76 acres of potential Sanford's arrowhead habitat. Of this, four acres are ponds and seasonally wet areas and 72 acres are canals. Although canals are considered potential habitat, water diversions and channel alteration have been listed as a threat to Sanford's arrowhead (CNDDB 2001, Tibor 2001).

Issuance of the proposed ITP to the Conservancy is likely to have both detrimental and beneficial effects on Sanford's arrowhead. Plants could be destroyed during the construction and management of reserves. For example, tractors working in an enhancement area could crush plants. The main potential beneficial effect is the construction of the Conservancy's system of managed marsh reserves. The overall effect of these reserves will likely be to improve habitat conditions for Sanford's arrowhead in the Basin. Reserves acquired as mitigation for development resulting from issuance of the ITPs (both together and separately) to the Land Use Agencies will provide a greater amount of potential habitat than currently exists in the Basin. As a result of destroying 124 acres of potential Sanford's arrowhead habitat in the City's Permit Area, the Conservancy (using mitigation fees) will develop 1006.2 acres of managed marsh habitat. As a result of destroying 225 acres of potential Sanford's arrowhead habitat in Sutter's Permit Area, the Conservancy (using mitigation fees) will develop 933.4 acres of managed marsh habitat. As a result of destroying 76 acres of potential Sanford's arrowhead habitat in MAPPOA's Permit Area, the Conservancy (using mitigation fees) will develop 247.9 acres of managed marsh habitat. In addition to the large increase in potential habitat, the habitat on managed marsh reserves is superior because it will not be subject to the relatively intense management practices that occur in the Basin's drainage and irrigation canals.

In addition to acquiring fees for the development of managed marsh reserves, the Land Use Agencies have proposed to minimize the effects of the proposed action on Sanford's arrowhead by conducting pre-development surveys and relocating any potentially affected plants (another potential direct effect related to development). The Conservancy will monitor any populations identified on Conservancy reserves and manage for their conservation.

The most likely potential indirect effect of the proposed action is the closing or reduced usage of drainage and irrigation canals in response to development. This potential effect is addresses in the snake's indirect effects section.

Overall, issuance of the proposed ITPs to the Permittees should have little to no adverse effects on the Sanford's arrowhead. The species has not been observed in the Basin. However, if the species later colonizes the Basin, it is likely to benefit from the proposed action because the

project will result in a net increase of suitable habitat. In the event the species is identified in an area to be developed, the plan allows for their transplantation prior to disturbance. The Conservancy's managed marsh reserves will provide high-quality habitat for the species that is not subject to the adverse impacts of practices such as devegetating irrigation and drainage canals. Because the proposed action is likely to have little adverse effects on Sanford's arrowhead locally, particularly as the species is not known to occur in the basin, and the range of the species is far greater than the immediate project area, the proposed action is not expected to adversely affect the species as a whole.

Delta Tule Pea

Delta tule pea is not known to occur within 20 miles of the action area and the Service does not believe that it is likely that the species will naturally occur in the action area during the future. The Service also does not anticipate any indirect effects to the species in the Basin or in general. Therefore, issuance of the proposed ITPs to the City, Sutter, and MAPPOA is not likely to result in adverse effects to the delta tule pea. In the very unlikely event the delta tule pea does eventually colonize the Basin, the Land Use Agencies have proposed to allow plants to be transplanted from development sites to minimize impacts to the affected individuals. The Conservancy's managed marsh reserves will provide high-quality habitat for the species that is not prone to management practices such as devegetating canals.

Cumulative Effects

Cumulative effects are the effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal Action under review (50 C.F.R. 402.02).

The NBHCP anticipates that a total of 17,500 acres of development will occur in the Basin during the 50-year life of the ITPs. This is based upon the extent, amount, and location of future development outlined in the City's, Sutter's, and Sacramento County's adopted Land Use Plans as well as the level of development contemplated in adopted community plans and specific plans. Section 3.1.4 of the Final NBHCP EIR/EIS discusses a number of development projects including, but not limited to, Alleghany Properties, Northern Territories/Brookfield Land Company, expansion of the Sacramento International Airport, and a private university proposal, that are outside of the development analyzed in the NBHCP and could potentially occur in the Basin in the future. However none of these potential development projects is reasonably certain to occur in the action area of the plan. These areas are not planned for urban development under adopted land use plans; (2) these areas are located outside of the City's Sphere of Influence, the City of Sacramento city limits and Sacramento County's Urban Services Boundary; (3) no urban services (such as sewage) are available to serve development; and (4) other significant legal and planning hurdles must be overcome before development could proceed. In addition, neither the City, Sutter, nor Sacramento County are considering proposed amendments to their general plans that would result in additional urban development in the Natomas Basin. Therefore, none of the projects are either "reasonably certain to occur" within the action area of the plan. Detailed discussion can be found in Section 3.1.4 of the Final NBHCP EIR/EIS.

In addition, any activities in the Natomas Basin that result in take of listed animal species would require either: (1) a Section 10 permit, a federal action, which in turn will trigger formal

consultation under Section 7 with the Service; or (2) a Section consultation with the service if a federal action is involved. The giant garter snake is known to occur in many of the areas identified above, so that incidental take authorization under Section 7 or Section 10 would likely be required before projects in these areas could legally proceed. Therefore, these activities would not be considered cumulative effects.

Both the City and Sutter have agreed to restrict development in the Basin to that outlined in the NBHCP (17,500 acres [including MAP]). If either the City or Sutter does decide to pursue additional development, they agree that prior to approval of any related rezoning or prezoning, such future urban development shall trigger a reevaluation of the Plan and ITPs, a new effects analysis, potential amendments and/or revisions to the Plan and ITPs, a separate conservation strategy and issuance of ITPs to the City and/or Sutter for that additional development. Failure to meet these requirements, could trigger suspension or revocation of their ITP(s).

Threatened Vernal Pool Fairy Shrimp, Endangered Vernal Pool Tadpole Shrimp, Threatened Colusa Grass, Threatened Slender Orcutt Grass, Endangered Sacramento Orcutt Grass, Midvalley Fairy Shrimp, Western Spadefoot Toad, California Tiger Salamander, Legenere, and Boggs Lake Hedge-Hyssop

Changes in land use practices could adversely affect Covered vernal pool species. For example, if an area used for grazing contains vernal pools, conversion of that area to row crops, vineyards, or orchards could result in the destruction of those vernal pools and the organisms that inhabit them. However, considering that most of the species have not been observed in the action area and that the amount of potential habitat in the Basin is very limited, this cumulative effect is likely to have little to no effect on the species by itself, or when added to the proposed action. If a listed vernal pool animal species occurs in the vernal pools, federal action would be required to authorize incidental take, so that these effects would not be considered cumulative to the current action.

Threatened Giant Garter Snake

Because the snake inhabits wetlands and adjacent uplands in highly modified portions of the proposed action's action area, the Service anticipates that a wide range of activities will affect the species. An undetermined number of future land use conversions and routine agricultural practices (including those by RD 1000 and Natomas Mutual) may convert or otherwise alter habitat or disturb, kill, or injure snakes. Ongoing agricultural activities also affect the giant garter snake and other Covered Species, and are largely not subject to an obvious bosection 7 consultation. Some agriculture, such as rice farming, can provide valuable seasonal foraging and upland habitat for Covered Species. Although rice fields and agricultural waterways can provide habitat for the snake and other Covered Species, agricultural activities such as waterway maintenance, weed abatement, rodent control, and discharge of contaminants into wetlands and waterways can degrade habitat and increase the risk of mortality (Service 1999). Maintenance of agricultural waterways can also eliminate or prevent establishment of snake habitat, eliminate food resources, and can fragment existing habitat and prevent dispersal of giant garter snakes and wetland-dependent species (Service 1999). In addition, crop rotation within the Natomas Basin causes shifts in habitat availability, quantity, quality, and affects the presence of giant garter snakes. Although these agricultural practices can result in take of the snake, the snake has persisted despite these activities for decades and therefore, its baseline is probably not being

further depressed by these activities. In addition, in the event take resulted from these activities, it would violate the Act unless authorized through an incidental take statement or an incidental take permit, both of which would trigger Section 7 consultation.

Other cumulative effects include: (1) fluctuations in acres of aquatic habitat due to water management or acres of ricelands in production; (2) diversion of water; (3) levee repairs; (4) riprapping or lining of canals and stream banks; (5) dredging, clearing, and spraying to remove vegetation from irrigation canals; (6) discing, mowing, clearing and spraying vegetation adjacent to canals and streams; (7) use of burrow fumigants on levees and other potential upland refugia; (8) contaminated runoff from agriculture and urbanization; and (9) use of herbicides and pesticides in ricelands and other agricultural lands that provide snake habitat, or which are adjacent to and/or drain into snake habitat. As with the agricultural activities discussed in the preceding paragraph, the snake has persisted despite these activities for decades and therefore, its baseline is probably not being further depressed by these activities.

Non-agricultural flood control and maintenance activities which can result in snake mortality and degradation of habitat include levee construction, stream channelization, and the riprapping of streams and canals (Service 1999); most of these activities would require permits from the U.S. Army Corps of Engineers and trigger a section 7 consultation with the Service. The interior drainage channels within the Natomas Basin are subject to fewer impacts than banks along riverine systems, but plans exist for a possible relocation of a reach of the Natomas East Main Drainage Canal. Similar to flood control and maintenance activities, these activities would likely not be considered cumulative effects because they would require a Section 404 Clean Water Act Permit and therefore, would require section 7 formal consultation if they were likely to adversely affect the snake.

Threatened Valley Elderberry Longhorn Beetle

No potential cumulative effects within the proposed action's action area are anticipated because habitat for this species is limited in the basin, the species is not known to occur in the basin and additional growth beyond planned development covered by the NBHCP not reasonably certain to occur within the action area.

Swainson's Hawk

Infection of hawks by West Nile virus could potentially occur within the Central Valley population of Swainson's hawks (M. Bradbury, pers. comm. to Craig Aubrey, 2002). However, the Service is not aware of Swainson's hawks being infected by the disease in California, although the species has been observed carrying the virus (Centers for Disease Control and Prevention, 2002). Infection of hawks from this disease is not reasonably certain to occur within the action area of the plan and is not considered a cumulative effect. In addition, according to Bradbury (2002, pers. comm. to Craig Aubrey), the more individuals there are, the more likely there will be enough immune individuals to allow the population to recover and the larger the area they cover, the less chance any individual will come into contact with the disease. The proposed action should have no affect on the ability of the hawk to either avoid or recover from the virus. The proposed action is not anticipated to reduce the number of hawks and the amount of habitat being converted is very small in comparison to the total amount of habitat in the vicinity of the proposed action.

Aleutian Canada Goose

A potential cumulative effect of the proposed action specific to the goose is the use of herbicides and pesticides in ricelands and other agricultural lands that provide goose foraging habitat. However, as discussed in the analysis of direct and indirect effects, the goose is only an occasional visitor to the Basin and the Basin represents only a small portion of the goose's winter range in California. Therefore, such use should have little effect on the goose, by itself or when added to the effects of the proposed action.

Burrowing Owl

Potential cumulative effects of the proposed action specific to the owl are: (1) the use of herbicides and pesticides in agricultural lands that provide owl foraging and nesting habitat; and (2) use of rodenticides in lands that provide owl burrowing habitat. However, neither of these activities is likely to reduce the viability of the owl in the Basin or as a whole, either alone or when added to the effects of the proposed action. The burrowing owl has persisted in the basin despite the use of herbicides, pesticides, and rodenticides for decades in the Basin, and the use of these substances is not expected to increase in the future.

Loggerhead Shrike

A potential cumulative effect of the proposed action specific to the shrike is use of herbicides and pesticides in agricultural lands that provide shrike foraging habitat. Herbicides and pesticides have been used for decades in the Basin; their use is not anticipated to increase or to affect the viability of the shrike in the Basin or as a species. The species is not considered to be subject to any identifiable threat in the State and populations in the western United States appear to be stable. Shrikes are common throughout lowland California and the Natomas Basin represents a very small fraction of the species' range. There for, such use is should have little effect on the shrike, by itself, or when added to the effects of the proposed action.

Tricolored Blackbird

A potential cumulative effects of the proposed action specific to the tricolor is the use of herbicides and pesticides in agricultural lands that provide tricolor nesting and foraging habitat. Because of the similarity of habitat requirements with the snake, many of the cumulative effects described for the snake such as agricultural activities will also affect the tricolor. As with the snake, these cumulative effects should not affect the viability of the tricolor in the Basin or as a species, by itself or when added to the effects of the plan. Herbicides and pesticides have been used for decades in the Basin; their use is not anticipated to increase.

White-Faced Ibis

A potential cumulative effect of the proposed action specific to the ibis is the use of herbicides and pesticides in agricultural lands that provide ibis wintering and foraging habitat. In addition, because of the similarity of habitat requirements with the snake, many of the cumulative effects described for the snake will also affect the ibis. Although agricultural pesticide use is a concern, ibis appear to be performing well in Central Valley rice fields, and rice fields represent the majority of available ibis habitat in the Basin. These cumulative effects, by themselves, or when

added to the effects of the proposed action, are not expected to reduce the viability of the ibis in the Basin or as a species.

Bank Swallow

A potential cumulative effects of the proposed action specific to the bank swallow the is use of herbicides and pesticides in agricultural lands that provide swallow foraging habitat. Herbicides and pesticides have been used for decades in the Basin; their use is not anticipated to increase. Furthermore, the swallow is only an occasional visitor to the Basin. Therefore, the cumulative effects of such use on the bank swallow are not, by themselves, or when added to the effects of the proposed action, expected to affect the viability of the swallow in the Basin or as a species.

Northwestern Pond Turtle

A potential cumulative effects of the proposed action specific to the turtle is the use of herbicides and pesticides in agricultural lands that provide turtle foraging habitat. In addition, because of the similarity of habitat requirements with the snake, many of the cumulative effects described for the snake such as canal maintenance will also affect the turtle. The turtle has probably persisted despite the use of herbicides and pesticides in the Basin for decades; their use is not anticipated to increase. The Basin currently provides limited habitat for the turtle and the species ranges from Washington to Mexico. The subspecies ranges from Washington to just south of the project area. Therefore, these cumulative effects, by themselves, or when added to the effects of the proposed action, are not expected to affect the viability of the turtle in the Basin or as a species.

Sanford's Arrowhead

One potential cumulative effect of the proposed action on Sanford's arrowhead is water transfers. In 2003, a number of northern California water districts (including Natomas Mutual) sold water to water districts in southern California. According to news accounts (e.g., Hacking 2003) southern California water districts are currently negotiating for long-term water transfer contracts. If entered into, these contracts could result in a decrease in the amount or suitability of potential Sanford's arrowhead habitat because less water would be available in the proposed action's action area for the species. However, since the basin area provides little potential habitat for this species and the the species has not been observed in the proposed action's action area, future water transfers, by water districts in the basin, either by themselves or when added to the proposed action, are not likely to affect the viability of the Sanford's arrowhead in the Basin or as a species.

Delta Tule Pea

Because the species has neither been observed in nor is expected to occur in the proposed action's action area, no cumulative effects are anticipated.

Conclusion

<u>Federally-Listed, Proposed and Delisted Species</u>

After reviewing the current status of the endangered vernal pool tadpole shrimp, threatened giant garter snake, threatened valley elderberry longhorn beetle, threatened vernal pool fairy shrimp,

endangered Sacramento Orcutt grass, threatened Colusa grass, threatened slender Orcutt grass, proposed California tiger salamander, and delisted Aleutian Canada goose, the environmental baselines for the action area, and the effects of the proposed action, including all measures proposed to avoid, minimize, and mitigate adverse effects and the cumulative effects, it is the Service's biological opinion that the issuance of incidental take permits to the City, Sutter, MAPPOA, and Conservancy pursuant to section 10(a)(1)(B) of the Act is not likely to jeopardize the continued existence of the vernal pool tadpole shrimp, giant garter snake, valley elderberry longhorn beetle, vernal pool fairy shrimp, Sacramento Orcutt grass, Colusa grass, slender Orcutt grass, California tiger salamander, and Aleutian Canada goose for the reasons stated in the "Effects of the Proposed Action" section of this opinion. Critical habitat has not been designated for the giant garter snake, therefore none will be affected. Critical habitat for the valley elderberry longhorn beetle exists to the south/southeast of the project area, but will not be affected. Proposed critical habitat for the listed vernal pool Covered Species (vernal pool tadpole shrimp, vernal pool fairy shrimp, Colusa grass, Sacramento Orcutt grass, and slender Orcutt grass) does not include the proposed action's action area; therefore, none will be affected. As stated earlier, the effects of the issuance of an ITP to MAP were previously analyzed in the January 16, 2002, biological opinion for that project (Service File # 1-1-01-F-0302) and the Service issued an ITP to MAPPOA on February 21, 2002 (TE036473-0). The MAP biological opinion is incorporated by this reference into this opinion.

Other Covered Species - Not Federally-Listed as Threatened or Endangered

After reviewing the current status of the unlisted Swainson's hawk, white-faced ibis, bank swallow, tricolored blackbird, northwestern pond turtle, loggerhead shrike, burrowing owl, western spadefoot toad, midvalley fairy shrimp, Boggs Lake hedge-hyssop, legenere, Sanford's arrowhead, and delta tule pea, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is the Service's opinion that should any of these species be listed in the future, issuing incidental take permits that include these species as covered species and that authorize the incidental take of the currently unlisted animal covered species should they become listed during the term of the permits, is not likely to jeopardize the continued existence of the Covered Species. Summaries of the components of the proposed NBHCP that were particularly instrumental in supporting the Service's conclusion with regard to currently unlisted Covered Species are provided in the effects section of this opinion. As stated earlier, the effects of the issuance of an ITP to MAP were previously analyzed in the January 16, 2002, biological opinion for that project (Service File # 1-1-01-F-0302) and the Service issued an ITP to MAPPOA on February 21, 2002 (TE036473-0). The MAP biological opinion is incorporated by this reference into this opinion.

Incidental Take Statement

Section 9(a)(1) of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened animal species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which

include, but are not limited to, breeding feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement. Sections 7(b)(4) and 7(o)(2) of the Act do not apply to listed plant species.

Ten of the fifteen covered animal species addressed in this biological opinion are neither proposed for listing nor currently listed. As such, there is no take prohibitions under the Act for these animal species at the time of writing. The Incidental Take Statement for the unlisted animal Covered Species and the Permit shall become effective as to each currently unlisted Covered animal Species if and when it becomes are listed under the Act during the terms of the permits.

The proposed NBHCP and its associated documents clearly identify anticipated impacts to affected species likely to result from the proposed taking and the measures that are necessary and appropriate to minimize those impacts. All conservation measures described in the proposed HCP, together with terms and conditions described in the associated IA and any section 10(a)(1)(B) permit or permits issued with respect to the proposed HCP, are hereby incorporated by reference as reasonable and prudent measures and terms and conditions within this Incidental Take Statement pursuant to 50 CFR 402.14(i). Such terms and conditions are non-discretionary and must be undertaken for the exemptions under section 10(a)(1)(B) and section 7(o)(2) to apply. If the Permittees fail to adhere to these terms and conditions, protective coverage of the section 10(a)(1)(B) permit and section 7(o)(2) may lapse. The amount or extent of incidental take anticipated under the proposed NBHCP, associated reporting requirements, and provisions for disposition of dead or injured animals are described in the NBHCP and its accompanying section 10(a)(1)(B) permits.

The proposed action's action area is known to be occupied or visited by ten of the Covered animal Species. Although the valley elderberry longhorn beetle, bank swallow, midvalley fairy shrimp, western spadefoot toad, and California tiger salamander are not known from the action area, all but the California tiger salamander have potential to be observed there in the future. The amount of take (killing, harming, harassing, wounding) of most animal species, described below, is anticipated to be low, due to the effectiveness of the take avoidance and minimization measures. Many of the species are highly mobile and/or only frequent the Natomas Basin during the winter and are expected to avoid direct effects. Indirect effects are best interpreted as the extent of habitat lost or degraded by the covered activity.

The section 10 (a) incidental take permit would also constitute a Special Purpose permit under 50 CFR 21.27 for the take of any Covered animal Species which may be listed as threatened or endangered under the Endangered Species Act during the permit term and which are also protected by the MBTA, in the amount and/or number and subject to the terms and conditions specified in the 10(a) permit. The MBTA special purpose permit would become effective upon the listing of the species under the ESA. Any such take shall not be in violation of the MBTA of 1918, as amended (16 U.S.C. 703-712). The Special Purpose permit shall be valid for a period of three years from the effective date, provided the section 10(a) permit remains in effect for such period. The Special Purpose permit shall be renewed, provided the permittees remain in compliance with the terms of the 10(a) permit and the Implementation Agreement. Each such

renewal shall be valid for the maximum period of time allowed by 50 CFR 21.27 or its successor at the time of renewal.

Incidental take associated with the MAP project was authorized in the 10(a)(1)(B) permit for that project. Therefore, incidental take related to that project and mitigation reserve lands acquired as a result of that project are not included in this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the Service so that they become binding conditions of any grant or permit issued to the City, Sutter, and Conservancy, as appropriate, for the exemption in section 7(o)(2) to apply. The Service has a continuing duty to regulate the activity covered by this Incidental Take Statement. If the Service (1) fails to assume and implement the terms and conditions or (2) fails to adhere to the terms and conditions of the Incidental Take Statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Service must track the progress of the action and its impact on the species as specified in the Incidental Take Statement. [50 CFR §402.14(i)(3)]

Amount or Extent of Take

The City and Sutter propose to permanently convert a maximum of 15,517 acres in accordance with the requirements, guidelines, measures, and processes described in the NBHCP and NBHCP IA. Additionally, if all of the 15,517 acres are developed, at least 7,758.5 acres of reserve lands are expected to be established under the NBHCP; take incidental to management of reserves is expected. The disturbance and conversion of land is expected to result in incidental take of the Covered Species. Incidental take that will result from the City's, Sutter's, and the Conservancy's habitat conversion and acquisition, restoration, and management of reserve lands will be authorized through the section 10(a)(1)(B) permit for the NBHCP. Take will be in the form of disturbance, harm, and kill. It is expected that individuals of the Covered Species will or may be taken during development as well as other activities addressed above and in the NBHCP.

The Service expects that incidental take of various Covered Species will be difficult to detect or quantify for the following reasons: (1) the aquatic nature of certain of the organisms and their relatively small body size make the finding of a dead specimen unlikely; (2) the secretive nature of certain of the species makes detection or quantification difficult; (3) species abundance may be masked by seasonal fluctuations in numbers or other causes; (4) species occur in habitats that make them difficult to detect; (5) the species use of the habitat is intermittent. Therefore, the Service estimates that take of covered animal species associated with loss of up to 15,517 acres of Covered Species habitat will be affected as a result of issuing the proposed ITPs to the City and Sutter.

The Service expects that incidental take of various Covered Species on the Conservancy's reserves will be difficult to detect or quantify for the following reasons: (1) the aquatic nature of certain of the organisms and their relatively small body size make the finding of a dead specimen unlikely; (2) the secretive nature of certain of the species makes detection or quantification difficult; (3) species abundance may be masked by seasonal fluctuations in numbers or other causes; (4) species occur in habitats that make them difficult to detect; (5) the species use of the habitat is intermittent. Due to the difficulty in quantifying the number of Covered Species that will be taken as a result of the proposed management actions (described in SSMPs and effects

section), the Service is quantifying take incidental to the project as the number of acres of habitat that could be affected for the Covered Species as a result of the action. Therefore, the Service estimates that take of covered animal species associated with restoration/enhancement/perpetual management of up to 7,758.5 acres of Covered Species habitat (excluding mitigation lands for MAP) will be affected as a result of issuing the proposed ITP to the Conservancy.

Listed and Proposed Species

Threatened Vernal Pool Fairy Shrimp and Endangered Vernal Pool Tadpole Shrimp

The Service anticipates that an undetermined number of vernal pool fairy shrimp and vernal pool tadpole shrimp could be taken over a 50-year period as a result of this proposed action. Vernal pool crustaceans could be killed, harmed, or disturbed during construction activities, implementation of the proposed conservation measures, or management on the Conservancy's reserves. We estimate that the City will incidentally take up to all vernal pool tadpole shrimp and vernal pool fairy shrimp via the disturbance associated with construction activities on 10.2 acres of vernal pools and up to 7 acres of ponds and seasonally wet areas within the City's Permit Area and in association with off-site infrastructure improvements. We estimate that Sutter will incidentally take up to all vernal pool tadpole shrimp and vernal pool fairy shrimp via the disturbance associated with construction activities on 3.3 acres of vernal pools and up to 10 acres of ponds and seasonally wet areas within Sutter's Permit Area and in association with off-site infrastructure improvements. We estimate that the Conservancy will incidentally take up to all vernal pool tadpole shrimp and vernal pool fairy shrimp via the disturbance associated with management activities on up to 0.9 acres per year of vernal pool habitat within the Conservancy's Permit Area. These estimates vastly overstates the actual amount of take likely to occur because it assumes: (1) that all ponds and seasonally wet areas are suitable vernal pool habitat; (2) that the applicants always fill pools; (3) that the applicants always mitigate according to the programmatic ratios; (4) that the Conservancy will disturb one percent of its pools per year to the point of taking all vernal pool fairy shrimp and vernal pool tadpole shrimp inhabiting them; and (5) that all of the Conservancy's pools are occupied by the vernal pool fairy shrimp and/or vernal pool tadpole shrimp. The number of vernal pool crustaceans affected by implementation of the proposed action should be very small, as the amount of potential vernal pool crustacean habitat is very limited throughout the proposed project's action area. No proposed critical habitat will be affected, as none is located in the proposed project's action area.

Threatened Giant Garter Snake

The Service anticipates that an undetermined number of giant garter snakes could be taken over a 50-year period as a result of this proposed action. Take associated with initial construction activities will be in the form of harm, disturbance, and injury or death. We estimate that the City will incidentally take two (2) giant garter snakes via mortality and ten (10) giant garter snakes via the disturbance associated with construction activities on 1,094 acres of snake habitat within the City's Permit Area and in association with off-site infrastructure improvements. Snake take values are based upon data gathered at Colusa National Wildlife Refuge (Service 1999). We estimate that Sutter will incidentally take thirteen (13) giant garter snakes via mortality and fifty-one (51) giant garter snakes via the associated with construction activities on 5,802 acres of snake habitat within Sutter's Permit Area and in association with off-site infrastructure improvements.

Sutter's development activities will kill no more than two (2) snakes per year. Snake take values are based upon data gathered at Colusa National Wildlife Refuge (Service 1999).

Giant garter snakes are likely to inhabit certain lands acquired for reserves and will thus be subject to harm and disturbance from restoration/enhancement/management activities. While minimization measures will be implemented, it is possible that giant garter snakes will be found within reserve lands during these activities. We estimate that the Conservancy will incidentally take three (3) giant garter snakes via mortality and eighteen (18) giant garter snakes via the disturbance associated with construction activities on the Conservancy's 1,939.7 acres of managed marsh reserves. The Conservancy's managed marsh construction activities will kill no more than two (2) snakes per year. We estimate that the Conservancy will incidentally take twenty-one (21) giant garter snakes per year via the disturbance associated with perpetual management activities on the Conservancy's 1,939.7 acres of managed marsh reserves. In addition, we estimate that the Conservancy will incidentally take (primarily in the form of disturbance) forty-one (41) giant garter snakes via the disturbance associated with activities on the Conservancy's 3879.3 acres of rice reserves.

Snake take values are based upon data gathered at Colusa National Wildlife Refuge (Service 1999). Colusa National Wildlife Refuge was chosen as a reference point because at the time the data were gathered, Colusa likely had snake habitat most similar to that of the Basin, when compared to Gilsizer Slough and Badger Creek. The Service would expect that, given the extensive marsh habitats at Gilsizer and Badger Creek, snake densities observed there would be greater than those expected in the Basin and therefore, they would not be good indicators of the density of snakes in the Basin. Although some snake populations have been estimated for the Basin, these populations are based upon linear estimates (i.e., snakes/unit length) and are therefore, not appropriate for estimating the number of snakes affected by the proposed project, which is expressed in the amount of habitat lost in acres (i.e., snakes/unit area).

Threatened Valley Elderberry Longhorn Beetle

The Service anticipates that an undetermined number of beetles could be taken over a 50-year period as a result of this proposed action. Take could be in the form of disturbance, harm, or death. The applicants did not conduct surveys for the beetle in the proposed Permit Areas. However, the amount of potential beetle habitat affected is expected to be very limited, as the Basin is not known for large stands of elderberry shrubs. We estimate that the City will incidentally take up to all valley elderberry longhorn beetles via the disturbance associated with elderberry shrub relocation activities on 6 acres of oak groves, 24 acres of riparian area, and 10 acres of tree groves in the City's Permit Area and in association with off-site infrastructure improvements. We estimate that Sutter will not take any beetles, as no potential habitat is expected to be in Sutter's proposed Permit Area. It is anticipated that some beetles inhabiting elderberry shrubs in riparian restoration areas of reserve lands could be subject to some direct and indirect effects from reserve management activities. Therefore, we estimate that the Conservancy will incidentally take up to all valley elderberry longhorn beetles inhabiting 25 elderberry shrubs per year via the disturbance associated with management activities on 1,939.7 acres of managed marsh in the Conservancy's Permit Area. This amount of take is based upon the amount of potential elderberry shrub habitat that will be lost, the average density of elderberry plant plantings outlined in the Beetle Guidelines (5 elderberry shrubs per 1800 square feet), an assumption that one elderberry shrub is located on each acre of potential beetle habitat to be lost,

and an assumption that ten percent of the Conservancy's elderberry shrubs will be affected per year. It greatly overestimates the actual amount of take likely to occur, as the Conservancy should not be conducting a significant amount of activity that will affect the beetle and not all elderberry shrubs, if any, will be occupied by the beetle. No critical habitat will be affected, as none is located in the proposed project's action area.

California Tiger Salamander

No salamanders are known or expected to occur within the proposed project's action area; therefore, no incidental take is expected from the issuance of the proposed ITP's to the City and Sutter.

Unlisted Species

Swainson's Hawk

The Service anticipates that an undetermined number of Swainson's hawks could be taken over a 50-year period as a result of this proposed action. Take associated with initial construction activities and the Conservancy's management activities (including monitoring) will be in the form of harm or disturbance. Loss of prey species and foraging habitat and disturbances to nesting and foraging hawks from construction are anticipated forms of take. Due to the difficulty in quantifying the number of hawks that will be taken as a result of the proposed action, the Service is quantifying take incidental to the project as the number of acres of potential nesting and foraging habitat that will be impacted due to direct or indirect effects as a result of the action. Therefore, the Service estimates that 8,785 acres of potential hawk foraging habitat will become unsuitable as a result of the proposed action. Issuance of the proposed ITP to the City is likely to result in 6,925 acres of potential foraging habitat and 40 acres of nesting habitat becoming unsuitable for the hawk. Issuance of the proposed ITP to Sutter is likely to result in 1,860 acres of potential foraging habitat becoming unsuitable for the hawk. Estimates of foraging and nesting habitat lost overestimate the actual take associated with the action. As stated in the "Effects of the Proposed Action" section, most of the potential nesting habitat lost (24 acres) will not actually be developed because it is in the Fisherman's Lake buffer area. Loss of potential nesting and foraging habitat is not expected to result in injury or mortality of hawks because hawks can both forage and nest in other habitat that is available in and around the Basin. Also, Swainson's nest trees will not be removed while young are still in the nest. Issuance of the proposed ITP to the Conservancy is likely to result in the conversion/restoration/ enhancement of up to 1,939.7 acres of potential hawk habitat when the Conservancy's upland reserves are created. Conservancy management practices will also potentially disturb hawks on 2,909.5 acres of managed marsh uplands, upland, and fallowed rice reserves.

Aleutian Canada Goose

The Service anticipates that an undetermined number of Aleutian Canada geese could be taken over a 50-year period as a result of this proposed action. Due to the difficulty in quantifying the number of geese that will be taken as a result of the proposed action, the Service is quantifying take incidental to the project as the number of acres of potential foraging habitat that will become unsuitable due to direct or indirect effects as a result of the action. Therefore, the Service estimates that 12,863 acres of potential goose foraging habitat will become unsuitable as a result

of the proposed action. Issuance of the proposed ITP to the City is likely to result in 5,656 acres of potential foraging habitat becoming unsuitable for the goose. Issuance of the proposed ITP to the Sutter is likely to result in 7,207 acres of potential foraging habitat becoming unsuitable for the goose. Estimating take in terms of foraging habitat lost overestimates the actual take, as geese will very likely forage in other areas available in the Basin and will not incur any significant disruption of their normal behavioral patterns. And, the goose is only a transient visitor to the Basin. Loss of its foraging habitat in the Basin should have very little impact on the goose. Issuance of the proposed ITP to the Conservancy is likely to result in the conversion of up to 1,939.6 acres of potential goose habitat when the Conservancy's managed marsh reserves are created. Conservancy management practices will also potentially distrub geese on 7,758.5 acres of managed marsh, upland, and rice reserves.

Burrowing Owl

The Service anticipates that an undetermined number of owls could be taken over a 50-year period as a result of this proposed action. Take will likely occur in the form of harm, disturbance and mortality. Due to the difficulty in quantifying the number of owls that will be taken as a result of the proposed action, the Service is quantifying take incidental to the project as the number of acres of potential foraging and nesting habitat that will become unsuitable due to direct or indirect effects as a result of the action. Therefore, the Service estimates that 685 acres of potential foraging habitat and 235.2 miles of canals will become unsuitable as a result of the proposed action. Issuance of the proposed ITP to the City is likely to result in 450 acres of potential foraging habitat and 19.3 miles of canals becoming unsuitable for the owl. Issuance of the proposed ITP to the Sutter is likely to result in 235 acres of potential foraging habitat and 33.6 miles of canals becoming unsuitable for the goose. Estimating take in terms of foraging habitat lost overestimates the actual take, as burrowing owls will likely forage in other areas available in the Basin, especially when that foraging habitat is not located near any burrowing owl burrows, and will not incur any significant disruption of their normal behavioral patterns. Issuance of the proposed ITP to the Conservancy is likely to result in the conversion of undetermined amount of potential foraging habitat when the Conservancy's managed marsh reserves are created. Conservancy management practices will also potentially disturb owls on 5,818.9 acres of managed marsh and upland reserves.

Loggerhead Shrike

The Service anticipates that an undetermined number of shrikes could be taken over a 50-year period as a result of this proposed action. Take will likely occur in the form of mortality, harm, and disturbance. Due to the difficulty in quantifying the number of shrikes that will be taken as a result of the proposed action, the Service is quantifying take incidental to the project as the number of acres of potential habitat that will become unsuitable due to direct or indirect effects as a result of the action. Therefore, the Service estimates that 8,550 acres of potential shrike habitat will become unsuitable as a result of the proposed action. Issuance of the proposed ITP to the City is likely to result in 6,473 acres of potential habitat becoming unsuitable for the shrike. Issuance of the proposed ITP to the Sutter is likely to result in 2,077 acres of potential habitat becoming unsuitable for the shrike. Estimating take in terms of foraging habitat lost overestimates the actual take, as the shrike will very likely forage in other areas available in the Basin and will not incur any significant disruption of its normal behavioral patterns. Issuance of the proposed ITP to the Conservancy is likely to result in the conversion of undetermined amount

of potential shrike habitat when the Conservancy's managed marsh and upland reserves are created. Conservancy management practices will also potentially disturb shrikes on 3,879.25 acres of managed marsh and upland reserves.

Tricolored Blackbird

The Service anticipates that an undetermined number of tricolored blackbirds could be taken over a 50-year period as a result of this proposed action. Take will likely occur in the form of harm and disturbance. Due to the difficulty in quantifying the number of tricolors that will be taken as a result of the proposed action, the Service is quantifying take incidental to the project as the number of acres of potential habitat that will become unsuitable due to direct or indirect effects as a result of the action. Therefore, the Service estimates that 373 acres of potential nesting habitat and 13,341 acres of potential foraging habitat will become unsuitable as a result of the proposed action. Issuance of the proposed ITP to the City is likely to result in148 acres of potential nesting habitat and 6,083 acres of potential foraging habitat becoming unsuitable for the tricolor. Issuance of the proposed ITP to the Sutter is likely to result in 225 acres of potential nesting habitat and 7,341 acres of potential foraging habitat becoming unsuitable for the tricolor. Estimating take in terms of foraging habitat lost overestimates the actual take, as the tricolor will very likely forage in other areas available in the Basin, especially when the foraging habitat is not near any tricolor nesting colonies, and will not incur any significant disruption of its normal behavioral patterns. Issuance of the proposed ITP to the Conservancy is likely to result in the conversion of undetermined amount of potential tricolor habitat when the Conservancy's managed marsh and upland reserves are created. Conservancy management practices will also potentially disturb tricolors on up to 7,758.5 acres of managed marsh upland, and rice reserves.

White-Faced Ibis

The Service anticipates that an undetermined number of white faced ibis could be taken over a 50-year period as a result of this proposed action. Take expected to be in the form of disturbance or harm, through loss of aquatic foraging habitat, primarily rice fields, canals and ditches. Due to the difficulty in quantifying the number of ibis that will be taken as a result of the proposed action, the Service is quantifying take incidental to the project as the number of acres of potential habitat that will become unsuitable due to direct or indirect effects as a result of the action. Therefore, the Service estimates that 6,899 acres of potential ibis habitat will become unsuitable as a result of the proposed action. Issuance of the proposed ITP to the City is likely to result in 1,097 acres of potential habitat becoming unsuitable for the ibis. Issuance of the proposed ITP to the Sutter is likely to result in 5,802 acres of potential habitat becoming unsuitable for the ibis. Estimating take in terms of foraging habitat lost overestimates the actual take, as the ibis will very likely forage in other areas available in the Basin and will not incur any significant disruption of its normal behavioral patterns. Issuance of the proposed ITP to the Conservancy is likely to result in the conversion of undetermined amount of potential ibis habitat when the Conservancy's managed marsh and upland reserves are created. Conservancy management practices will also potentially disturb ibis on 7,758.5 acres of managed marsh, upland, and rice reserves.

Bank Swallow

The Service anticipates that an undetermined number of bank swallows could be taken over a 50-year period as a result of this proposed action. Take expected to be in the form of harm or disturbance through loss of rarely-used foraging habitat. Due to the difficulty in quantifying the number of swallows that will be taken as a result of the proposed action, the Service is quantifying take incidental to the project as the number of acres of potential habitat that will become unsuitable due to direct or indirect effects as a result of the action. Therefore, the Service estimates that 13,797 acres of potential foraging habitat will become unsuitable as a result of the proposed action. Issuance of the proposed ITP to the City is likely to result in 6,231 acres of potential foraging habitat becoming unsuitable for the swallow. Issuance of the proposed ITP to the Sutter is likely to result in 7,566 acres of potential foraging habitat becoming unsuitable for the swallow. Estimating take in terms of foraging habitat lost overestimates the actual take, as the bank swallow will very likely forage in other areas available in the Basin and will not incur any significant disruption of its normal behavioral patterns. In addition, there is there is very little potential nesting habitat near the Natomas Basin and therefore, the number of swallows that forage in the Basin should be small. Issuance of the proposed ITP to the Conservancy is likely to result in the conversion of undetermined amount of potential swallow foraging habitat when the Conservancy's managed marsh and upland reserves are created. Conservancy management practices will also potentially disturb shrikes on 7,758.5 acres of managed marsh, upland, and rice reserves.

Northwestern Pond Turtle

The Service anticipates that an undetermined number of pond turtles could be taken over a 50-year period as a result of this proposed action. Take expected to be in the form of harm, disturbance and killing, through construction-related loss of habitat and management of the Conservancy's reserves. Due to the difficulty in quantifying the number of turtles that will be taken as a result of the proposed action, the Service is quantifying take incidental to the project as the number of acres of potential habitat that will become unsuitable due to direct or indirect effects as a result of the action. Therefore, the Service estimates that 6,920 acres of potential turtle habitat will become unsuitable as a result of the proposed action. Issuance of the proposed ITP to the City is likely to result in 1,118 acres of potential habitat becoming unsuitable for the turtle. Issuance of the proposed ITP to the Sutter is likely to result in 5,802 acres of potential habitat becoming unsuitable for the turtle. Estimating take in terms of habitat lost overestimates the actual take, as much of the Basin's available turtle habitat is rice and as stated in the "Effects of the Proposed Action," has limited value to the turtle. Issuance of the proposed ITP to the Conservancy is likely to result in the conversion of undetermined amount of potential shrike habitat when the Conservancy's managed marsh and upland reserves are created. Conservancy management practices will also potentially disturb turtles on 7,758.5 acres of managed marsh and rice reserves.

Western Spadefoot Toad and Midvalley Fairy Shrimp

The Service anticipates that an undetermined number of toads and midvalley fairy shrimp could be taken over a 50-year period as a result of this proposed action. Toads and midvalley fairy shrimp could be killed, harmed, or disturbed during construction activities, implementation of the proposed conservation measures, or management on the Conservancy's reserves. The number of

toads and midvalley fairy shrimp affected by implementation of the proposed action should be very small, as the amount of potential suitable habitat is very limited throughout the proposed project's action area. We estimate that the City will incidentally take up to all western spadefoot toads and midvalley fairy shrimp via the disturbance associated with construction activities on 10.2 acres of vernal pools and up to seven acres of ponds and seasonally wet areas within the City's Permit Area and in association with off-site infrastructure improvements. We estimate that Sutter will incidentally take up to all western spadefoot toads and midvalley fairy shrimp via the disturbance associated with construction activities on 3.3 acres of vernal pools and up to 10 acres of ponds and seasonally wet areas within Sutter's Permit Area and in association with off-site infrastructure improvements. We estimate that the Conservancy will incidentally take up to all western spadefoot toads and midvalley fairy shrimp via the disturbance associated with management activities on up to 0.9 acres per year of vernal pool habitat within the Conservancy's Permit Area. This estimate vastly overstates the amount of actual take likely to occur because it assumes: (1) that all ponds and seasonally wet areas are suitable vernal pool habitat; (2) that the applicants always fill pools; (3) that the applicants always mitigate according to the programmatic ratios; (4) that the Conservancy will disturb one percent of its pools per year to the point of taking all western spadefoot toads and midvalley fairy shrimp inhabiting them; and (5) that all of the Conservancy's pools are occupied by the western spadefoot toads and/or midvalley fairy shrimp. The number of midvalley fairy shrimp and western spadefoot toads affected by implementation of the proposed action should be very small, as the amount of potential vernal pool habitat is very limited throughout the proposed project's action area and neither one of the species has ever been observed in the Basin.

Effect of the Take

Listed and Proposed Species

For the reasons stated in the analyses of the proposed project's effects, the Service determined that the level of incidental take specified in the effects of the action and this Incidental Take Statement is not likely to result in jeopardy to the endangered vernal pool tadpole shrimp, threatened giant garter snake, threatened valley elderberry longhorn beetle, threatened vernal pool fairy shrimp, or proposed California tiger salamander. The Service has also determined that the proposed action will not destroy or adversely modify either valley elderberry longhorn beetle critical habitat or proposed vernal pool fairy shrimp and vernal pool tadpole shrimp critical habitat.

Unlisted Species

For the reasons stated in the analyses of the proposed project's effects, the Service determined that the level of incidental take specified in the effects of the action and this Incidental Take Statement is not likely to result in jeopardy to the following unlisted Covered Species should they become listed: Swainson's hawk, white faced ibis, bank swallow, tricolored blackbird, northwestern pond turtle, loggerhead shrike, burrowing owl, western spadefoot toad, and midvalley fairy shrimp. The Service has determined that the specified level of incidental take is not likely to result in jeopardy to the Aleutian Canada goose, should it become re-listed.

Reasonable and Prudent Measures and Terms and Conditions

The NBHCP and accompanying agreements identify anticipated adverse effects to all Covered Species likely to result from the proposed actions, and the specific measures and levels of species and habitat protection that are necessary and appropriate to minimize those adverse effects. All of the conservation and management measures in the NBHCP and accompanying agreements, together with the terms and conditions identified in the associated Implementing Agreement, are hereby incorporated by reference as reasonable and prudent measures, and terms and conditions for this incidental take statement pursuant to 50 CFR 402.14(I). Such terms and conditions are non-discretionary and must be undertaken for the exemptions under section 10(a)(1)(B) and section 7(o)(2) of the Act to apply. If the Applicants fail to adhere to these terms and conditions, the protection of the Permit, and section 7(o)(2), may lapse. The amount or extent of the incidental take anticipated under the NBHCP, associated reporting requirements, and provisions for disposing of dead or injured animals, are as described in the Permit.

Further, the following terms and conditions apply to the Service after issuance of the Permit:

1. The Service shall provide technical assistance to the Applicants throughout the term of the Permit.

2. The Service shall, at all time of listing of any of the currently unlisted Covered Species, reinitiate consultation on the proposed actions in accordance with 50 C.F.R. 402.16.

3. The Service shall ensure that any section 7 consultation with other Federal agencies regarding development activities covered by the permits are consistent with the conservation goals and objectives of the NBHCP, and that any such activities reviewed under section 7 and the Act shall provide levels of listed species protection consistent with the protection afforded under the NBHCP.

Reporting Requirements

The Conservancy shall provide the Wildlife Agencies with an Implementation Annual Report by May 1 of each calendar year the NBHCP is in effect. The Implementation Annual Report shall include all of the information identified in Chapter VI of the NBHCP, including the results of the Compliance Monitoring implemented by City, Sutter and the Conservancy and the Biological Effectiveness Monitoring implemented by the Conservancy during the prior calendar year, and provide an accounting of all mitigation fees collected, all urban development permits issued, and all mitigation lands acquired.

The City and Sutter shall each implement the annual report requirements described at Chapter VI of the NBHCP. In addition, at any other time during the Permit terms, City and Sutter, at the request of the Service or CDFG, shall provide within thirty (30) days, to the Wildlife Agencies additional information relevant to implementation of the NBHCP reasonably available to the City and Sutter.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service has the following conservation recommendations:

1. Pursue available funding sources to enhance and enlarge the habitat preservation program of the MAPHCP and the NBHCP. Priority areas for acquisition should have known giant garter snake presence. In addition, known giant garter snake corridors should be acquired to enhance population exchange.

2. Investigate methods whereby phased agricultural practices can be employed on upland parcels such that maximum net benefits are achieved for Swainson's hawks, burrowing owls, loggerhead shrikes, tricolored blackbirds, and bank swallows.

Reinitiation-closing statement

This concludes formal consultation and conference on the issuance of a Permit to implement the NBHCP. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals that the agency action may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

The Incidental Take Statement provided in this conference opinion for unlisted Covered Species does not become effective until the unlisted Covered Species is listed and the conference opinion is adopted as the biological opinion issued through formal consultation. If you have any questions regarding this consultation, please contact Wayne S. White, Field Office Supervisor, at (916) 414-6600.

Enclosures

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Table 1. Species proposed for coverage (Covered Species) in the Natomas Basin Habitat Conservation Plan (E = endangered, T = threatened, P = Proposed, D = delisted, SC = species of concern, R = rare, SSC = species of special concern).

Species	Federal Status	State Status
Aleutian Canada goose	D	
Bank swallow		T
Burrowing owl		SSC
Loggerhead shrike	SC	SSC
Swainson's hawk		T
Tricolored blackbird	SC	SSC
White-faced ibis	SC	SSC
Giant garter snake	T	T
Northwestern pond turtle	SC	SSC
California tiger salamander	P	SSC
Western spadefoot toad	SC	SSC
Valley elderberry longhorn beetle	T	
Midvalley fairy shrimp	SC	
Vernal pool fairy shrimp	T	
Vernal pool tadpole shrimp	E	
Boggs Lake hedge-hyssop		E
Colusa Grass	T	
Delta tule pea	SC	
Legenere	SC	
Sacramento Orcutt grass	E	E
Sanford's arrowhead	SC	
Slender Orcutt grass	T	E

Table 2. Habitat reserve types to be created based upon Planned Development in the Natomas Basin Habitat Conservation Plan.

Permittee	Planned Development	Reserve Total to be Created at 0.5 to 1.0	50 percent Rice Reserves	25 percent Managed Marsh Reserves	25 percent Upland Reserves
City of Sacramento	8,050	4,025.0	2,012.5	1,006.3	1,006.3
Sutter County	7,467	3,733.5	1,866.8	933.4	933.4
Metro Air Park	1,983	991.5	495.8	247.9	247.9
TOTAL	**17,500**	**8,750.0**	**4,375.0**	**2,187.5**	**2,187.5**

Table 3. Ratios used to calculate amount of habitat to be acquired to compensate for vernal pool resources.

	Bank	Non-Bank
Preservation	2:1	3:1
Creation	1:1	2:1

Table 4. Anticipated change in the amount of potential giant garter snake habitat (acres) in the Natomas Basin as a result of implementing the Natomas Basin Habitat Conservation Plan. Acreage values were obtained from the Draft NBHCP EIR/EIS.

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	After Implememntation
Ponds / seasonally wet areas	96	-7	-4	-10	-21	75
Rice	22,693	-970	-1,541	-5,577	-8,087	14,606
Canals	1,778	-117	-72	-215	-404	1,374
TOTAL	**24,567**	**-1,094**	**-1,617**	**-5,802**	**-8,512**	**16,055**

Table 5. Anticipated change in the amount of potential Swainson's hawk habitat (acres) in the Natomas Basin as a result of implementing the Natomas Basin Habitat Conservation Plan (a = nesting habitat, b = foraging habitat). Acreage values for nesting habitat were obtained from the Draft NBHCP EIR/EIS. Acreage values for the foraging habitat were obtained from the *Addendum to the NBHCP EIR/EIS Technical Memorandum* (see Appendix K of the NBHCP), which includes an updated analysis of Swainson's hawk foraging habitat.

(a)

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Riparian	124	-24	0	0	-24	100
Oak groves	98	-6	-2	0	-8	89
Tree groves	106	-10	-23	0	-33	73
TOTAL	**328**	**-40**	**-25**	**0**	**-65**	**263**

(b)

Habitat Quality	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
High	1,835	-675	-50	-8	-733	1102
Moderate	15,666	-5,098	-349	-1,852	-7,299	8,367
Low	4,550	-1,152	-4	0	-1,156	3,394
TOTAL	**22,051**	**-6,925**	**-403**	**-1,860**	**-9,188**	**12,863**

Table 6. Anticipated change in the amount of potential Aleutian Canada goose habitat (acres) in the Natomas Basin as a result of implementing the Natomas Basin Habitat Conservation Plan. Acreage values were obtained from the Draft NBHCP EIR/EIS.

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Non-rice crops	16,686	-4,663	-325	-1,529	-6,517	10,169
Pasture	674	-23	-22	-101	-147	527
Rice (roosting/ foraging)	22,693	-970	-1,541	-5,577	-8,087	14,606
TOTAL	**40,053**	**-5,656**	**-1,888**	**-7,207**	**-14,751**	**25,302**

Table 7. Anticipated change in the amount of potential burrowing owl habitat (acres) in the Natomas Basin as a result of implementing the Natomas Basin Habitat Conservation Plan. Acreage values were obtained from the Draft NBHCP EIR/EIS.

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Alfalfa	371	0	0	0	0	371
Grassland	886	-427	0	-134	-560	325
Pasture	674	-23	-22	-101	-147	527
TOTAL	**1,931**	**-450**	**-22**	**-235**	**-707**	**1,223**

Table 8. Anticipated change in the amount of potential loggerhead shrike habitat (acres) in the Natomas Basin as a result of implementing the Natomas Basin Habitat Conservation Plan. Acreage values were obtained from the Draft NBHCP EIR/EIS.

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Alfalfa	371	0	0	0	0	371
Grassland	886	-427	0	-134	-560	325
Non-rice crops	16,686	-4,663	-325	-1,529	-6,517	10,169
Oak groves	98	-6	-2	0	-8	89
Orchard	182	-13	0	0	-13	169
Pasture	674	-23	-22	-101	-147	527
Ponds and seasonally wet areas	96	-7	-4	-10	-21	75
Riparian	124	-24	0	0	-24	100
Ruderal	1,970	-1,137	-6	-88	-1,231	739
Rural	377	-46	-10	0	-56	321
Tree groves	106	-10	-23	0	-33	73
Canals (all)	1,778	-117	-72	-215	-404	1,374
TOTAL	**23,348**	**-6,473**	**-464**	**-2,077**	**-9,014**	**14,332**

Table 9. Anticipated change in the amount of potential Tricolored blackbird habitat (acres) in the Natomas Basin as a result of implementing the Natomas Basin Habitat Conservation Plan (a = nesting habitat, b = foraging habitat). Acreage values were obtained from the Draft NBHCP EIR/EIS.

(a)

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Ponds and seasonally wet areas	96	-7	-4	-10	-21	75
Riparian	124	-24	0	0	-24	100
Canals (all)	1,778	-117	-72	-215	-404	1,374
TOTAL	**1,998**	**-148**	**-76**	**-225**	**-449**	**1,549**

(b)

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Alfalfa	371	0	0	0	0	371
Non-rice crops	16,686	-4,663	-325	-1,529	-6,517	10,169
Grassland	886	-427	0	-134	-560	325
Pasture	674	-23	-22	-101	-147	527
Rice	22,693	-970	-1,541	-5,577	-8,087	14,606
TOTAL	**41,310**	**-6,083**	**-1,888**	**-7,341**	**-15,311**	**25,998**

Table 10. Anticipated change in the amount of potential white-faced ibis habitat (acres) in the Natomas Basin as a result of implementing the Natomas Basin Habitat Conservation Plan. Acreage values were obtained from the Draft NBHCP EIR/EIS.

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Alfalfa	371	0	0	0	0	371
Ponds and seasonally wet areas	96	-7	-4	-10	-21	75
Rice	22,693	-970	-1,541	-5,577	-8,087	14,606
Canals (all)	1,778	-117	-72	-215	-404	1,374
TOTAL	**24,938**	**-1,097**	**-1,617**	**-5,802**	**-8,512**	**16,426**

Table 11. Anticipated change in the amount of potential bank swallow habitat (acres) in the Natomas Basin as a result of implementing the Natomas Basin Habitat Conservation Plan. Acreage values were obtained from the Draft NBHCP EIR/EIS.

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Alfalfa	371	0	0	0	0	371
Grassland	886	-427	0	-134	-560	325
Non-rice crops	16,686	-4,663	-325	-1,529	-6,517	10,169
Pasture	674	-23	-22	-101	-147	527
Ponds and seasonally wet areas	96	-7	-4	-10	-21	75
Rice	22,693	-970	-1,541	-5,577	-8,087	14,606
Riparian	124	-24	0	0	-24	100
Canals (all)	1,778	-117	-72	-215	-404	1,374
TOTAL	**43,308**	**-6,231**	**-1,964**	**-7,566**	**-15,760**	**27,547**

Table 12. Anticipated change in the amount of potential northwestern pond turtle habitat (acres) in the Natomas Basin as a result of implementing the Natomas Basin Habitat Conservation Plan. Acreage values were obtained from the Draft NBHCP EIR/EIS.

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Ponds and seasonally wet areas	96	-7	-4	-10	-21	75
Rice	22,693	-970	-1,541	-5,577	-8,087	14,606
Riparian	124	-24	0	0	-24	100
Canals (all)	1,769	-117	-72	-215	-404	494
TOTAL	**24,691**	**-1,118**	**-1,617**	**-5,802**	**-8,536**	**16,155**

Table 13. Anticipated change in the amount of habitat (acres) most likely to support habitat of the valley elderberry longhorn beetle (elderberry shrubs [*Sambucus* spp.] with stems greater than one inch diamter) in the Natomas Basin as a result of implementing the Natomas Basin Habitat Conservation Plan. Acreage values are based upon data available in the Draft NBHCP EIR/EIS.

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Oak groves	98	-6	-2	0	-8	89
Riparian	124	-24	0	0	-24	100
Tree groves	106	-10	-23	0	-33	73
TOTAL	**328**	**-40**	**-25**	**-0**	**-65**	**262**

Table 14. Anticipated change in the amount of habitat (acres) most likely to support habitat of the vernal pool fairy shrimp, vernal pool tadpole shrimp, midvalley fairy shrimp, western spadefoot toad, Colusa grass, Sacramento Orcutt grass, slender Orcutt grass, legenere, and Bogg's Lake hedge-hyssop in the Natomas Basin as a result of implementing the Natomas Basin Habitat Conservation Plan. Acreage values are based upon data available in the Draft NBHCP EIR/EIS.

Habitat Class	Baseline	City of Sacramento	Sutter County	Total Change	Future Condition
Ponds and seasonally wet areas	96	-7	-10	-17	75
Grassland	886	-427	-134	-561	325
TOTAL	**982**	**-434**	**-144**	**-578**	**400**

Table 15. Anticipated change in the amount of habitat (acres) most likely to support Sanford's arrowhead and Delta tule pea in the Natomas Basin as a result of implementing the Natomas Basin Habitat Conservation Plan. Acreage values were obtained from the Draft NBHCP EIR/EIS.

Habitat Class	Baseline	City of Sacramento	Metro Air Park	Sutter County	Total Change	Future Condition
Ponds and seasonally wet areas	96	-7	-4	-10	-21	75
Canals (all)	1,778	-117	-72	-215	-404	1,374
TOTAL	**1,874**	**-124**	**-76**	**-225**	**-425**	**1,449**

IN THE UNITED STATES DISTRICT COURT

FOR THE EASTERN DISTRICT OF CALIFORNIA

NATIONAL WILDLIFE FEDERATION, et al.,

Plaintiffs,

v.

GALE NORTON,

Defendant.

CIV-S-04-0579 DFL JFM

MEMORANDUM OF OPINION AND ORDER

Plaintiffs National Wildlife Federation, Friends of the Swainson's Hawk, Planning and Conservation League, and Sierra Club allege that the Secretary of the Interior violated the Endangered Species Act by approving the Natomas Basin Habitat Conservation Plan and issuing incidental take permits to the City of Sacramento and Sutter County. By orders of July 2, 2004 and July 19, 2004, the court permitted the City of Sacramento, Sutter County, and several landowners in the affected area to intervene as defendants. The parties now cross-move for summary judgment.

This is the second time that the court has been asked to

review a habitat conservation plan for the Basin. See Nat'l Wildlife Fed'n v Babbitt, 128 F.Supp.2d 1274 (E.D. Cal. 2000) ("Natomas I"). In Natomas I, the court held that the habitat conservation plan was inadequate. For the reasons that follow, the court now finds that the revised plan satisfies the requirements of the Endangered Species Act ("ESA").

I. Background

A. History of the Habitat Conservation Plan

The Natomas Basin is a low-lying region of approximately 53,000 acres in Sacramento and Sutter Counties. (Administrative Record ("AR") 59.) The Basin is home to the Giant Garter Snake ("GGS") and the Swainson's Hawk, the two species of greatest concern in this litigation. In 1993, the Secretary listed the GGS as a threatened species under the Endangered Species Act ("ESA").[1] The Swainson's Hawk has not been listed as a threatened species by the Secretary; however, it has been so listed by the California Department of Fish and Game under the California Endangered Species Act. 14 C.C.R. § 670.5(b)(5)(A), Cal. Fish & Game Code § 2067. The GGS is an elusive animal that lives in rice fields and drainage ditches; it is found only in rice-growing regions of the Central Valley, including rice-growing areas in the Basin and associated canals. The Swainson's Hawk is migratory, wintering in Central and South America and

[1] A "threatened" species is any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. 16 U.S.C. § 1532(20).

spending March to September in the Central Valley. The hawk forages on small rodents found in large open fields and nests in large trees; there are approximately 50 identified hawk nesting sites in the Basin and the riparian corridor of the Sacramento river. (AR 952-55.)

The ESA conditions the Secretary's issuance of an incidental take permit ("ITP") upon her approval of a habitat conservation plan ("HCP). The ITP allows activity, here development, that could injure or harm - "take" in the language of the statute -- an endangered or threatened species. Without an ITP, developers would be subject to serious penalties, including criminal prosecution, for any injury to an endangered or threatened species. 16 U.S.C. §§ 1538, 1540. The history of the development of the Natomas Basin HCP is outlined in Natomas I and need not be repeated here in detail. See Nat'l Wildlife Fed'n v Babbitt, 128 F.Supp.2d at 1277-78. In brief, the first HCP for the Basin was a regional conservation plan designed to cover development in the entire Basin. Id. at 1279. The 1997 HCP anticipated that five jurisdictions -- the City, Sacramento County, Sutter County, Reclamation District No. 10, and the Natomas Central Mutual Water Company -- would apply for ITPs. Id. The HCP was designed to permit development of 17,500 acres of Basin land over the 50-year life of the ITPs, with mitigation lands acquired at a .5-to-1 ratio as land was developed. Id. at 1280. The acquisitions were to be funded with mitigation fees paid by developers in the relevant jurisdictions. Id. In the

end, however, only the City applied for a permit under the HCP. Despite the lack of participation by the other jurisdictions, the Secretary granted an ITP to the City, finding that the issuance of an ITP to the City, with the limitations imposed by the HCP, would not likely jeopardize the continued existence of the species covered by the HCP, including the GGS and the Swainson's Hawk. Id. at 1282-84.

The Secretary's issuance of an ITP to the City was challenged by various organizations, among whom were the plaintiffs in the present action. On August 15, 2000, the court found that several of the Secretary's findings were unreasonable and violated the ESA, thereby setting aside the Secretary's issuance of the ITP. Id. at 1292-1300. Specifically, the court found that the Secretary erroneously concluded that: (1) the HCP minimized and mitigated the impact of the permitted takings "to the maximum extent practicable;" (2) the City had ensured adequate funding for the mitigation plan; and (3) issuance of the ITP to the City, in the absence of participation by the other jurisdictions, would not jeopardize the continued existence of the covered species. Id. On this last issue, the court found that a principal failing of the 1997 ITP was that it relied upon an HCP that took a regional approach to conservation, covering the entire 53,000-acre Basin, when in fact only the City sought an ITP and agreed to be bound by the HCP. Id. at 1291, 1299. The HCP failed to analyze possible effects on the species in the event that the other jurisdictions -- primarily Sacramento and

Sutter counties -- failed to subscribe to the HCP. However, the court upheld the conclusion that the HCP would not result in jeopardy to the covered species were it implemented by the five jurisdictions envisioned by the HCP. Id. at 1295-98.

After the 1997 ITP was set aside, the City revised the HCP to address the flaws identified by the court. Currently before the court is a revised HCP, covering development only by the City and Sutter. This second Natomas Basin HCP ("NBHCP") was approved by the Secretary in April 2003. At the same time, the Secretary granted ITPs to the City and Sutter, authorizing a total of 15,517 acres of development.[2] Shortly thereafter, the Service and the Secretary issued the required supporting documents: a Biological Opinion ("BiOp") examining effects upon the species listed in the proposed ITP, Findings and Recommendations supporting the issuance of an ITP, a final EIR/EIS, and the Record of Decision, in which the Secretary adopted the Service's findings and announced her decision to issue the ITPs.[3]

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[2] The NBHCP also anticipates development of 1,983 acres in the Metro Air Park project. (Pl.'s Mot. at 5-6.) An ITP was previously issued for that project, an action the court upheld in Nat'l Wildlife Fed'n v. Norton, 306 F.Supp.2d 920 (E.D. Cal. 2004) ("Metro Air Park"). In total the NBHCP anticipates 17,500 acres of development in the Basin.

[3] The final EIR/EIS was prepared to comply with the public agencies' obligations under the National Environmental Policy Act and the California Environmental Quality Act. The EIR/EIS evaluates a broader range of potential environmental impacts. The adequacy of the EIR/EIS is not challenged in this action. However, because the EIR/EIS is part of the record of decision, the analysis and responses to comments in the EIR/EIS are relevant to evaluating the Secretary's conclusions under the ESA.

B. The Final NBHCP

The purpose of the NBHCP is to "promote biological conservation in conjunction with economic and urban development within the permit area." (AR 19.) The final NBHCP envisions participation by the City and Sutter, but does not depend on participation by both entities. (Id. at 50-51.) The NBHCP covers 22 species, with particular attention to the GGS and the Swainson's Hawk, since they are prominent in the Basin, listed as threatened under state or federal law, and occupy habitat that will also benefit other covered species. (Id. at 64.) The NBHCP anticipates that development by the City and Sutter will be limited to 15,517 acres -- 8,050 acres within the City and 7,467 acres in Sutter County -- and provides that approval of any development beyond this limit -- whether by the City and Sutter or by other entities -- will trigger reevaluation and possible amendment of the plan, and could result in suspension or revocation of the City and Sutter permits. (Id. at 20, 23-26, 110.)

Like the 1997 HCP, the primary mitigation measure relied on in the NBHCP is acquisition and enhancement of reserve properties at a .5-to-1 ratio for all of the lost habitat, to be funded by developer fees.[4] (Id. at 36, 169-98.) The 8,750 acres of reserve land will be divided in the following fashion: 50% in

[4] The plan also requires other minimization and avoidance measures. In particular, the plan calls for preservation of the "Swainson's Hawk Zone," a one-mile strip of land adjacent to the Sacramento River, which contains many of the Swainson's Hawk nesting sites in the Basin. (AR 1032, 1034.)

rice cultivation that will serve as habitat for the GGS; 25% in managed marsh habitat for the GGS; and 25% in upland habitat that could be used for foraging by the Swainson's Hawk. (Id. at 37.) The NBHCP offers the following reasons to support the adequacy of the .5-to-1 ratio: (1) the reserves will provide higher quality habitat than the lands to be developed, especially given that the reserves will be managed for the covered species; (2) much of the land to be developed is of limited value as habitat but will be assessed as if it were of value; (3) the reserves will provide permanent habitat for the covered species; (4) the NBHCP provides monitoring and adaptive management to protect the species; and (5) the reserves will be large and biologically viable. (Id. at 132-33.) On this last point, the NBHCP requires that, by the end of the 50-year term of the plan, there must be one reserve of at least 2,500 acres in size, with the remaining reserves in blocks of 400 acres or more that will be connected by watercourses. (Id. at 140.) The NBHCP also provides that setback zones should be "considered" prior to the acquisition of reserve lands and that, if possible, reserve lands should be located 800 feet or more from urban development. (Id. at 142.)

The NBHCP contains several provisions designed to ensure that its environmental objectives will be achieved and that development will not outpace the acquisition of mitigation lands. One of these provisions is a 200-acre "cushion" of mitigation land, which requires that, as of September of each year, the Natomas Basin Conservancy ("NBC") -- which is the entity that

owns, acquires, and manages the reserve lands -- must have acquired at least 200 more acres of reserve land than necessary to mitigate all of the development approved to that date before any further development is permitted. (Id. at 213-14.) This requirement is intended to assure that the NBC will never be unable to find and acquire mitigation lands for development that has already been approved. The NBHCP also calls for increases in the mitigation fees, as necessary and without a cap, to pay for increased costs of land acquisition and reserve management. (Id. at 211.) "Catch-up fee" ordinances enacted by the City and Sutter will require developers who have received development approval to pay the increased mitigation fees if they have not yet engaged in ground-disturbing activity. (Id. at 212.)

The NBHCP also imposes monitoring and review obligations designed to ensure that the plan will achieve the desired conservation objectives and goals. Two types of monitoring are required by the plan: (1) compliance monitoring, to assure that the reserves are properly acquired and managed; and (2) biological effectiveness monitoring, to determine whether the assumptions of the plan hold true in practice over time. (Id. at 217-32.) Beyond these continuing obligations, the plan also calls for broad reviews at designated development milestones. An overall program review will be conducted once 9,000 acres of development have been approved. (Id. at 239-41.) The overall program review will be made available for public review and comment. (Id.) The NBHCP also calls for an independent mid-

point review by each permittee to address the possibility that development might proceed faster in one jurisdiction than the other. (Id.) The NBHCP also provides for "adaptive management" to respond to the monitoring, reviews, or other new scientific data. (Id. at 234-38.) Should the adaptive management provisions prove insufficient, the NBHCP can be amended or revised, or, in the worst case, the permits could be suspended or revoked. (Id. at 252-56.)

The NBHCP concedes that there will be harm to the species listed in the permit, but contends that the harm will be significantly reduced by the measures described above. (Id. at 263-330.) The NBHCP further finds that the proposed level of mitigation is the "maximum extent practicable," relying on economic analysis. (Id. at 332-36.) Finally, the NBHCP concludes that the plan as proposed is the best option among other possible alternatives in light of biological and financial considerations. (Id. at 336-38.)

Through the implementation agreement, the City and Sutter agree to be bound by the terms of the NBHCP, which are also incorporated into the ITP. (Id. at 806-55.)

C. The 2003 Biological Opinion

The Biological Opinion ("BiOp") is an evaluation by the Service's wildlife biologists of the potential effects of issuance of the ITPs on the species identified in the plan and

the proposed ITPs.[5] 16 U.S.C. § 1536. While acknowledging that the proposed development will have both direct and indirect negative effects on the GGS, the BiOp ultimately concludes that the ITPs will not affect the viability of the GGS population within the Natomas Basin or the viability of the species as a whole. (AR 1028.) This finding is based on several factors: (1) the minimization and take avoidance measures imposed by the NBHCP, including pre-construction surveys and de-watering and fencing of canals; (2) the protection, enhancement, restoration, or creation of 6,562.5 acres of higher quality reserves for the snake; (3) the maintenance of connectivity between reserve lands; (4) the continued existence of 16,000 acres of GGS habitat that will remain in the Basin after development; and (5) the creation of year-round protected habitat in the reserves specifically managed to benefit the GGS and not subject to the vagaries of rice farming. (Id.)

The BiOp similarly acknowledges that the Swainson's Hawk will suffer some negative impacts from implementation of the proposed action, including the loss of up to 20% of its nesting habitat and 40% of its foraging habitat in the Basin, most of which is of high or moderate quality. (Id. at 1032-37.) However, the BiOp concludes that the proposed action will not jeopardize the survival of the Central Valley population of the Swainson's Hawk or the species as a whole because: (1) the

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[5] The BiOp is required by the ESA because the issuance of an ITP is a federal action. See part II.A, infra.

reserves created will provide foraging opportunities at the appropriate time of year, during nesting; (2) approximately 13,000 acres of foraging habitat will not be affected; (3) the acquired foraging habitat will be closer to the nesting trees; (4) more high quality foraging habitat will be created; and (5) significant foraging habitat exists to the west, in Yolo County. (Id. at 1039.) In sum, the BiOp concludes that issuance of ITPs to the City and Sutter will not appreciably reduce the likelihood of the survival and recovery of these species in the wild.

D. The 2003 Findings and Recommendations

The Findings and Recommendations represent the Service's findings in light of the information in the NBHCP and the BiOp. The Service concludes that the impacts of the issuance of the ITPs will be minimized and mitigated to the maximum extent practicable. (Id. at 1182.) Specifically, the Service finds that the injury to the species covered by the permit will be mitigated to the maximum extent practicable by: (1) the measures identified in the NBHCP; (2) establishment, enhancement, and active management of 7,758.5 acres of high-quality reserve habitat; (3) establishment of a monitoring and reporting plan; and (4) use of a funding mechanism that contains assurances that the NBHCP will be implemented. (Id. at 1184-85.) The Service finds that the harm will be minor for all of the covered species, except the GGS, and that, for all covered species, including the GGS, the consequences of the harm will be effectively mitigated by the conservation measures provided for by the NBHCP. More

specifically, as to the Swainson's Hawk, the Service determines that the degree of injury will be low because: (1) the majority of the foraging habitat that will be lost is currently not available to the hawk during its nesting season[6]; (2) substantial foraging habitat will exist in the Basin even after the planned development; and (3) substantial foraging habitat will remain in Yolo County. (Id. at 1188-89.) The Service further concludes that any injury will be effectively mitigated for the reasons stated in the BiOp and described above.

As to the GGS, the Service acknowledges that there is a higher likelihood of injury to the GGS, but still concludes that the injury will be effectively mitigated by the measures included in the NBHCP, including: (1) limits on construction during the GGS dormant period; (2) pre-construction surveys and dewatering; (3) the creation of managed marsh habitat; (4) the acquisition of rice fields and their management with "snake friendly practices"; and (5) the assurances of connectivity of snake habitat. (Id. at 1190-91.)

The Findings and Recommendations conclude that, in addition to effectively mitigating for the anticipated harm, the NBHCP provides for mitigation to the "maximum extent practicable," relying on the economic analysis prepared in conjunction with the

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[6] The Swainson's Hawk nests and breeds in the Basin from March to September. However, under current conditions, much of the potential foraging habitat is cultivated with crops that either do not provide good foraging habitat for the Swainson's Hawk or do not provide good foraging habitat until August or September, after young have fledged. (AR 725-49.)

NBHCP. (Id. at 1192-93.) The Findings and Recommendations likewise conclude that the City and Sutter have ensured adequate funding for the plan through: (1) the mitigation fee program, which includes five different components and which is not capped; (2) the catch-up fee ordinance; and (3) the 200-acre cushion of mitigation land. (Id. at 1194-95.) Finally, the Findings and Recommendations conclude that the issuance of the ITPs will not appreciably reduce the likelihood of survival and recovery of any of the covered species, including the Swainson's Hawk and GGS. (Id. at 1196-99.) In accordance with these Findings, the Service recommends that the Secretary of the Interior approve the ITPs for the City and Sutter.

The Findings and Recommendations became the decision of the Secretary of Interior once she adopted them in the Record of Decision and issued the two ITPs.[7] This suit followed in March 2004. Plaintiffs seek a ruling that the Secretary's findings are not supported by the record and that the Secretary's approval of the NBHCP and issuance of the ITPs should be revoked.

II. Statutory Standards and Requirements

A. The Endangered Species Act

The purpose of the ESA is to "conserve ecosystems upon which endangered and threatened species depend" and "to provide a

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[7] Although the Secretary made the final decision to issue an ITP, her conclusions depend on the analysis and findings of the Service. Therefore, although the Secretary is the named defendant in this case, the court will frequently refer to the BiOp and Findings and Recommendations of the Service in reviewing the decision of the Secretary.

program for the conservation of such endangered species." 16 U.S.C. § 1531(b). As a means of achieving this goal, Section 9 of the ESA prohibits private individuals from "taking" endangered or threatened species. Id. § 1538(a)(1)(B). The ESA defines "take" to include "harm" to animals. Id. § 1532(19). The Service has defined "harm," within the meaning of "take," to include "significant habitat modification or degradation where it actually kills or injures wildlife," a definition that has been upheld by the Supreme Court. 50 C.F.R. § 17.3 (2004); Babbitt v. Sweet Home Chapter for Cmtys. for a Great Or., 515 U.S. 687, 696, 115 S.Ct. 2407 (1995).

The broad scope of Section 9 is limited by several exceptions, found in Section 10. Specifically, Section 10 authorizes the Secretary to issue a permit, an ITP, for any taking that is incidental to the carrying out of an otherwise lawful activity. 16 U.S.C. § 1539(a)(1)(B). To receive an ITP, the permit applicant must submit an HCP that specifies: (i) the impact which will likely result from such taking; (ii) what steps the applicant will take to minimize and mitigate such impacts, and the funding that will be available to implement such steps; (iii) what alternative actions to such taking that the applicant considered and the reasons why such alternatives were not selected; and (iv) such other measures that the Secretary may require as necessary or appropriate for the purposes of the plan. Id. § 1539(a)(2)(A); 50 C.F.R. § 17.22 (2004). The Secretary must issue an ITP upon finding that: (i) the taking will be

incidental; (ii) the applicant will, to the maximum extent practicable, minimize and mitigate the impacts of the taking; (iii) the applicant has ensured adequate funding for the HCP; (iv) the taking will not appreciably reduce the likelihood of the survival and recovery of the species in the wild; and (v) any additional measures required by the Secretary will be undertaken. 16 U.S.C. § 1539(a)(2)(B).

Section 7 of the ESA applies to federal actions, and requires federal agencies, through consultation with the Service, "to insure that any action authorized, funded, or carried out" by the agency is "not likely to jeopardize the continued existence of any endangered species or threatened species." Id. § 1536(a)(2). Issuance of an ITP is an agency action that requires the Service to engage in internal consultation and prepare a BiOp evaluating whether issuance of the ITP will result in jeopardy to any endangered or threatened species. Id. § 1536(b). An action will result in "jeopardy" if it will "reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild. . . ." 50 C.F.R. § 402.02 (2004). The required jeopardy analysis under Section 7(a)(2) is identical in almost all respects to the inquiry under Section 10(a)(2)(B)(iv). Natomas I, 128 F.Supp.2d at 1286. In considering whether the action will jeopardize a species, the Service must evaluate the effects of the action and any cumulative effects on the listed

species.[8] 50 C.F.R. § 402.14(g) (2004).

B. The Administrative Procedure Act

Review of final agency actions under the ESA is governed by the Administrative Procedure Act ("APA"). 5 U.S.C. § 706; Pacific Coast Fed'n of Fishermen's Ass'ns v. NMFS, 265 F.3d 1028, 1034 (9th Cir. 2001). The APA provides that the court must "hold unlawful and set aside agency action, findings and conclusions" that are "arbitrary, capricious, an abuse of discretion or otherwise not in accordance with law." 5 U.S.C. § 706(2)(A). An agency action is arbitrary and capricious if the agency failed to consider relevant factors, failed to articulate a rational connection between the facts found and the choice made, or made a clear error of judgment. Baltimore Gas & Elec. Co. v. NRDC, 490 U.S. 87, 105-06, 103 S.Ct. 2246 (1983); Pacific Coast Fed'n of Fishermen's Ass'ns, 265 F.3d at 1034; Greenpeace v. NMFS, 80 F.Supp.2d 1137, 1150 (W.D. Wash. 2000). Review under this standard is "searching and careful," but "narrow." Marsh v. Or. Natural Res. Council, 490 U.S. 360, 378, 109 S.Ct. 1851 (1989). The court should not substitute its judgment for that of the agency, but rather must determine whether the evidence in the

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[8] "Effects of the action" are the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent on that action, that will be added to the environmental baseline. 50 C.F.R. § 402.02 (2004). "Cumulative effects" are "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." Id.

administrative record permitted the agency to make the decision it did. Baltimore Gas & Elec. Co., 462 U.S. at 97; Occdidental Eng'g Co. v. INS, 753 F.2d 766, 769-70 (9th Cir. 1985). The agency decision need not be ideal, so long as the agency gave at least minimal consideration to the relevant facts contained in the record. Southwest Ctr. for Biological Diversity v. Bureau of Reclamation, 143 F.3d 515, 523, quoting Ctr. for Marine Conservation v. Brown, 917 F.Supp. 1128, 1143 (S.D. Tex. 1996).

Deference to the agency is especially appropriate where the challenged decision relies upon the agency's expertise. Mt. Graham Red Squirrel v. Espy, 986 F.2d 1568, 1571 (9th Cir. 1993). The court should defer to the agency's reasonable interpretation and resolution of equivocal or conflicting evidence, including conflicting expert opinions. Friends of Endangered Species, Inc. v. Jantzen, 760 F.2d 976, 986 (9th Cir. 1985); Cent. Ariz. Water Conservation Dist. v. EPA, 990 F.2d 1531, 1539 (9th Cir. 1993).

Plaintiffs challenge three of the Secretary's conclusions as arbitrary and capricious under the APA: (1) that the injury to the GGS and Swainson's Hawk will not appreciably reduce the likelihood of survival and recovery of these species; (2) that the NBHCP will minimize and mitigate the effects of any taking to the maximum extent practicable; and (3) that the City and Sutter will ensure adequate funding for the required mitigation. (Compl. ¶¶ 55-72.)[9] The court addresses these three contentions

[9] Defendants do not contest plaintiffs' standing to challenge the Secretary's issuance of the ITPs and approval of the NBHCP.

in the following sections.

III. No Jeopardy to Survival Findings

Plaintiffs allege that the Secretary erroneously concluded that development activity permitted under the NBHCP will not appreciably reduce the likelihood of the survival and recovery of the Swainson's Hawk and the GGS. 16 U.S.C. §§ 1536, 1539. At the heart of plaintiffs' argument is their contention that the Secretary gave insufficient consideration to the development that is likely to occur in the remainder of the Basin, outside the City's current boundaries and Sutter County, over the 50-year term of the NBHCP, and to the effect of this additional development on the viability and efficacy of the planned reserves and the survival of the species. (Pls.' Mot. at 19.) Plaintiffs' arguments generally fall into three categories: (1) the Service failed to analyze the lack of binding commitments from other jurisdictions and, at the same time, erroneously relied on voluntary mitigation measures by those jurisdictions; (2) the Service failed to consider the cumulative impacts of other proposed projects in the Basin; and (3) the Service failed to consider the lack of protection of the 800-foot reserve setbacks.

A. Failure to Analyze the Lack of Binding Commitments by Other Jurisdictions

Plaintiffs argue that the Service failed to address the lack of binding commitments to the NBHCP by other entities -- namely, the County of Sacramento, the Natomas Mutual Water Company, and

Reclamation District 1000 -- and instead assumed that these entities will continue their current course of conduct. (Id.) Plaintiffs rely on Natomas I, in which the court faulted the Secretary for issuing an ITP to the City alone, based on a regional HCP that assumed participation of five jurisdictions. 128 F.Supp.2d at 1295-96, 1299. However, unlike the 1997 HCP, the non-participation of the other jurisdictions is specifically considered and addressed in the present NBHCP; the Secretary determined that the lack of participation would not negatively impact implementation of the plan.

As to the water agencies, plaintiffs argue that the plan erroneously assumes that the water agencies will continue to maintain the network of canals and irrigation ditches that will connect the reserves. All parties agree that the connectivity of habitat provided by the irrigation system is essential to the survival of the GGS. In response, defendants contend that this issue was looked at in great detail and that, for a number of reasons, the Service reasonably concluded that hydrological connectivity would not be affected by the failure of the water districts to participate. First, the Service found that connectivity corridors will remain open because they will continue to be needed for drainage and irrigation of agricultural lands. (AR 1611-14.) Of course, this assumes that much of the Basin will continue in agriculture, a point addressed further below, but if this assumption is correct then irrigation canals will still be necessary. The Service further analyzed whether

current management practices by farmers and the water agencies are sufficient to protect the snake as it moves through the corridors and concluded that they are. (Id.) Second, the Service reasoned that any decision by the water agencies to close or fill the canals would necessarily require further federal consultation, either because the activity would result in a "taking" under the ESA or because it would require a § 404 Clean Water Act permit, and that any adverse impacts to the GGS could be mitigated at that time. (Id.) Third, the Service noted that the NBHCP includes other measures to protect connectivity, including yearly evaluations of connectivity and the use of mitigation fees to purchase canals or channels, if needed. (Id.) Finally, and closely related to the third point, the Service also relied on the NBC's status as a landowner and, therefore, as a shareholder in the Natomas Mutual Water Company, increasingly able to influence the water company's decision-making as the NBC acquires new land and shares. (Id. at 1612, 1028.)

The issue of connectivity is discussed in the NBHCP, the BiOp, and in the Final EIR/EIS, both as part of the original analysis and in response to comments. (Id. at 134-37; 888-90, 1027-28, 1611-14, 1955-58, 1999-2000, 2005-06, 2132-44.) All of the arguments now advanced by defendants have been addressed in these documents. Taken together, the four considerations advanced by the Service rationally explain how connectivity will be maintained. It cannot fairly be said that the Service and, by extension, the Secretary, failed to consider the issue. Nor does

it appear, in light of the evidence in the record, that the Secretary was "arbitrary and capricious" or made a clear error of judgment in concluding that connectivity would not be significantly affected by the failure of the water agencies to participate.

Plaintiffs similarly argue that the Secretary failed to consider the non-participation of Sacramento County and erroneously assumed that Sacramento County's land in the Basin will remain devoted to agricultural uses. (Pls.' Mot. at 19-21.) The NBHCP and the BiOp do assume that development in the Basin will be limited to the 17,500 acres in the permit areas and relies on that assumption in concluding that sufficient habitat will remain for the covered species. (AR 1026.) This assumption is based on the current land use plans of Sacramento County. (Id. at 121, 1055.) The NBHCP, BiOp, and EIR/EIS also conclude that because any future development in the Basin not covered by the HCP and ITPs would likely result in injury to listed species, any future development in the Basin would require new federal approvals. Any such approvals would in turn require a new HCP and ITP for the particular project, and could also lead to revision of the existing NBHCP, were the additional development to exceed the assumed limits in the NBHCP. (Id. at 121, 1055, 1617-32.) The court previously upheld reliance of the Service on the general plans of the City, Sutter, and Sacramento County to determine the probable extent of development and the likely impacts to the covered species. Natomas I, 128 F.Supp.2d at

1296. Although these plans can be changed, they are the best current information about future development. Given that any development outside of the NBHCP would be subject to its own environmental review, the decision of the Service to rely on the general plan of Sacramento County to predict future development in Sacramento County is not unreasonable.[10]

Plaintiffs also argue that the Service ignored the development of "agricultural-residential rural estates" and other small projects in Sacramento County whose impacts have not, and will not, be mitigated. (Pls.' Reply at 8, 14-15, 20-22.) However, the impacts of such developments were considered in the NBHCP and the EIR/EIS, and their impact was determined to be small. (AR at 61, 1630, 1979, 2082-83.) The Service considered these developments and rationally determined that they would not result in jeopardy to the covered species.

Finally, plaintiffs cite a number of cases for the proposition that the Service cannot rely on "voluntary" and "speculative" mitigation measures by the water agencies,

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[10] One of the benefits of a regional HCP is that it removes the incentive to be among the first to develop and the potential unfairness to those landowners who, for whatever reason, choose to develop at a later time. Those who develop at the end of the line may find that they cannot obtain an ITP because so much habitat has already been affected by earlier development. The same dynamic occurs as between regional HCPs. Thus, the decision not to participate in the NBHCP may place Sacramento County in a more difficult position if it later seeks an ITP. Thus, while plaintiffs contend that future development will vitiate the NBHCP, it is more likely that, if future development in the County will have this effect, the Secretary will decline to issue ITPs for development in the County or will insist on mitigation that may be considerably greater than that required by the NBHCP.

individual landowners, or Sacramento County in reaching a no-jeopardy conclusion. (Pls.' Mot. 21-22 n.12; Pls.' Reply at 13.) However, in the cases cited by plaintiffs, the Service assumed that the third-party would undertake affirmative acts that would mitigate injury to a species, even though those actions were speculative or voluntary. In this case, by contrast, the Service merely evaluated the baseline conditions in the Basin and concluded, based on articulated reasons, that those conditions were not reasonably likely to change without further federal review and approval.

Accordingly, the Secretary's finding that the failure of other jurisdictions to participate in the NBHCP does not undermine its effectiveness is not arbitrary, capricious or clearly erroneous. The fatal flaw of the earlier HCP was that it was a regional conservation plan that assumed all jurisdictions would participate and gave no attention to the possibility that some would not. 128 F.Supp.2d at 1291. This plan, by contrast, focuses on the two permittees and explains why further development or action by any other entity would require additional federal approvals. The plan does not assume or require the participation of any third parties to be effective. Plaintiffs' claim that the plan depends on the voluntary actions of third-parties is without merit.

B. Failure to Consider the Cumulative Impacts of the Joint Vision MOU and Other Proposed Projects

Plaintiffs argue that the Service failed to undertake an

adequate cumulative effects analysis, as required by the ESA, because it failed to consider the impacts of the so-called "Joint Vision" development and other proposed projects. (Pls.' Mot. at 22-31.) Specifically, plaintiffs focus on a Memorandum of Understanding entered into in December 2002 by the City of Sacramento and Sacramento County, commonly referred to as the "Joint Vision MOU," which sets forth several principles for going forward with annexation and urbanization of 10,000 acres in Sacramento County currently designated for agricultural use. (Id.) This 10,000-acre area is not part of the 17,500 acres that the NBHCP projects for development in the entire Basin and, were development of the 10,000 acres to occur, this might well be a significant change in circumstances that could destroy the effectiveness of the NBHCP. Because the "Joint Vision MOU" is by no means a concrete plan for development, the court finds that the Service was correct in finding that the lands covered by the MOU are not reasonably likely to be developed and, therefore, need not be the subject of a cumulative effects analysis.

The purpose of the Joint Vision MOU is to "define a mutually acceptable set of proposed principles that the City and [Sacramento] County are prepared to consider when considering future land use planning" in the Basin. (AR 2374.) The principles set forth are "intended to guide future discussion and the ultimate negotiation of an agreement between the County and the City." (Id. at 2377.) The MOU asserts that growth in the Basin is "inevitable," and assigns to the City the primary

responsibility for planning new growth in the area. (Id. at 2373, 2375.) However, the MOU also contemplates that any implementation of its principles will require discretionary legislative actions by the relevant land-use jurisdictions and further state and federal environmental review. (Id. at 2374-75.)

The ESA requires the Service, in evaluating whether the ITP will affect the likelihood of survival and recovery of the covered species, to consider "cumulative effects" on the species. 50 C.F.R. § 402.02 (2004). These effects are defined to include the "effects of future state or private actions, not involving federal activities, that are reasonably likely to occur." Id. By negative implication, the Service is not required to analyze the effects of future federal actions. Similarly, it is not required to analyze non-federal actions that are not reasonably likely to occur. Future federal actions include actions that require federal authorization, through permitting or funding. Loggerhead Turtle v. County of Volusia, 120 F.Supp.2d 1005, 1017 n.20 (M.D. Fla. 2000); Cal. Native Plant Soc.'y v. Norton, 2004 WL 1118537 at *14 (S.D. Cal. Feb. 10, 2004). Although the regulations do not define when an effect is "reasonably certain" to occur, the FWS HCP Handbook offers the following explanation[11]:

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[11] Defendants argue that the Handbook is entitled to deference under the standard set forth in United States v. Mead Corp., 533 U.S. 218, 226-27, 121 S.Ct. 2164 (2001). Plaintiffs do not dispute that the interpretation of "reasonably certain" in the Handbook is entitled to deference, nor do they offer an

> the more State, tribal, or local administrative discretion remaining to be exercised before a proposed non-federal action can proceed, the less there is a reasonable certainty the project will be authorized. Speculative non-federal actions that may never be implemented are not factored into the cumulative effects analysis . . . . The action agency should consider the economic, administrative, and legal hurdles remaining before the action proceeds.

United States Fish & Wildlife Service and National Marine Fisheries Service, Endangered Species Act Consultation Handbook 4-30 (1998).

In support of their argument that the "no jeopardy" finding was arbitrary and capricious in light of the cumulative effects on the species, plaintiffs contend: (1) the additional 10,000 acres of development proposed in the MOU is reasonably certain to occur; (2) the development of this acreage fatally undermines the NBHCP; (3) the development will not necessarily require further federal approval; and (4) the Service was required to consider its effects upon the species covered by the ITP but failed to do

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alternate interpretation of the term. In enacting the ESA, Congress gave the Service authority to promulgate binding regulations. 16 U.S.C. § 1540(f). However, the Handbook definition is not a regulation, but a mere interpretation of a regulation. The court in Mead explicitly found that interpretations contained in agency manuals are not entitled to the highest level of deference. 533 U.S. at 234. Nonetheless, a court may still defer to an agency's interpretation of its own regulation, depending upon "the thoroughness evident in its consideration, the validity of its reasoning, its consistency with earlier and later pronouncements, and all those factors which give it power to persuade, if lacking power to control." Id. at 227-230, 234-38, quoting Skidmore v. Swift & Co., 323 U.S. 134, 140, 65 S.Ct. 161 (1944). Applying this standard, the court finds that the Service's interpretation is entitled to deference and is a reasonable construction of the regulation.

so. (Pls.' Mot. at 22-31.)

In concluding that development of the 10,000 acres within the Joint Vision MOU was not "reasonably certain," the Service relied on the numerous discretionary steps remaining before any development could occur, and the preliminary nature of the Joint Vision MOU. These discretionary steps include: land-use planning, environmental review, biological resources evaluation, compliance with local, state, and federal laws, and approval of the plan by the City, County, and Local Agency Formation Commission ("LAFCO"). (AR 1617.) If these regulatory hurdles are surmounted, further review will be required by federal agencies under the ESA and the NBHCP.

Furthermore, the Joint Vision MOU is only a "conceptual agreement" designed to "establish principles to form the parameters of a future agreement or agreements." (Id. at 2373.) The MOU is not a concrete development proposal establishing a set level of development or land use patterns. (Id. at 2373-77.) No funds are committed. (Id.) The MOU does not change the existing agricultural-use designation for any of the 10,000 acres. (Id. at 2374.) The MOU does not waive any existing land use requirements but explicitly contemplates the necessity for further discretionary approvals and environmental review. (Id.) Given the tentative, general nature of the MOU and the considerable number of local, state, and federal approvals that would be required before any development of the 10,000 acres could occur, the Service did not err in determining that the

Joint Vision development was not reasonably certain to occur and need not be considered by the Service in conducting its jeopardy analysis.

In addition, the Service reasonably concluded that the MOU would require federal action because any future development will require: (1) a new ITP and therefore a new evaluation by the Service of possible injury to protected species from that development if the ITP is approved; and (2) a reevaluation of the efficacy of the NBHCP in light of the proposed development. Indeed, the City has a powerful incentive to assure that development under the MOU is consistent with federal requirements; through the implementation agreement, the City has committed to ensuring that additional development does not occur in the Basin without federal review. Thus, were the MOU lands to develop without federal review -- an unlikely prospect given that the MOU assigns control to the City -- the City could face revocation of its existing ITP under the NBHCP. (Id. at 20-21.) Therefore, any further development will necessarily be a federal action because further federal approval will be required under any scenario that could impair the efficacy of the NBHCP.[12] The

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[12] Plaintiffs cite two cases for the proposition that the MOU must be considered now as a cumulative impact. Neither case is binding and neither is on point. In NWF v. Norton, 332 F.Supp.2d 170,177-79 (D.D.C. 2004), the court found that the Service entirely ignored small-scale state and local projects that were reasonably certain to occur and, in fact, ignored its own conclusion that habitat degradation was a significant threat to the panther. Here, the Service explicitly considered the possibility of additional development and determined that any development would be subject to additional federal review. In Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv., 2005 WL

Service is entitled to assume that private individuals and the relevant agencies will seek the required federal approvals before proceeding with activities that could result in a taking of a protected species. Natomas I, 128 F.Supp.2d at 1298. The determination of the Service that any development under the Joint Vision MOU would be a federal action and, therefore, need not be included in the cumulative effects analysis, is not arbitrary or clearly erroneous, particularly given that development of the 10,000 acres is not "reasonably certain" to occur.

C. Impact of the Joint Vision on the Acquisition of Reserves

Plaintiffs argue that, in addition to the direct destruction of 10,000 acres of habitat through the Joint Vision development addressed above, the Service also should have considered the probable effect of the Joint Vision development on the ability of the NBC to acquire sufficient reserves. (Pls.' Mot. at 30.) Plaintiffs argue that, of the 53,000 acres in the Basin, 7,000 acres are already developed, 17,500 acres are approved for development under the NBHCP, and 10,000 are contemplated for development under the Joint Vision, leaving only 18,000 acres for mitigation of the impacts of both the NBHCP development and the Joint Vision development. (Id.)

Plaintiffs' scenario is unlikely and, more importantly, is

1278878 at *18-21 (D.Or. 2001), the court held that the agency had the discretion to consider the impacts of future actions that were reasonably certain to occur, even though such actions would require additional federal approvals, not that it was required to do so.

adequately addressed in the record. First, as discussed above, at this point, the Joint Vision development is not reasonably likely to occur. Second, if and when a concrete development proposal is put forth, it will be the subject of additional federal and state environmental review. The Service, and the court, are entitled to assume at this point that future development will not be permitted if sufficient mitigation land is unavailable and the development will result in jeopardy.[13] Furthermore, the NBHCP provides a fail-safe measure to ensure a sufficient supply of mitigation land. The NBHCP provides that, if off-site mitigation land is not available for purchase by the NBC, development must either stop or the developer must provide an in-lieu dedication of sufficient mitigation land. (AR 804.) Finally, the EIR/EIS did consider the impact of the Joint Vision on the acquisition of mitigation lands, but concluded that it was not a pressing concern at this time, for the reasons addressed above. (Id. at 1618.) For these same reasons, the court finds that the Service did not clearly err in concluding that the Joint Vision MOU does not vitiate the NBHCP.

D. Other Proposed Developments

Finally, plaintiffs argue that the Service erred in failing

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[13] The court notes, however, that the Service and those seeking an ITP in the future will face an uphill battle if they attempt to argue that additional development in the Basin beyond 17,500 acres will not result in jeopardy. The NBHCP, BiOp, EIR/EIS, and Findings and Recommendations are all predicated on the assumption that development in the Basin will be limited to 17,500 acres and that the remaining lands will remain in agricultural use. (AR 20-24, 862, 866-67, 1171-72, 1617-18.)

to analyze the cumulative impacts of other specific development proposals moving forward in the Basin. (Pls.' Mot. at 22-27.) However, the final EIR/EIS specifies that all of these projects will require future federal approval because they are not covered by any of the ITPs issued under the NBHCP. (AR 1624-31.) Moreover, the record reflects multiple reasons why the Service concluded that these developments are not reasonably certain to occur: (1) the areas are not currently planned for urban development under existing land use plans; (2) the lands are located outside the City's sphere of influence, the City limits, and the urban services boundary; (3) no urban services are available; and (4) there are significant legal and planning hurdles to development. (Id. at 1055, 1216, 1614-32.) Plaintiffs, by contrast, present no evidence in the record showing that these projects are anything more than the optimistic day dreams of developers. In light of the reasoned analysis by the Service as to why the impacts of these proposals need not be considered, and in the absence of any evidence that the Service made a clear error of judgment, the decision to exclude consideration of these projects was not arbitrary or clearly erroneous.

E. Failure to Consider the Lack of Protection of Setbacks

Finally, plaintiffs argue that the no-jeopardy conclusion was erroneous because it depends on 800-foot setbacks for the reserve lands but does not protect the setbacks from development. (Pls.' Mot. at 32; Pls.' Reply at 26.) As discussed above, one

of the acquisition criteria for reserve lands is that they should be located at least 800 feet from lands currently designated or used for urban development. (AR 889.) The plan does not contemplate that the setback lands will be acquired by the NBC, but assumes that the setback areas will be agricultural lands within the Basin. (Id. 889-90.) However, after reserve lands are acquired, the setbacks are not required to be managed in any particular fashion and later could be used for urban development. (Id.) Plaintiffs argue that the failure to protect the setbacks fatally undermines the no-jeopardy conclusion. (Pls.' Mot. at 32; Pls.' Reply at 26.)

However, the Service explicitly stated in the BiOp that the setbacks are not a permanent aspect of the mitigation program but are, instead, a mere acquisition criteria, to be considered and achieved, if possible. (AR 889-90.) Therefore, the Service's no-jeopardy conclusion did not erroneously assume or depend on permanent protection of the 800-foot setbacks. Moreover, the NBHCP provides for re-evaluation of the status and adequacy of the setback criteria during the mid-point reviews. (Id. at 142-3.) The Service's determination that the reserve system would prevent jeopardy to the GGS and Swainson's Hawk considered the potential impact of development in the setback zone. This determination was not arbitrary or capricious.

F. Summary

In sum, plaintiffs have not pointed to evidence demonstrating that the "no-jeopardy" finding was arbitrary and

capricious. Although the Secretary did not reach the conclusions plaintiffs desire, the record indicates that the Secretary considered the relevant factors and articulated a rational connection between the facts found and the conclusions reached. The Service addressed the non-participation of other agencies, considered the potential Joint Vision development plan, and did not depend on the 800-foot preferred setbacks in reaching the no-jeopardy conclusion. The no jeopardy finding is not arbitrary or clearly erroneous.

IV. Mitigate to the Maximum Extent Practicable

Prior to issuing an ITP, the Secretary must determine that the permit applicant will, to the maximum extent practicable, minimize and mitigate the impacts of the taking. 16 U.S.C. § 1539(a)(2)(B)(ii). There are two components to this finding: (1) the adequacy of the mitigation program in proportion to the level of injury -- take -- that will result; and (2) whether the mitigation is the maximum that can be practically implemented by the applicant. Metro Air Park, 306 F.Supp.2d at 927-28. These two factors are evaluated on a sliding scale, such that a stronger showing on one factor may compensate for a weaker showing on the other. Id. For instance, where the habitat lost is of minimal or no value to the covered species and the mitigation plan more than compensates for the level of injury, the applicant need not do more, even if it would be financially feasible. Id. at 928. Here, plaintiffs assert that the Service's findings on both aspects are arbitrary and capricious.

A. Proportionality to the Injury

Plaintiffs argue that the Service erred in finding that the .5-to-1 mitigation ratio sufficiently compensates for the injury that will occur to the GGS and the Swainson's Hawk as a result of the development authorized by the ITPs. (Pls.' Mot. at 35.)

1. Giant Garter Snake

As a result of the development authorized by the ITPs, 8,512 acres of GGS snake habitat will be destroyed. (AR 1021.) The Service determined that, if unmitigated, this would result in considerable harm to the GGS. (Id. at 1190.) However, this habitat will be replaced by 2,187 acres of restored marshlands and 4,375 acres of rice habitat, resulting in an effective mitigation ratio, for the GGS, of approximately .75-to-1. (Id. at 1191.)

The Service offers several reasons why the reserve lands adequately compensate for the loss of some habitat. Unlike existing habitat, reserve habitat: (1) will be protected in perpetuity; (2) will be actively managed for the snake; (3) will not be subject to the continual disturbance caused by farming or canal maintenance; (4) will be available year round; (5) will not be unavailable to the snake because of canal maintenance activities; and (6) will be relatively free of human intrusion. (Id. 1026, 1191.) The restored marsh is considered particularly valuable replacement habitat, as it is the preferred habitat for the GGS. (Id. at 1191.) The Service also emphasizes the provisions of the NBHCP that preserve connectivity and minimize

disturbances during construction activity. (Id. at 1190-92.) The Service concludes that the combination of on-site minimization measures and the new high-quality wetland habitat will effectively mitigate for the harm to the GGS of the development permitted by the ITP and the NBHCP. (Id. at 1192.) The Service's analysis considers the relevant issues and is a reasoned explanation as to why the mitigation measures are proportionate to the possible injury or take.

2. Swainson's Hawk

Two types of Swainson's Hawk habitat will be affected by the development authorized by the ITPs: nesting habitat and foraging habitat. (Id. at 1188-89.) Approximately 80% of the nesting habitat in the Basin, most of it in the Swainson's Hawk Zone, will remain after the authorized development. (Id. at 1032.) Although four nest trees will be removed as a result of the authorized development, the City has committed to planting 60 replacement nesting trees. (Id. at 1033.) The Service determined that this was adequate to mitigate for the removal of nest trees and the small loss of nesting habitat, particularly given that most of the nesting trees in the area of authorized development are not active. (Id. at 1034.) Plaintiffs do not point to any evidence in the record to contradict this conclusion, or any evidence that the Service should have considered, but did not. The Service evaluated the available scientific information and reached a reasonable conclusion that the effects to nesting habitat would be fully mitigated.

The impact to Swainson's Hawk foraging habitat is quantitatively more significant. Approximately 40% of the Basin's potential foraging habitat, some 9,188 acres, will be lost as a result of the authorized development. (Id. at 1034.) The NBHCP provides for acquisition of 2,187.5 acres of high-quality upland foraging habitat. (Id. at 731.) Approximately 1,000 acres of additional foraging habitat will be available through the fallowed rice lands and upland components of the managed marsh. (Id. at 732.) However, even with the reserve lands, there will be a net loss of approximately 6,000 acres of potential foraging habitat.

Nonetheless, the Service concludes, for reasons discussed at length in the BiOp, the Findings and Recommendations, and an Addendum to the EIR/EIS, that the loss of this habitat would result in a low level of harm to the hawk if mitigated as required by the NBHCP. (Id. at 1034-39, 1189-90, 726-47.) The Service concludes that despite the quantitative losses in habitat, the replacement habitat will likely be qualitatively equivalent. (Id.) The technical memorandum identifies at least three reasons why the Swainson's Hawk will not be negatively affected by the loss of habitat. First, the 2,187.5 acres of replacement habitat will all be of high quality, managed specifically for the hawk. (Id. at 731.) Even under the worst-case implementation scenario, where more than half of the reserve lands would consist of current high-value habitat, rather than newly created high-value habitat, the NBHCP will result in an

increase of 353 acres of high-value habitat.[14] (Id. at 742.)

Second, under the NBHCP, the temporal availability of foraging opportunities would be maintained or improved. (Id.) Under current conditions, much of potential foraging habitat is available in September, when row crops such as corn are harvested, and in June. (Id. at 737.) By contrast, relatively little foraging habitat is available during the other months the Swainson's Hawk is in the Basin -- April, May, July, and August. (Id.) Under the most likely implementation scenarios for the NBHCP, foraging opportunities would be increased during the months of April, May, and June, with the anticipated effect of increasing nesting density and reproductive success. (Id. at 740-41, 744.)

Third, the acquired reserves will likely be in closer proximity to nesting trees. (Id. at 745.) A primary acquisition criteria for upland reserves is proximity to known or potential nesting trees. (Id. at 156.) Proximity of foraging habitat to nesting trees has been linked to reproductive success for the Swainson's Hawk. (Id. at 738.) For all of these reasons, the Service concludes that any harm to the Swainson's Hawk as a result of lost foraging lands will be effectively mitigated by the reserve lands. The Service considered the relevant scientific evidence in the record and articulated reasons for its

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[14] The analysis also offers several reasons why this situation, "Scenario 3," is not likely to occur. (AR 745.) Instead, Scenario 1 or 2, which both result in a net increase of 1,455 acres of high-value habitat, are determined to be more likely to occur. (Id.)

ultimate conclusion that the mitigation was sufficient.

In response to this technical analysis, plaintiffs point to a letter from James Estep, a leading expert on the Swainson's Hawk and Chair of the Swainson's Hawk Technical Advisory Committee. (Id. at 1244-46.) In his letter, Estep references earlier comments submitted by the Swainson's Hawk Technical Advisory Committee, which indicated that increased foraging habitat is needed to protect the Swainson's Hawk from losses. (Id.) He then criticizes the technical analysis prepared in response to these comments. (Id.) Specifically, while Estep admits that it is "literally possible" to double rodent production on half the foraging land, he asserts that this concept has "since been widely dismissed." (Id. at 1245.) He calls Appendix K an "attempt to construct models designed to justify the same flawed biological reasoning." (Id.)

This single letter from a respected expert is insufficient to show that the Service's conclusions are arbitrary or clearly erroneous. The Service responded to early comments with an extensive technical analysis of the effectiveness of the mitigation strategy, with references to multiple expert reports to support its conclusions. (Id. at 727-49.) Although Estep asserts that the conclusions of Appendix K are "flawed," he does not offer any explanation as to why the conclusions are flawed or offer any expert opinions to contradict these conclusions. Moreover, the court defers to the agency's reasonable resolution of conflicting opinions from experts, since the Service's

wildlife experts are in a much better position than the court to evaluate such evidence. See Friends of Endangered Species, Inc., 760 F.2d at 986; Cent. Ariz. Water Conservation Dist., 990 F.2d at 1539. Finally, although plaintiffs fault the Service for approving an HCP with less than a one-to-one mitigation ratio and cite other HCPs from surrounding areas that have higher ratios, they provide no evidence that these HCPs cover the same species, involve the same quality of habitat issues, or involve the same economic or demographic variables.

Based on the evidence in the record, the Secretary's determination that the mitigation was proportionate to the expected take of the GGS and Swainson's Hawk is not arbitrary or capricious. However, because the NBHCP results in a net loss of habitat, including moderate and high value habitat, for both the GGS and the Swainson's Hawk, this is not one of those rare cases where the habitat to be developed is of such low value that the feasibility of further mitigation is irrelevant.

B. Feasibility of Further Mitigation

Plaintiffs argue that the Service erroneously relied on the permittees' analysis of the feasibility of additional mitigation, rather than conducting an independent analysis of practicable alternatives. (Pls.' Mot. at 36-37.) Plaintiffs also argue that even the economic analysis prepared by the City and Sutter supports a higher mitigation ratio. (Id. at 30.) The economic analysis prepared by the permittees indicates two reasons why increased mitigation, specifically a 1-to-1 mitigation ratio,

would not be practicable or feasible: (1) the mitigation fees charged under the NBHCP are already substantially higher than fees charged under the HCPs in other California jurisdictions; and (2) the fees that would be charged under a higher mitigation ratio might well push the costs of development beyond the industry standard of feasibility. (AR 441-444, 455-57.)

On the first point, the economic analysis compares the proposed NBHCP mitigation fees to costs under the City of Bakersfield HCP, the City of Coalinga HCP, the South Sacramento HCP, and the Yolo County HCP and finds that the fees charged by these jurisdictions are substantially lower than the fees proposed under the NBHCP. (Id. at 457.) However, this analysis is not dispositive on the question of feasability because the level of mitigation fees the market will bear is tied to the relevant real estate market and the land-use composition of the development. Therefore, without any evidence that the lands covered by these HCPs have similar market conditions and land-use plans, these comparisons are of little value in determining the feasibility of a higher mitigation fee under the NBHCP.

However, the expert economic analysis also evaluates the market conditions in the Sacramento region and analyzes the effect of the proposed fees on the cost-effectiveness of the proposed development, looking at the cost burdens imposed by the combination of the proposed NBHCP fees and infrastructure fees, such as fees for schools, water, wastewater, and traffic. (Id. at 441-44, 457-60, 494.) The analysis finds that the estimated

total fees for residential development within the permit areas would be approximately 13-14% of the estimated sales price of a residential unit. (Id. at 441.) It also finds that a 15% fee burden is generally the "feasibility benchmark" for residential development, although a 20% cost burden may be feasible, depending on specific financial considerations. (Id.)

The analysis determines that alternatives calling for increased mitigation would not push the cost burden beyond the 15% benchmark under current conditions, but offers two reasons why increased mitigation might become infeasible. First, the analysis notes the City originally adopted a low infrastructure fee for the North Natomas area that eliminated certain funding and programs, including funding for police, fire services, bike trails and community center facilities. (Id. at 441, 443, 457-60.) However, that fee program is currently under revision, and the development impact fees are anticipated to increase, raising the overall fee burden. (Id.) Second, because the mitigation fees are not capped, and land acquisition prices are rising rapidly, the mitigation fees might be increased substantially to generate the funds necessary to buy mitigation lands. The analysis notes that this is particularly likely if mitigation is required at a 1-to-1 ratio, because developable land would become even more scarce. (Id.)

The Findings and Recommendations consider the economic analysis offered by the permittee and also offer three further reasons why additional mitigation is impracticable. (Id. at

1193.) First, the Findings and Recommendations point out that there is no cap on the mitigation fee over the 50-year term of the plan. (Id.) Second, the Service notes that the mitigation fee more than doubled since the time the economic analysis was prepared, so that the cost burdens might now be at or past the industry benchmarks of feasibility. (Id.) What was theoretical at the time the economic analysis was prepared, has become the reality. Finally, the Findings and Recommendations state that further fee increases are expected in the future, which could push costs beyond the industry benchmarks for feasibility. (Id.)

Plaintiffs contend that: (1) the project applicants did not examine an adequate range of alternatives; (2) the economic analysis does not support the finding of "impracticability"; and (3) the Service's two-page analysis is insufficient to support the finding of impracticability. (Pls.' Mot. at 38-39.) As to the first argument, defendants did consider two alternatives that called for an increased mitigation ratio. (AR 3351.) Plaintiffs do not indicate what other alternatives should have been considered or cite any legal precedent to support this position. (Pls.' Reply at 36.) Plaintiffs' second argument -- that the economic analysis does not support a finding of impracticability -- is based on a flawed interpretation of the word "practicable" as used in the statute. Plaintiffs assert that since the economic analysis does not state that increased fee levels are totally infeasible, the City and Sutter have not met their burden of showing that additional mitigation would be

impracticable. (Id. at 37-38; Pls.' Mot. at 39.) As this court previously found in Metro Air Park, 306 F.Supp.2d at 928 n.12, "practicable" as used in the ESA does not simply mean "possible," as opposed to impossible, but has the more nuanced meaning of "reasonably capable of being accomplished." The economic analysis noted a number of uncertainties that could push the fee burden beyond the feasibility benchmark and doom all development. In light of these uncertainties, and the rapid rise in fees noted in the Findings and Recommendations, the Service rationally concluded that additional mitigation was not "reasonably capable of being accomplished" without jeopardizing the proposed development. Ultimately this question is not a matter of arithmetic based on firm figures and projections but a judgment call given the uncertainties of the real estate market and the various other factors that affect development costs and rewards. In the circumstances here, particularly in light of rapidly rising land costs, the Secretary's finding represents a reasonable judgment.

Plaintiffs' final argument is that the Service abrogated its duties by relying on the analysis of the permit applicants to determine whether additional mitigation would be practicable. However, the case relied on by plaintiffs, Gerber v. Norton, 294 F.3d 173, 185 (D.C. Cir. 2002), is readily distinguishable. In Gerber, the Service relied on the developer's word that the proposed alternative was impracticable, without any supporting analysis. 294 F.3d at 185. Here, the City and Sutter provided

an extensive expert analysis to substantiate the conclusion that additional mitigation was not practicable. Furthermore, the Service went beyond the information provided by the City and Sutter, noting, for instance, that mitigation fees had increased significantly since the economic analysis was prepared.[15]

Based on the foregoing analysis, the finding of the Secretary that the NBHCP would minimize and mitigate the impacts of the proposed action to the maximum extent practicable is not arbitrary and capricious. The Service and the Secretary evaluated both proportionality and practicability and rationally determined that the proposed level of mitigation: (1) would effectively compensate for the injury to species that would occur under the ITPs; and (2) was the maximum practicable in the circumstances.

V. Failure to Ensure Adequate Funding

Plaintiffs' final claim is that the NBHCP fails to ensure adequate funding for the plan, as required by 16 U.S.C. § 1539(a)(2)(B)(iii). (Pls.' Mot. at 40.) Plaintiffs make three arguments as to why funding is not ensured: (1) the NBHCP relies on unfunded voluntary measures such as setbacks and connectivity;

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[15] Plaintiffs also contend that the Service had a duty to inquire whether a modified development scenario -- for example, commercial as opposed to residential -- would have been possible and permitted additional mitigation. (Pls.' Reply at 37-38.) However, plaintiffs have not provided any legal precedent for this position and the court previously rejected a similar argument. See Metro Air Park, 306 F.Supp.2d at 928 (holding that it is best to "avoid unduly enmeshing the Service in developers' economic affairs and projections.").

(2) the permittees have not "guaranteed" that they will fund the mitigation plan in the event that the developer fees prove inadequate; and (3) developers are immune from retroactive fee increases. (Id.; Pl.'s Reply at 39-41.) With regard to the first argument, as discussed above in Section III.A, the NBHCP does not rely on unfunded voluntary measures to ensure success -- funds are provided for ensuring connectivity and the plan does not "rely" on the 800-foot setback zones, which are merely a preferred acquisition criteria. (AR 135, 140-41.)

The second and third arguments are based on the same hypothetical fact scenario. Plaintiffs assert that since the fees will be set and then paid by developers on an annual basis, the fees collected may be insufficient if property costs increase between the time the fees are collected and the time mitigation lands are purchased. (Pls.' Mot. at 40.) As a result, plaintiffs argue, funding for the NBHCP has not been "ensured" by the City and Sutter.[16] (Id.) However, the NBHCP includes several fail-safe provisions to protect against rising land costs during the period between collection of fees and acquisition of reserve lands. First, the NBHCP requires the NBC to maintain a 200-acre "cushion" of reserve lands, so that development will not outpace the acquisition of mitigation land. (AR 213-14.)

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[16] Plaintiffs point to some speculation by the court in Natomas I "that it is not clear that a funding mechanism that is not backed by the applicant's guarantee could ever satisfy the requirement of § 1539(a)(2)(B)(iii)." This language is not holding and merely raises a question that is answered in this opinion.

Second, if land acquisition costs increase before the City and Sutter have an opportunity to adjust the mitigation fees, the developer can be required to dedicate land rather than paying the fee. (Id. at 804, 1195.) Although plaintiffs argue that "funding shortfalls" are still possible with land dedications, the court fails to see how this could occur; if there is a dedication of the required mitigation land, the landowner will not have to pay the land acquisition component of the mitigation fee, and the NBC will obtain the appropriate amount of reserve land. Third, the "catch-up" fee ordinances further protect against rising land costs, as they narrow the window between fee payment and acquisition of mitigation land. (Id. at 212.) Finally, unlike the funding mechanism found inadequate in Natomas I, the mitigation fees are not capped under the NBHCP, so that fees can be increased to compensate for rising land costs. (Id. at 212.)

In the Findings and Recommendations, the Service relied on all of these elements to find that the City and Sutter had adequately ensured funding for the plan. (Id. at 1194-96.) While it is true, as plaintiffs assert, that developers are protected from retroactive fee increases, plaintiffs have not pointed to any evidence in the record suggesting that such retroactive fee increases would be necessary under the NBHCP. The NBHCP is structured to avoid the need for retroactive fee increases through foresight and advance planning. Plaintiffs have not shown that the NBHCP, as structured, will not adequately

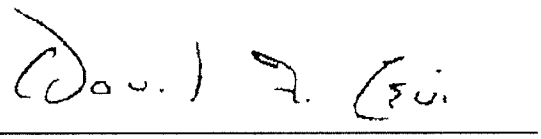
fund the required mitigation. The finding of the Secretary that the plan adequately ensures funding is not arbitrary or capricious.

VI. Conclusion

For the foregoing reasons, defendants' motion for summary judgment is GRANTED and plaintiffs' motion for summary judgment is DENIED. The clerk shall enter judgment.

IT IS SO ORDERED.

Dated: September 7, 2005



DAVID F. LEVI
United States District Judge

Natomas Basin Habitat Conservation Plan Area Biological Effectiveness Monitoring Report

2023 ANNUAL SURVEY RESULTS

ICF. 2024. *Natomas Basin Habitat Conservation Plan Area Biological Effectiveness Monitoring Report: 2023 Annual Survey Results*. July. Prepared for the Natomas Basin Conservancy, Sacramento, CA. Prepared by ICF, Sacramento, CA.

FRONT AND BACK COVER PHOTO OF SWAINSON'S HAWK: USFWS

FINAL

BIOLOGICAL EFFECTIVENESS MONITORING FOR THE NATOMAS BASIN HABITAT CONSERVATION PLAN AREA 2023 ANNUAL SURVEY RESULTS

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Sacramento, CA 95814

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Acronyms and Abbreviations

Basin	Natomas Basin
BEMP	Biological Effectiveness Monitoring Program
BEMT	Biological Effectiveness Monitoring Team
BKS	Betts Kismat Silva
Cal-IPC	California Invasive Plant Council
CDFW	California Department of Fish and Wildlife
CESA	California Endangered Species Act
CMR	capture-mark-recapture
Covered Species	species covered by the Plan
DFG	California Department of Fish and Game
DFW	California Department of Fish and Wildlife
ESA	Endangered Species Act
g	grams
GGS	giant gartersnake
GIS	Geographic information system
I-	Interstate
ICF	ICF International and ICF Jones & Stokes
km^2	square kilometers
MAP HCP	Metro Air Park Habitat Conservation Plan
mm	millimeters
NAIP	National Agricultural Imagery Program
NBHCP	Natomas Basin Habitat Conservation Plan
NLIP	Natomas Levee Improvement Program
PIT	passive integrated transponder
Plan	Natomas Basin Habitat Conservation Plan
plan area	NBHCP Area
SAFCA	Sacramento Area Flood Control Agency
SCAS	Sacramento County Airport System
SECR	spatially-explicit capture-recapture
SMF	Sacramento International Airport
SR	State Route
SSMP	Site-Specific Management Plan
SUL	snout-urostyle-length
SVL	snout–vent length
TAC	Technical Advisory Committee
TNBC	The Natomas Basin Conservancy
TVL	tail–vent length
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
UTM	Universal Transverse Mercator

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Chapter 1
Introduction

CHAPTER HIGHLIGHTS

- 2023 marked the 20th year of comprehensive biological effectiveness monitoring for the Natomas Basin and Metro Airpark Habitat Conservation Plans.
- This annual report fulfills the monitoring and reporting requirements of the federal incidental take permits issued by the U.S. Fish and Wildlife Service and the state incidental take permits issued by the California Department of Fish and Wildlife.
- A summary of monitoring results for 2023 is provided at the end of this chapter.

1.1 Background

In November 1997, the Natomas Basin Habitat Conservation Plan (NBHCP) (City of Sacramento 1997) was submitted to the U.S. Fish and Wildlife Service (USFWS) and the California Department of Fish and Game (now the California Department of Fish and Wildlife [CDFW]) in support of an application for a federal permit under Section 10(a)(1)(B) of the Endangered Species Act (ESA) and a state permit under Section 2081 of the California Fish and Game Code. USFWS and CDFW subsequently approved the NBHCP and issued permits. A modified version of the NBHCP was approved in 2003 (City of Sacramento *et al*. 2003).

The NBHCP (also referred to as the *Plan*) was designed to promote biological conservation while allowing economic development and the continuation of agriculture in the Natomas Basin (Basin) (Figure 1-1). The Plan established a multispecies conservation program to minimize and mitigate the anticipated loss of habitat and the incidental take of species covered by the Plan (hereafter referred to as *Covered Species*) that could result from urban development and actions associated with implementation of conservation activities that are required as mitigation.

The overall goal of the Plan is to minimize incidental take of Covered Species in the NBHCP Area (also referred to as the *plan area*) and to mitigate for impacts of covered activities on Covered Species and their habitats. Mitigation is achieved through the acquisition of reserve lands intended to be managed for the benefit of Covered Species. The primary biological goal of the Plan is to create a system of reserves that contain both wetland and upland components that will support and sustain viable populations of Swainson's hawk (*Buteo swainsoni*), giant garter snake (*Thamnophis gigas*), and other species covered under the Plan.

The Natomas Basin Conservancy (TNBC) is the nonprofit entity responsible for administering and implementing the NBHCP and the Metro Air Park Habitat Conservation Plan (MAP HCP).[1] TNBC serves as the Plan Operator on behalf of the City of Sacramento, Sutter County, and the MAP Property Owners Association. TNBC's actions are governed primarily by NBHCP terms and the commitments set forth in the Plan's Implementation Agreement. TNBC's primary function is the

[1] The MAP HCP covers a 2,015-acre portion of the Basin, adjacent to Sacramento International Airport (SMF), that is part of the 17,500 acres of planned urban development considered in the NBHCP.

acquisition, restoration, enhancement, and management of reserve lands. To fulfill this function, TNBC develops and implements Site-Specific Management Plans (SSMPs) and Site-Specific Biological Effectiveness Monitoring Plans (BEMPs)) for its mitigation land holdings within the Basin. A Technical Advisory Committee (TAC) provides technical assistance to TNBC when requested by the Executive Director.

To achieve the goals of the Plan, TNBC retained ICF (formerly ICF International and ICF Jones & Stokes) to conduct comprehensive biological effectiveness monitoring and report the results as required by the NBHCP. ICF assembled a Biological Effectiveness Monitoring Team (BEMT) comprised of published species' experts to conduct the required biological effectiveness monitoring, document progress made toward meeting the biological goals and objectives of the Plan, and provide recommendations for adapting management strategies as identified through the monitoring efforts.

By March 2023, TNBC owned and managed 38 separate tracts totaling approximately 5,153 acres (2,086 hectares) in the Basin on which biological effectiveness monitoring was implemented (Table 1-1). Since 2007, individual tracts of mitigation land have been organized into three main reserves: the North Basin Reserve, the Central Basin Reserve, and the Fisherman's Lake Reserve (Figure 1-2).

1.1.1 Location

The Basin is a low-lying area of the Sacramento Valley that encompasses portions of northern Sacramento and southern Sutter Counties (Figure 1-1). The 54,206-acre (21,666-hectare) plan area is bounded on the west by the Sacramento River, on the north by the Natomas Cross Canal, on the east by Steelhead Creek (formerly known as the Natomas East Main Drainage Canal), and on the south by Garden Highway (Figure 1-2).

The plan area contains incorporated and unincorporated areas within the jurisdictions of the City of Sacramento, Sacramento County, and Sutter County. The southern portion of the Basin is mostly urbanized and development of the northeast corner of the Basin began in earnest in 2023, while the rest of the Basin remains primarily agricultural.

1.1.2 Setting

The Basin is in the historical floodplain of the Sacramento and American Rivers. Land cover types in the Basin historically consisted of wetlands, narrow streams with associated riparian vegetation, shallow lakes, and grasslands on the terraces along the Basin's eastern edge. During the late 1800s and early 1900s, most of the Basin was converted to agriculture and many native aquatic habitats were replaced by channelized water delivery and drainage systems.

The lowest elevations in the Basin are currently in the central and northern portions, which are flat, open areas with deep clay soils that primarily support rice farming (Figure 1-3). With the exception of the mature riparian forest and wetland complex present along the length of the Natomas Cross Canal on the Basin's northern boundary (Figure 1-3), very few trees or native vegetation types remain.

The southern and western portions of the Basin contain largely alluvial soils and support a mixture of row, grain, and hay crops although small remnant stands of valley oak woodland and patches of riparian woodland persist throughout this area (Figure 1-4). The Sacramento River on the Basin's western edge supports mature cottonwood-dominated riparian forest. Implementation of the

Natomas Levee Improvement Project (NLIP) and its associated mitigation have resulted in a broad band of grasslands and young riparian forests connecting many of the patches of remnant oak woodland along the western boundary of the Basin (Figure 1-5).

The highest elevation in the Basin is the eastern edge situated on a terrace with gently rolling topography which is characterized by loam and clay-loam soils and supports annual grasslands as well as dry and irrigated pastures. Steelhead Creek - a channelized drainage - forms the eastern Basin boundary and hosts an extensive wetland complex with sparse riparian vegetation along its length (Figure 1-6).

1.2 The Biological Effectiveness Monitoring Program

1.2.1 Goals and Objectives

The purpose of the BEMP is to evaluate the effectiveness of the Plan in meeting its biological goals and objectives, and to provide recommendations for adapting management strategies to ensure that the Plan's goals and objectives are met. In general, monitoring is designed to establish annual conditions, track changes over time, and evaluate the effectiveness of current management actions. Specific purposes of the BEMP are listed below.

- Track population trends of Covered Species within the plan area to evaluate the effectiveness of the NBCHP in sustaining populations of Covered Species in the Basin.
- Evaluate the effectiveness of reserve design and management.
- Provide information and recommendations that can be used to enhance the design and management of reserves.

Monitoring must be conducted in accordance with the guidelines set forth in the Plan to achieve compliance with the provisions of the ESA 10(a)(1)(B) permit.

1.2.2 Covered Species

The NBHCP's 22 Covered Species are listed in Table 1-2. Seven Covered Species have been detected in the Basin. Two Covered Species—Swainson's hawk (*Buteo swainsoni*) and tricolored blackbird (*Agelaius tricolor*)—are currently listed under the California Endangered Species Act (CESA), while a third Covered Species—giant garter snake (*Thamnophis gigas*)—is listed under both CESA and the federal ESA (FESA). A fourth covered species, northwestern pond turtle (*Actinemys marmorata*), is currently proposed for listing as threatened under FESA. Three additional Covered Species are known to occur in the Basin: burrowing owl (*Athene cunicularia*), white-faced ibis (*Plegadis chihi*), and loggerhead shrike (*Lanius ludovicianus*). As Swainson's hawk and giant garter snake were federally or state listed when the Plan was approved, most of the monitoring efforts are devoted to these two species and are individually addressed in Chapter 3, *Giant Garter Snake*, and Chapter 4, *Swainson's Hawk.* The remaining Covered Species (collectively referred to as *Other Covered Species)* are addressed in Chapter 5, *Other Covered Wildlife Species.* No covered plant species have been found in the Basin since comprehensive monitoring began in 2004. Comprehensive floristic surveys were discontinued in 2023.

1.2.3 Types of Monitoring

The NBHCP and its Implementation Agreement require monitoring in accordance with the conditions of the federal [10(a)(1)(B)] and state (2081) permits issued by USFWS and CDFW, respectively. A comprehensive monitoring strategy was developed to satisfy these conditions and has been appropriately revised as new data and analytical techniques have become available over the last approximately 20 years.

1.2.3.1 Land Cover Tracking

Comprehensive land cover tracking has been conducted continuously since 2004 to identify and quantify the acreages of land cover types present in the Basin and habitat needed to support populations of Covered Species. Annual land cover tracking identifies the conditions extant during each annual monitoring effort and provides a method to quantify land cover changes through time. Land cover tracking is conducted on reserve lands and Basin-wide and is an essential component to evaluating the status of NBHCP Covered Species. Land cover tracking has built a comprehensive database of changes in the distribution and abundance of habitat types in the Basin from 2005-2023. The methods and results of land cover tracking are described in Chapter 2, *Land Cover Tracking.*

1.2.3.2 Giant Garter Snake Monitoring

Giant garter snake monitoring has been conducted in the Basin since the late 1990s. A standardized monitoring protocol and survey design was developed and implemented in 2004. The monitoring protocol was subsequently modified in 2011 to address survey issues associated with the low capture probabilities typically encountered with giant garter snake, and again in 2018 to incorporate recent advances in sampling and analytical techniques for species with low capture probabilities. The sampling design changes implemented in 2018, concurrent with the development of new analytical techniques, made the estimation of population density possible, which provided a valid metric to compare population densities among sites. Density estimates are more suitable for comparisons among sites than abundance estimates because they account for differences in the area sampled at each site. These estimates were used for the first time in 2023. Chapter 3, *Giant Garter Snake*, describes the sampling protocol methods and the results of these surveys.

1.2.3.3 Swainson's Hawk Monitoring

Systematic Swainson's hawk monitoring has been conducted under the auspices of the NBHCP since 1999. Because Swainson's hawk is a far-ranging species, it is intensively monitored throughout the Basin inclusive of both sides of the drainages that form the Basin's periphery. The methods and results of the Swainson's hawk surveys are described in Chapter 4, *Swainson's Hawk*.

1.2.3.4 Other Covered Wildlife Species Monitoring

Monitoring populations of Other Covered Species was initiated in 2004. Surveys on reserve lands are conducted to evaluate the effectiveness of reserve design and management in meeting objectives for Other Covered Species. Surveys on non-reserve lands are conducted to serve as "controls" for comparison to reserve lands to evaluate the success of design and management in increasing the numbers of Other Covered Species. Density estimates were used for the first time in 2023, along with information on nesting tricolored blackbird and white-faced ibis, to complete a comprehensive

evaluation of the effectiveness of the design, restoration, and management of mitigation lands in providing habitat and supporting Other Covered Species.

The methods and results of surveys for Other Covered Species are described in Chapter 5, *Other Covered Wildlife Species*.

1.3 Summary of the 2023 Biological Effectiveness Monitoring Program Results

This section summarizes the 2023 results of the BEMP. California experienced an extreme drought for 5 years from 2013 to 2017 that ended with one of the wettest years on record. This was followed by several more years of extreme drought (2018-2022), which ended in 2023 with another year of record rainfall. These extremes in weather and climate would be expected to negatively affect populations of Covered Species in multiple ways - some predictable and some unpredictable.

In 2015, construction was completed for the portion of the NLIP setback levee managed by the Sacramento Area Flood Control Agency (SAFCA) along the rural portions of the Sacramento River in the Basin. Large swaths of grassland, riparian, and managed marsh habitat that were created as mitigation for NLIP have been fully functional for more than 5 years and should contribute significantly to the conservation of Other Covered Species in the Basin.

Changes in land cover types from 2022 to 2023 were significant, with the majority of rice fields that were fallowed in 2022 due to extreme drought in the preceding years coming back into production after another record wet winter.

An assessment of the mitigation lands focused primarily on emergent tule marsh habitats created by TNBC indicates that habitat provided for giant garter snake in most TNBC marsh complexes provides habitat value equivalent to the habitat value provided in many linear water conveyance features delivering water to rice fields.

The sampling effort for giant garter snake in 2023 was similar to previous years. The number of snakes caught per unit effort was slightly higher in 2023 than 2022. Although the size distribution of captured snakes in 2023 was consistent with a healthy population, estimates of occupancy decreased between 2022 and 2023, and occupancy has decreased at a mean annual rate of 4% per year from 2011 through 2023. Management recommendations are provided to assist TNBC in achieving its goal to maintain a stable or increasing trend in the probability of occurrence of giant garter snake throughout the reserve system.

The total number of Swainson's hawk breeding pairs in the Basin declined slightly from 2022 to 2023, but remained well above the average and the overall trend of an increasing population over the monitoring period remains. However, all measures of reproductive success now exhibit a significant decline over the monitoring period, a phenomenon observed across the range of the species in California.

Reserve lands continue to provide important habitats for a wide variety of species, including shorebirds, neotropical migrants, raptors, and waterfowl. However, burrowing owl and loggerhead shrike detections have significantly declined on both reserve and non-reserve lands. Management action is required if these species are to be conserved in the Basin.

Northwestern pond turtle now occurs on most if not all TNBC tracts with a wetland component. In contrast, tricolored blackbird and white-faced ibis have not nested on reserve lands since 2010. These species are currently nesting intermittently on the SCAS Willey Wetlands Preserve and a patch of Armenian blackberry in an irrigated pasture on private land. Management of wetland habitats on reserve lands likely need to be modified for nesting of tricolored blackbird or white-faced ibis to be supported on reserve lands again.

Recommendations to improve reserve land functionality and modify management strategies of reserve lands to provide habitat that will support Covered Species are provided at the end of each chapter.

1.4 References

City of Sacramento. 1997. *Natomas Basin Habitat Conservation Plan, Sacramento and Sutter Counties, California*. November. Sacramento, CA.

City of Sacramento, Sutter County, and the Natomas Basin Conservancy. 2003. *Natomas Basin Habitat Conservation Plan; Sacramento and Sutter Counties, California*. Sacramento, CA.

Natomas Basin Conservancy. 2023. Current Base Map. Available: https://www.natomasbasin.org/helpful-documents/preserve-maps/. Accessed: March 9, 2024.

Table 1-1. Reserve Lands Acquired under the NBHCP on which Biological Effectiveness Monitoring was Conducted [a, b]

Reserve/Tract	Date Acquired	Acres
North Basin Reserve		
Atkinson	6/12/03	199
Bennett North	5/17/99	227
Bennett South	5/17/99	132
Bolen North	4/29/05	114
Bolen South	4/29/05	102
Bolen West	9/01/06	155
Frazer	7/31/00	93
Huffman East	9/30/03	136
Huffman West	9/30/03	158
Lauppe North	1/5/22	185
Lauppe South	6/30/20	172
Lucich North	5/18/99	268
Lucich South	5/18/99	352
Nestor	9/1/06	233
Ruby Ranch	6/23/03	91
Verona	7/02/20	116
Vestal	9/12/05	95
Willey	10/19/20	108
Central Basin Reserve		
Betts	4/5/99	139
Bianchi West	11/7/06	110
Elsie	11/7/06	158
Elverta	7/13/21	288
Frazer South	11/7/06	110
Kismat	4/16/99	40
Paulsen South	9/28/20	52
Richter	1/03/20	81
Sills	7/15/02	436
Silva	1/7/99	159
Silva South 1	9/28/12	29
Tufts	9/29/04	148
Fisherman's Lake Reserve		
Alleghany	11/7/02	50
Cummings	11/7/02	67
Natomas Farms	7/9/01	55
Rosa Central	3/23/05	100
Rosa East	3/23/05	106
Souza	7/2/01	40
Ann Rudin Preserve	2/28/23	53
Total		**5,155**

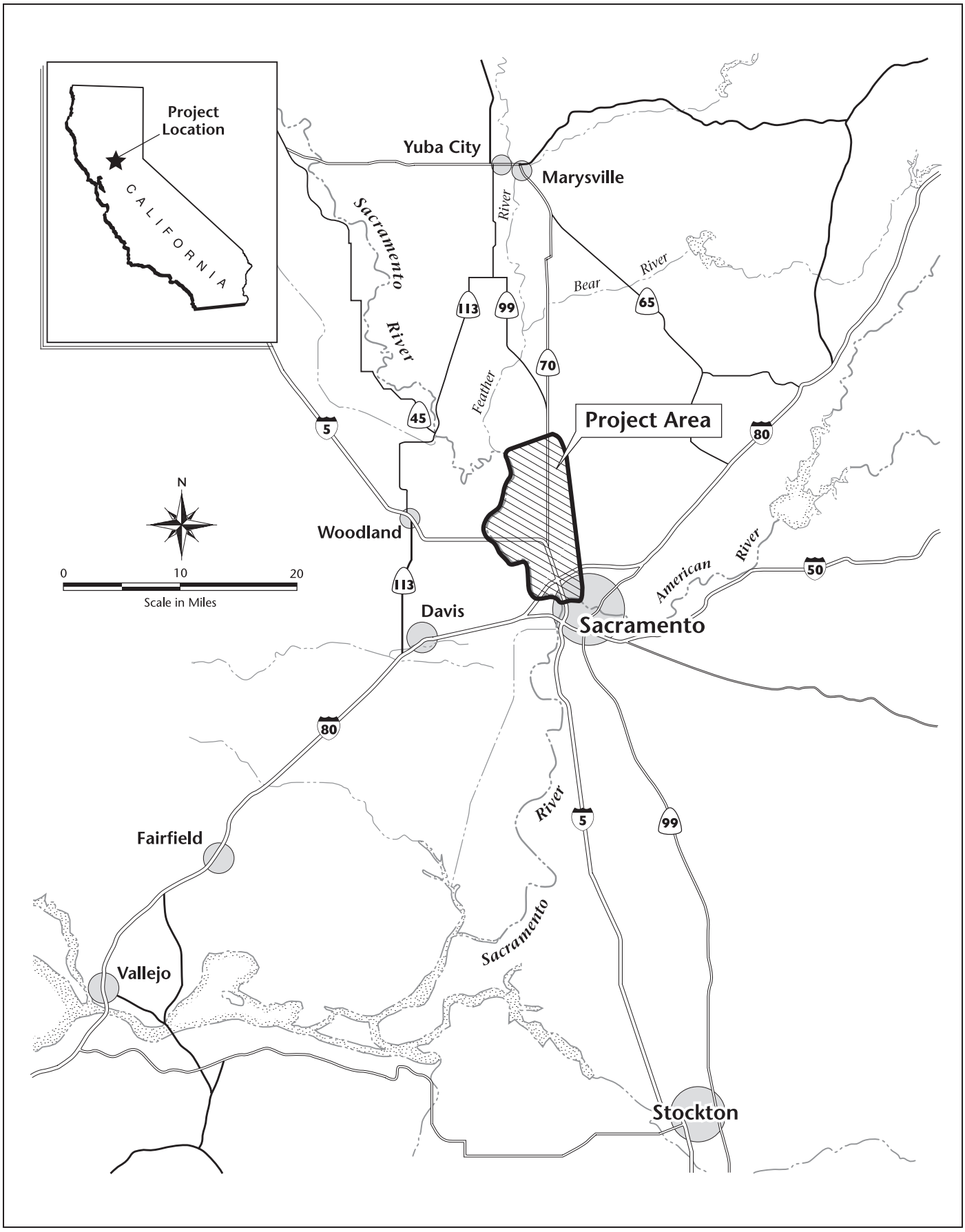
Source: The Natomas Basin Conservancy 2023.

[a] Includes 27.08 acres under easement.
[b] Acreage totals gathered through land cover mapping and GIS analysis may vary slightly.

Table 1-2. Species Covered under the NBHCP

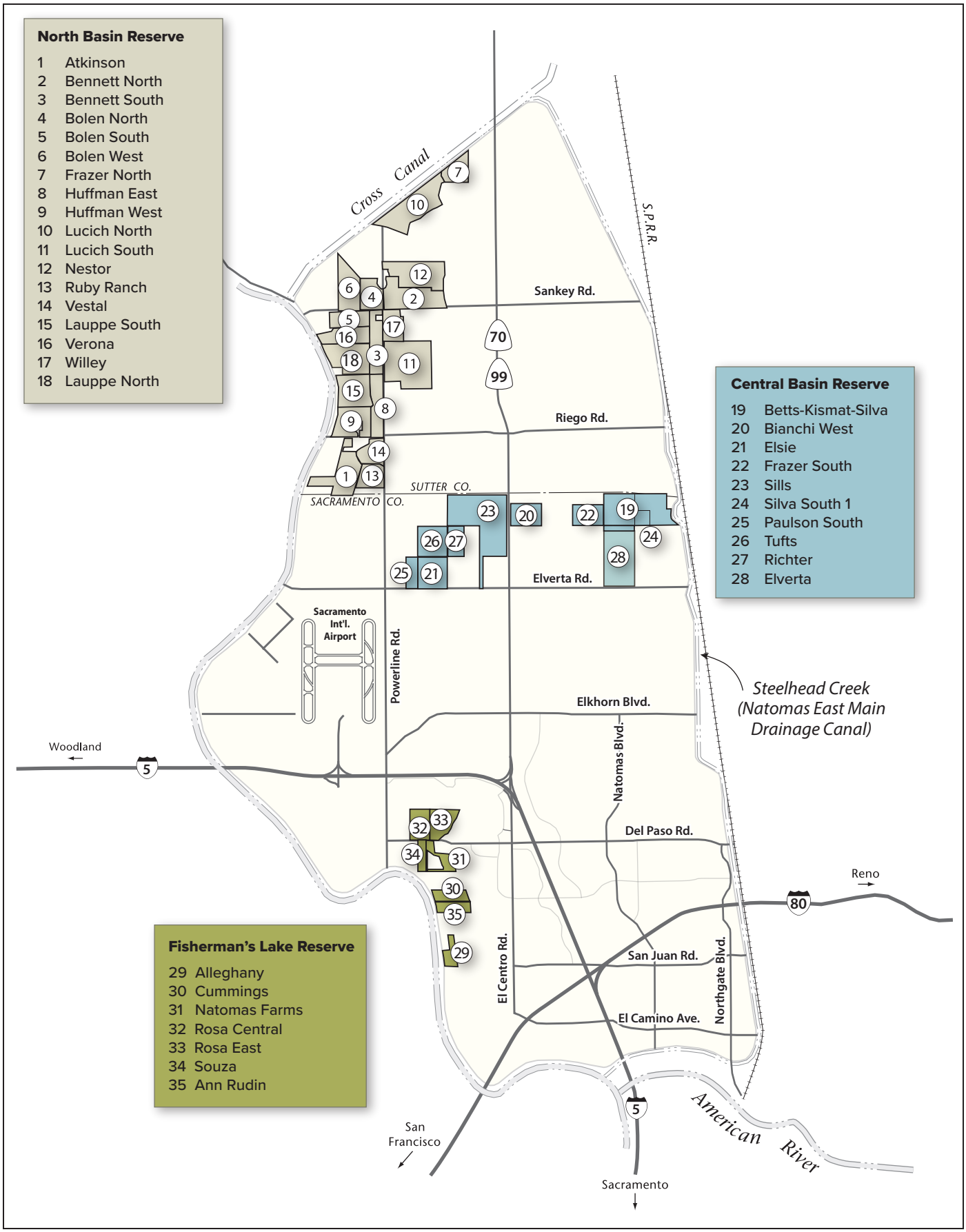
Common Name	Scientific Name
White-faced ibis	*Plegadis chihi*
Aleutian cackling goose[a]	*Branta hutchinsii leucopareia*[a]
Swainson's hawk	*Buteo swainsoni*
Burrowing owl	*Athene cunicularia*
Loggerhead shrike	*Lanius ludovicianus*
Bank swallow	*Riparia riparia*
Tricolored blackbird	*Agelaius tricolor*
Giant garter snake	*Thamnophis gigas*
Pacific pond turtle	*Actinemys marmorata*
California tiger salamander	*Ambystoma californiense*
Western spadefoot	*Spea hammondii*
Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*
Vernal pool fairy shrimp	*Branchinecta lynchi*
Midvalley fairy shrimp	*Branchinecta mesovallensis*
Vernal pool tadpole shrimp	*Lepidurus packardi*
Delta tule pea	*Lathyrus jepsonii* ssp. *jepsonii*
Sanford's arrowhead	*Sagittaria sanfordii*
Colusa grass	*Neostapfia colusana*
Boggs Lake hedge-hyssop	*Gratiola heterosepala*
Sacramento Orcutt grass	*Orcuttia viscida*
Slender Orcutt grass	*Orcuttia tenuis*
Legenere	*Legenere limosa*

[a] Formerly Aleutian Canada goose (*Branta canadensis leucopareia*).



Graphics ... 890.10 NBC 3-11-2021) TAG

FIGURE 1-1
Project Location



NBC 104332 (4-20-2023) TG

FIGURE 1-2
Natomas Basin Reserves

Typical habitat of the central and northern Natomas Basin

Natomas Cross Canal

Graphics ... 890.10 (3-11-2021) TAG

FIGURE 1-3
Central and Northern Basin Habitats

Fisherman's Lake

Mature riparian forest along the Sacramento River

Graphics ... 890.10 (03-13-2024) JC

FIGURE 1-4
Riparian Habitats in the Northern Basin

Riparian habitat created as mitigation for the SAFCA levee improvement project

Grassland habitat created as mitigation for the SAFCA levee improvement project

Graphics ... 890.10 (03-13-2024) JC

FIGURE 1-5
Southern and Western Basin Habitats

Typical habitat of the east basin

Steelhead Creek (formerly the Natomas East Main Drain Canal)

Graphics ... 890.10 (03-13-2024) JC

ICF

FIGURE 1-6
Eastern Basin Habitats

Chapter 2
Land Cover Tracking

CHAPTER HIGHLIGHTS

- After a substantial decrease in the acreage of active rice fields and the concomitant increase in fallow agricultural lands that occurred in 2022 due to extreme drought, active rice fields rebounded from 22% of the Basin in 2022 to 36% in 2023 following a historically wet winter. Rice fields continue to dominate the landscape in the Basin.
- Acreages of active rice fields to support giant garter snake and acreages of suitable foraging habitat for Swainson's hawk have not dropped below the minimum acreage thresholds.
- Large developments in the north and west of the plan area have been steadily increasing the acreage of developed land in the plan area.

2.1 Introduction

Land cover and habitat mapping is stipulated in the BEMP (2009) and is relevant to all Covered Species as it annually tracks temporospatial changes in the distribution and abundance of land cover and habitat types throughout the Basin. Land cover and habitat monitoring is achieved through annual field surveys of each original land cover polygon (circa 2004) and documenting changes that have occurred since the previous year.

Land cover monitoring on reserve lands has historically included botanical surveys for covered plant species and documenting distributions and abundances of noxious plant species with the potential to compromise habitat values for Covered Species. Botanical surveys were conducted from 2005 through 2022 and no covered plant species were detected. Botanical surveys were discontinued in 2023 because no covered plant species have been detected after 17 years of annual surveys. Noxious weed surveys are now being conducted by TNBC's land management firm (Triangle Properties); thus, no data on noxious weeds are reported herein.

2.1.1 Goals and Objectives

Effective monitoring requires baseline information on the distributions and abundances of the resources of interest. Annual land cover and habitat mapping in the plan area establishes the baseline conditions for the monitoring effort in each given year. The objective of the Basin-wide land cover and habitat monitoring component as identified in the 2009 BEMP is to "*quantify the distribution and abundance of land cover and habitat types throughout the Basin to guide future acquisitions of mitigation lands, to provide information on potential dispersal corridors between reserves, and to assess changes in the distribution and abundance of suitable habitats for Covered Species over time*" (BEMP Pg. 7, 2009).

2.2 Methods

Land cover and habitat types in the plan area have been documented annually since 2004 using aerial imagery followed by field surveys to verify ("ground-truth") digital mapping. Annually updated National Agricultural Imagery Program (NAIP) imagery at a resolution of 1 meter has been used by ICF geographic information system (GIS) specialists since 2013 to generate basemaps of Sacramento and Sutter counties. These basemaps are then used to digitally map land cover which is subsequently ground-truthed. In 2023, professional ICF botanists, experienced in aerial imagery interpretation and vegetation signatures of the southern Sacramento Valley, digitally mapped land cover types using Environmental Systems Research Institute's ArcGIS® 10.3.1 software. Polygons were delineated at a scale of 1:2,500–1:5,000 (approximately 1 inch = 200–400 feet) by following visible differences in color tone and texture on the photographs. In some cases, riparian areas and wetlands were digitized at larger scales. Minimum polygon size was typically 5 acres (2 hectares) for agricultural habitat types and developed areas, 0.25 acre (0.1 hectare) for seasonal wetlands, and 0.5 acre (0.2 hectare) for other sensitive habitat types. Ditches were historically mapped as line features, and no attempt has been made to calculate their area at any time; thus, ditches remain as line features.

All accessible polygons were subsequently ground-truthed during the growing season by ICF botanists. The acreage of each land cover type occurring on reserve lands from 2005 through 2023 is provided in Appendix A.

2.3 Results

2.3.1 Land Cover Types Basin-Wide

Table 2-1 lists the acreages of each land cover type mapped in the Basin from 2005 to 2023. The distribution of these types is shown on Figure 2-1 (note that several land cover types have been combined in the figure for clearer representation). The major land cover types that provide habitat for Covered Species in the Basin are rice fields, wetlands, upland agricultural lands, fallow agricultural fields, and grasslands. Upland agricultural fields, fallow agricultural fields, and grasslands constitute the majority of foraging habitat for Swainson's hawk. Active rice fields as well as the irrigation and drainage ditches that supply water to the fields are important habitats that can support giant garter snake, while created wetlands can provide essential habitats for giant garter snake, tricolored blackbird, and several other Covered Species. The acreages of these land cover categories are shown in Table 2-2, along with the proportion of the Basin comprising each type. Figure 2-2 shows changes in the acreage of major land cover types since 2005 which are summarized below.

- Active rice fields increased from 22% of the Basin in 2022 to 36% in 2023 following a historically wet winter. Rice fields continue to be the dominant land cover in the Basin.
- Fallow lands decreased substantially, previously covering 18.1% of the Basin in 2022 to 2.6% of the Basin in 2023.
- Upland agricultural lands, previously covering 14.3% of the Basin in 2022, decreased to 12.4% in 2023 losing approximately 1,017 acres.

- Grassland habitats, previously covering 10.0% of the Basin in 2022, increased to 12.6% in 2023 with an addition of 1,418 acres.
- Developed land cover increased by approximately 523 acres.

Changes in land cover and habitat values over the last 10 years continue to be driven by construction of the NLIP. Mitigation for impacts from the NLIP setback levee construction project have included the creation of fresh emergent marsh habitats from soil borrow sites and the creation and preservation of large swaths of grassland and riparian habitats adjacent to the new setback levee. These mitigation areas have the potential to significantly benefit numerous wildlife species, including several covered by the NBHCP.

Another significant change in the last few years has been the rapid increase in development since the 2017 lifting of the development moratorium issued in December 2008 to address flood protection concerns in the Basin. In 2023, developed habitats continued to increase - particularly in Sutter County - with large areas of land graded for conversion to high density developed lands in 2024.

Both the NBHCP and the BEMP have threshold limits for the minimum amount of habitat acreages for Covered Species. If habitat acreages drop to the minimum limit, a re-examination of the operating conservation program would be required. The fallowing of rice fields due to extreme drought can influence this threshold. The minimum limit for giant garter snake habitat acreage was reached in 2022 when active rice production dropped with the fallowing of rice fields due to extreme drought. Acreages of active rice fields rebounded to above the minimum threshold in 2023 with re-activation of the fallow rice fields following a very wet year. As of 2023, acreage of suitable foraging habitat for Swainson's hawk has not dropped below the minimum threshold.

The drop in active rice fields from 2005 through 2011 was due primarily to anticipated development. Subsequent variation in the acres of active rice fields have been due to extreme weather variations and its impact on water availability. Large fluctuations in acreages of active rice fields could potentially have adverse effects on populations of giant garter snake and other species that depend to varying degrees on the aquatic habitat provided by rice cultivation.

Natural vegetation, composed of tree- and shrub-dominated native communities such as valley oak woodland, riparian woodland, and riparian scrub, constitutes a small proportion of the Basin (i.e., 1.6% of the land area), but provides high-quality habitat for many species, including Swainson's hawk and loggerhead shrike, which are both Covered Species. As noted above, the Basin-wide acreage comprising these habitat types has been increasing due to mitigation from the NLIP. The maturation of tree plantings at freeway off-ramps resulted in those areas being mapped as woodland land cover types (e.g., mixed oak woodland, live oak woodland) in 2022. The small area of terrace grassland on the eastern edge of the Basin was included in the nonnative annual grassland category, although this area includes some remnant native valley floor grassland.

2.3.2 Land Cover Types on Reserves

The total acreage of each land cover type mapped on reserves from 2005 to 2023 is shown in Table 2-3; the major categories of land cover types providing habitat for Covered Species on reserves (rice, wetlands, upland agricultural lands, fallow agricultural fields, and grasslands) are shown in Table 2-4, along with the proportion of reserve lands comprising each type. The Ann Rudin tract (formerly AKT tract) was acquired from SAFCA in June 2023. This tract is comprised of approximately 37 acres

of created fresh emergent marsh habitat and 16 acres of upland row and field crop habitat. The area of plantings that was added on the Souza Tract in 2016 is continuing to thrive and mature.

Table 2-5 summarizes the major habitat types on reserves as a proportion of those habitats in the entire Basin. In 2023, reserve lands accounted for 46% of the managed marsh/wetlands in the Basin, but only 15.5% of the rice lands and 13.6% of upland agricultural habitats. Rice and upland agriculture are the other two important agricultural habitat types for Covered Species in the Basin. In 2023, active rice fields on reserve lands constituted 11% of the Basin-wide total, down from 11.5% in 2022. Upland agriculture on reserve lands accounted for approximately 6.8% of the upland agriculture in the Basin in 2023, up from 5.3% in 2021. Habitats on reserve lands are important components of the habitat landscape throughout the Basin. Managed marshes on TNBC reserves provide important habitats for several Covered Species. Because these marshes constitute almost half the wetlands in the entire Basin, they are an extremely important component of the mosaic of Basin-wide habitats.

2.4 Discussion

In summary, changes in the distribution and abundance of land cover and habitat types across the Basin have been primarily due to: (1) the fallowing of rice lands in 2006 and subsequent return to rice cultivation over the last decade; (2) the implementation of the NLIP, which resulted in a substantial increase in grasslands and managed marsh/wetland habitats; (3) the rapid resumption of development after the lifting of the moratorium on development in 2017; and (4) the fallowing of rice land in 2022 due to extreme drought and subsequent rapid return to rice cultivation the next year due to historically high precipitation in the 2022–2023 winter. Despite these changes, as of 2023, acreages of active rice fields to support giant garter snake and acreages of suitable foraging habitat for Swainson's hawk have not dropped below the minimum acreage thresholds.

Management actions to control noxious weeds should continue to be implemented in a timely fashion. Given that reserve lands are surrounded by a mosaic of urban, agricultural, and disturbed areas, management of noxious weeds is necessary to sustain the intended habitat values on reserves.

2.5 Recommendations

- Continue to monitor the distribution and abundance of noxious weeds on reserves, with a particular focus on aquatic plants (e.g., water primrose (*Ludwigia peploides*), mosquito fern (*Azolla* spp.), perennial pepperweed (*Lepidium latifolium*), and small smutgrass (*Sporobolus indicus*) that may compromise habitat values for Covered Species. Monitoring results should be used to inform timely weed control actions.

Table 2-1. Basin-Wide Extent (acres) of Mapped Land Cover Types, 2005–2023.

Land Cover Type	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Rice	22,321	14,792	14,590	14,224	15,014	15,023	15,287[a]	16,956	19,001	20,104	20,796	20,482	16,329	19,092	17,442	20,256	19,758	11,892	19,503
Fallow	1,625	10,101	10,033	10,076	5,869	2,912	2,323	2,282	2,160	1,555	1,366	1,712	6,442	3,307	4,667	3,234	3,414	8,951	1,404
Alfalfa	931	1,401	1,189	1,519	2,194	1,302	2,417	2,023	1,303	1,179	1,200	1,386	877	470	352	555	794	695	852
Irrigated grassland	452	374	451	373	378	345	746	750	757	757	352	326	326	311	311	310	314	295	280
Grass hay	178	153	2,212	2,367	2,769	6,724	5,423	6,504	6,250	6,850	7,582	7,043	7,211[f]	7,570	7,571	6,220	5,271	4,265	3,244
Dryland Pasture	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27
Wheat	1,824	2,375	1,104	804	3,919	695	585	413	440	978	650	1,192	383	172	792	705	321	552	341
Milo	0	328	211	161	0	0	0	0	155	94	0	0	0	303	104	111	289	14	0
Tomatoes	50	145	112	113	8	10	0	0	0	108	63	40	0	51	261	175	389	528	645
Sunflower	709	572	0	251	166	804	714	362	821	903	388	519	355	464	181	55	443	690	556
Safflower	886	532	244	426	162	214	278	322	0	29	448	426	345	511	196	262	193	404	175
Cover Crop	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	140
Other row and grain crops	2,537	582	2,396	2,279	2,096	3,770	4,937	3,645	2,370	906	1,151	958	1586	1445	719	445	770	308	503
Orchard	184	184	184	99	99	94	53	50[b]	50	307[d]	406[d]	406	406	480	480	482	463	626	630
Fresh emergent marsh (created)	575	575	676	897	897	897	897	897	897	1,042	1,042	1,042	1,042	1,042	1042	1,042	1,199	1,199	1,199
Fresh emergent marsh	138	154	154	155	155	155	154	154	154	154	154	154	154	154	154	154	154	154	154
Seasonal wetland	105	105	108	105	105	110	103	103	115	115	115	115	115	115	115	116	116	103	103
Grassland (created)	49	71	68	74	74	80	74	75	469[c]	511	511	511	506	506	506	506	506	506	570
Nonnative annual grassland	7,389	6,786	5,192	4,988	5,016	4,032	3,670	3,652	3,609	3,594	2,887	2,723	3,035	2,939	2,887	2,877	2,896	3,537	3,781
Ruderal	329	406	409	399	704	747	864	766	754	856	946	924	824	814	801	661	639	1,375	2,484
Valley oak woodland	191	195	192	192	194	209	240	242	257	248	261	322[e]	322	322	322	340[i]	341	328	267
Live oak woodland	–	–	–	–	–	–	–	–	–	–	–	–	–	–	38[h]	34[h]	28	28	28
Mixed oak woodland	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	11[i]	11	11	11
Riparian woodland	348	346	357	357	354	359	357	398	398	393	389	390	393	393	393	393	407	407	428
Riparian scrub	117	117	114	133	133	133	133	133	133	134	134	138	138	138	137[g]	137	137	137	137
Non-riparian woodland	52	50	51	51	51	29	28	43	43	43	28	28	26	26	26	43[i]	43	51	45
Open water	352	340	340	337	337	360	381	387	490	459	459	462	462	462	462	462	462	456	470
Developed—low density	1,565	1,639	1,706	1,949	1,961	1,977	2,114	2,202	2,307	2,296	2,310	2,306	2,115	2,194	3,000	3,072	2,573	2,249	2,426
Developed—high density	9,859	10,764	11,533	11,304	11,260	10,910	10,770[a]	10,604	10,529	10,533	10,505	10,539	10,753	10,868	11,191	11,470	12,081	12,592	12,666
Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33
Disturbed/bare	1,440	1,127	578	573	291	2,321	1,659	1,243	744	58	63	62	62	58	55	81[j]	177	830	1,102
Vineyard	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	19	2	2
Total	**54,206**	**54,206**	**54,206**	**54,206**	**54,206**	**54,206**	**54,206**	**54,206**	**54,206**	**54,206**	**54,206**	**54,206**	**54,206**	**54,206**	**54,206**	**54,206**	**54,206**	**54,206**	**54,206**

[a] In 2011, 586 acres of rice were erroneously mapped as developed—low density; acreages for both land cover types have been corrected in this report.
[b] Decrease in orchard acreage due to availability of new aerial imagery that allowed visibility of private property. This 3-acre crop is now irrigated grassland.
[c] Increase in grassland (created) due to conversion of disturbed/bare by SAFCA.
[d] Increase in orchard due to conversion of land west of the airport from row crops to orchard in 2014 and 2015.
[e] Increase in valley oak woodland due to establishment of woodland planted during the SAFCA revegetation of the setback levee.
[f] In 2017, 10 acres of grass hay were erroneously mapped as grassland (created), and 15 acres of grassland (created) were mapped as grass hay. Acreages for both land cover types have been corrected in this report.
[g] Small swath of riparian scrub along a canal was developed for housing.
[h] Maturation of live oak woodland plantings along freeway off-ramps; acreage was refined in 2020
[i] Maturation of woodlands along off-ramps.
[j] Disturbed/bare land cover was incorrectly labeled as fallow in 2019 and 2020; in 2021 the parcel's restoration was finished and it is now a fresh emergent marsh (created).

Table 2-2. Basin-Wide Summary of Major Habitat Types, 2005–2023.

Habitat Type[a]	2005		2006		2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		2017		2018		2019		2020		2021		2022		2023	
	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin	Acres	% of Basin
Rice	22,321	41.2	14,782	27.3	14,590	26.9	14,224	26.2	15,017	27.7	15,023	27.7	15,287[b]	28.2[b]	16,956	31.3	19,001	35.1	20,104	37.0	20,796	38.4	20,482	37.8	16,329	30.1	19,092	35.2	17,442	32.2	20,256	37.4	19,758	36.4	11,892	21.9	19,503	36.0
Managed marsh/ wetlands	818	1.5	834	1.5	938	1.7	1,157	2.1	1,157	2.1	1,162	2.1	1,153	2.1	1,153	2.1	1,165	2.1	1,311	2.4	1,311	2.4	1,311	2.4	1,311	2.4	1,311	2.4	1,311	2.4	1,311	2.4	1,468	2.7	1,455	2.7	1,456	2.7
Upland agriculture	7,567	14.0	6,462	11.9	7,919	14.6	8,293	15.5	11,692	21.6	13,863	25.6	15,100	27.9	14,019	25.9	12,096	22.3	11,601	21.4	11,771	21.7	11,890	21.9	11,084[d]	20.4	11,777	21.7	10,488[e]	19.3	8,837	16.3	8,784	16.2	7,752	14.3	6,735	12.4
Grassland	7,767	14.3	7,263	13.4	5,669	10.5	5,461	10.1	5,794	10.7	4,853	9.0	4,608	8.5	4,493	8.3	4,832	8.9[c]	4,961	9.2	4,344	8.0	4,157	7.7	4,364[d]	8.0	4,257	7.8	4,193	7.7	4,043	7.5	4,041	7.4	5,418	10.0	6,836	12.6
Fallow	1,625	3.0	10,101	18.6	10,033	18.5	10,076	18.5	5,869	10.8	2,912	5.4	2,323	4.3	2,282	4.2	2,160	4.0	1,555	2.9	1,366	2.5	1,712	3.2	6,442	11.9	3,307	6.1	4,667	8.6	3,234	6.0	3,414	6.3	9,813	18.1	1,404	2.6
Developed	12,864	23.7	13,531	25.0	13,817	25.5	13,826	25.5	13,512	24.9	15,208	28.1	14,543[b]	26.8[b]	14,049	25.9	13,581	25.1	12,887	23.8	12,878	23.8	12,907	23.8	12,929	23.9	13,120	24.1	14,246	26.3	14,623	27.0	14,831	27.3	15,671	28.9	16,194	29.9
Other	1,245	2.3	1,233	2.3	1,239	2.3	1,169	2.2	1,168	2.2	1,184	2.2	1,192	2.2	1,254	2.3	1,371	2.5	1,787	3.3	1,740	3.2	1,746	3.3	1,204	2.2	1,342	2.5	1,860	3.4	1,902	3.5	1,909	3.5	2,205	4.1	2,078	4.2
Total	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54,206**	**100**	**54.206**	**100**

[a] The managed marsh/wetlands habitat category includes the following land cover types: fresh emergent marsh, fresh emergent marsh (created), and seasonal wetland. The upland agriculture habitat category includes the following land cover types: alfalfa, grass hay, irrigated grassland, tomatoes, milo, safflower, sunflower, wheat, and other row and grain crops. The grassland habitat category includes the following land cover types: grassland (created), nonnative annual grassland, and ruderal. The fallow habitat category includes the following land cover types: fallow, fallow rice, and fallow row and grain crops. The developed habitat category includes the following land cover types: developed—low density, developed—high density, and disturbed/bare.

[b] In 2011, 586 acres of rice were erroneously mapped as developed—low density; acreages for both land cover types have been corrected in this report.

[c] Increase in grassland (created) due to conversion of disturbed/bare by SAFCA.

[d] In 2017, 10 acres of grass hay were erroneously mapped as grassland (created), and 15 acres of grassland (created) were mapped as grass hay. Acreages for both land cover types have been corrected in this report.

[e] In the 2019 annual report, orchard was erroneously included in this category; it has been corrected here.

Table 2-3. On-Reserve Extent (acres) of Mapped Land Cover Types, 2005–2023.

Land Cover Type	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Rice	1,671	1,529	1,715	1,849	2,136	2,059	1,930	2,200	2,273	2,205	2,442	2,344	1,820	2,262	2,000	2,344	2,606	1,526	3,028
Fallow	820	593	727	373	375	450	668	348	177	206	64	214	643	58	558	144	213	1,655	48
Alfalfa	106	106	150	150	204	127	126	259	204	348	348	348	143	143	88	161	335	437	536
Irrigated grassland	0	96	0	0	4	5	0	0	0	0	0	0	0	0	0	0	0	0	0
Grass hay	19	19	81	160	157	144	57	84	147	135	158	57	295[f]	356	145	241	136	196	166
Wheat	207	497	77	79	132	187	58	58	58	58	47	74	11	23	299	204	71	0	163
Milo	0	0	49	0	0	0	0	0	155	94	0	0	0	0	0	0	0	0	0
Tomatoes	0	0	55	55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sunflower	0	0	0	0	0	104	116	84	56	50	0	0	29	104	0	0	204	226	0
Safflower	0	0	0	0	104	0	68	11	0	0	0	23	41	0	0	0	0	0	0
Other row crops	10	157	279	472	26	32	27	6	27	0	37	59	132	127	28	23	58	0	31
Fresh emergent marsh (created)[a]	561	561	627	627	627	627	627	627	627	627	627	627	627	627	627	627	627	626	663
Cover Crop	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	140
Fresh emergent marsh	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seasonal wetland	6	6	4	4	4	4	3	3	4	4	4	4	4	4	4	4	3	3	3
Grassland (created)	47	76	76	72	72	72	71	72	72	73	73	73	67[f]	67	67	67	52	52	53
Nonnative annual grassland	318	225	254	254	254	254	254	228	226	226	226	203	203	203	203	203	204	204	204
Ruderal	38	33	29	29	29	28	25	25	25	36	36	36	47	47	42	44	34	34	60
Valley oak woodland	6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	5[g]	6	6	5
Riparian woodland	13	13	12	12	12	12	12	12	12	12	12	12	12	12	12	12	9	9	10
Riparian scrub	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Nonriparian woodland	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Open water	0	0	0	0	0	0	0	0	20[c]	20	20	20	20	20	20	20	22	22	22
Developed—low density	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Developed—high density	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Disturbed/bare	0	0	0	0	0	0	63[b]	47	11	0	0	0	0	0	0	0	0	10	10
Total[d]	**3,835**	**3,931**	**4,154**	**4,154**	**4,154**	**4,124[b]**	**4,124**	**4,082[b]**	**4,112[e]**	**4,112**	**4,112**	**4,112**	**4,112**	**4,112**	**4,112**	**4,112**	**4,593**	**5,052**	**5,154**

[a] The fresh emergent marsh (created) land cover type includes some, but not all, of the associated uplands for most, but not all, tracts with wetlands. When patches of associated uplands are smaller than the minimum mapping unit, they are included in the fresh emergent marsh (created) land cover type; when they are larger than the minimum mapping unit, they are mapped as the land cover type that characterizes them.

[b] Acreage change from previous years is due to the SAFCA NLIP.

[c] Completion of improvements to linear water conveyance features in the North Basin Reserve resulted in the change of 20 acres of disturbed/bare to open water habitat in 2013.

[d] Discrepancies between this total and the surveyed acreages are due to inclusion here of a 12-acre easement of the Sills tract and minor GIS rounding errors.

[e] Acreage increase is due to the acquisition of the Silva South 1 tract.

[f] In 2017 on the Atkinson tract, 10 acres of grass hay were erroneously mapped as grassland (created), and 15 acres of grassland (created) were mapped as grass hay. Acreages for both land cover types have been corrected in this report.

[g] Valley oaks were removed as a part of levee improvements and maintenance.

Table 2-4. On-Reserve Summary of Major Habitat Types, 2005–2023.

Habitat Type	2005		2006		2007		2008		2009		2010		2011		2012		2013		2014		2015		2016		2017		2018		2019		2020		2021		2022		2023	
	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands	Acres	% of Reserve Lands
Rice	1,671	43.6	1,529	38.9	1,715	41.3	1,849	44.5	2,136	51.5	2,059	49.93	1,930	46.8	2,200	53.9	2,273	55.3	2,205	53.6	2,442	59.4	2,344.4	57.0	1,819.7	44.3	2,262.2	55.0	2,000.1	48.6	2,343.9	57.0	2,231	54.9	1,526	30.2	3,028	58.8
Managed marsh/ wetlands	569	14.8	569	14.4	631	15.2	631	15.2	631	15.2	631	15.2	630	15.3	631	15.4	631	15.3	630	15.3	630	15.3	630.1	15.3	630.1	15.3	630.1	15.3	630.1	15.3	630.1	15.3	626	15.4	626	12.4	667	12.9
Upland agriculture	342	8.9	875	22.3	691	16.7	916	22.1	627	15.1	594	14.4	452	11	502	12.3	647	15.7	591	14.4	591	14.4	560	13.6	651[e]	15.8	794	19.3	560.2	13.6	629.6	15.3	655	16.1	873	17.3	1035	20.1
Grassland	403	10.5	334	8.5	359	8.6	355	8.5	355	8.5	331	8.02	350	8.5	325	8.0	323	7.8	334	8.1	334	8.1	312	7.6	317[e]	7.7	317	7.7	312	7.5	314.0	7.6	289	7.1	290	5.7	317	6.1
Fallow	820	21.4	593	15.1	727	17.5	373	9.0	375	9.0	450	10.9	668	16.2	348	8.5	177	4.3	206	5.0	64	1.5	214	5.2	643	15.6	58	1.4	558.0	13.6	144.0	3.5	213	5.2	1,674	33.1	48	0.9
Developed	5	0.1	5	0.1	5	0.1	5	0.1	5	0.1	5	0.1	68[b]	1.6	51	1.2	16	0.4	5	0.1	5	0.1	5	0.1	5	0.1	5	0.1	5	0.1	5	0.1	5	0.1	16	0.3	16	0.3
Other	25	0.7	26	0.7	25	0.6	25	0.6	25	0.6	54	0.8	26	0.6	25	0.6	45	1.1	140	3.4	46	1.1	46	1.1	46	1.1	46[f]	1.1	46	1.1	44.9	1.1	44	1.1	47	0.9	44	1
Total[c]	**3,835**	**100**	**3,931**	**100**	**4,154**	**100**	**4,154**	**100**	**4,154**	**100**	**4,124[b]**	**100**	**4,124**	**100**	**4,082[b]**	**100**	**4,112[d]**	**100**	**4,112**	**100**	**4,112**	**100**	**4,112**	**100**	**4,112**	**100**	**4,112**	**100**	**4,112**	**100**	**4,112**	**100**	**4,063**	**100**	**5,052**	**100**	**5,154**	**100**

[a] The fresh emergent marsh (created) land cover type includes some, but not all, of the associated uplands for most, but not all, tracts with wetlands. When patches of associated uplands are smaller than the minimum mapping unit, they are included in the fresh emergent marsh (created) land cover type; when they are larger than the minimum mapping unit, they are mapped as the land cover type that characterizes them.

[b] Acreage change from previous years is due to the SAFCA NLIP.

[c] Discrepancies between this total and the surveyed acreages are due to inclusion here of a 12-acre easement of the Sills tract and minor GIS rounding errors.

[d] Acreage increase is due to the acquisition of the Silva South 1 tract.

[e] "Other" acreage reported incorrectly as 0 acres in 2018; acreage fixed in this report.

[f] In 2017 on the Atkinson tract, 10 acres of grass hay were erroneously mapped as grassland (created) and 15 acres of grassland (created) were mapped as grass hay. Acreages for both land cover types have been corrected in this report.

Table 2-5a. On-Reserve Extent of Major Habitat Types as a Proportion of Each Habitat Type in the Basin, 2005–2014.

	2005			2006			2007			2008			2009			2010			2011			2012			2013			2014		
Habitat Type	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves
Rice	14,782	10.3	1,715	14,745	11.6	1,849	14,224	12.9	7.5	1,529	14,782	10.3	1,715	14,745	11.6	1,849	14,224	12.9	1,820	16,329	11.1	2,262	19,092	11.8	2,204.1	17,442	11.5	2,205	20,104	11.0
Managed marsh/ wetlands	834	68.2	631	936	67.3	631	1,157	54.5	69.6	569	834	68.2	631	936	67.3	631	1,157	54.5	630	1,311	48.1	630	1,311	48.1	630	1,311	48.1	631	1,311	48.0
Upland agriculture	6,462	13.5	691	7,919	8.7	916	8,293	11.0	4.5	875	6,462	13.5	691	7,919	8.7	916	8,293	11.0	651	11,089	5.9	794	11,782	6.7	560.2	10,488	5.3	591	11,601	5.1
Grassland	7,263	4.6	359	5,669	6.3	355	5,461	6.5	5.2	334	7,263	4.6	359	5,669	6.3	355	5,461	6.5	319	4,902	6.5	319	4252	7.5	312	4,193	7.4	334	4,961	6.7
Fallow	10,101	5.9	727	10,035	7.2	373	10,076	3.7	50.5	593	10,101	5.9	727	10,035	7.2	373	10,076	3.7	643	6,442	10.0	58	3,307	1.8	558	4,667	12.0	206	1,555	13.2
Developed	13,531	0	5	13,817	0	5	13,826	0	0	5	13,531	0	5	13,817	0	5	13,826	0	5	12,929	0.0	5	13,062	0.0	5	14,246	0.0	5	12,887	0.0
Other	1,233	2.1	25	1,239	2	25	1,169	2.1	2	26	1,233	2.1	25	1,239	2	25	1,169	2.1	46	1,204	3.8	46	1,399	0	46	1,860	2.5	140	1,787	7.8
Total	**54,206**	**7.3**	**4,154**	**54,206**	**7.6**	**4,154**	**54,206**	**7.7**	**7.1**	**3,931**	**54,206**	**7.3**	**4,154**	**54,206**	**7.6**	**4,154**	**54,206**	**7.7**	**4,112**	**54,206**	**7.6**	**4,112**	**54,206**	**7.6**	**4,112**	**54,206**	**7.6**	**4,112**	**54,206**	**7.6**

Table 2-5b. On-Reserve Extent of Major Habitat Types as a Proportion of Each Habitat Type in the Basin, 2015–2023.

	2015			2016			2017			2018			2019			2020			2021			2022			2023		
Habitat Type	Reserve Acres	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves	Reserve Acres	Basin Acres	% of Habitat on Reserves
Rice	2,442	20,796	11.70%	2,344.40	20,482	11.4	1,820	2,606	2606	2,262	19,092	11.8	2,000.1	17,442	11.5	2,343.9	20,256	11.6	2,231	19,758	11.3	1,526	11,891	12.8	3,028	19,503	15.5
Managed marsh/wetlands	630	1,311	48.10%	630.1	1,311	48.1	630	630	630	630	1,311	48.1	630	1,311	48.1	630.1	1,311	48.1	626	1,468	42.6	626	1,455	43.0	667	1,456	45.8
Upland agriculture	591	11,771	5.00%	560	11,850	4.7	651[g]	805	805	794	11,782	6.7	560.2	10,488	5.3	629.6	9,319	6.8	655	8,784	7.5	873	7,752	11.3	895	6,596	13.6
Grassland	334	4,344	7.70%	312	4,157	7.5	319[g]	290	290	319	4252	7.5	312	4,193	7.4	314	4,043	7.8	289	4,041	7.2	290	5,418	5.4	317	6,835	4.6
Fallow	64	1,366	4.70%	214	1,712	12.5	643	213	213	58	3,307	1.8	558	4,667	12	144	3,234	4.5	213	3,414	6.2	1,674	9,813	17.1	48	1,404	3.4
Developed	5	12,878	0.00%	5	12,907	0	5	6	6	5	13,062	0	5	14,246	0	5	14,623	0	5	14,831	0	16	15,671	0.1	16	16,194	0.1
Other	46	1,740	2.60%	46	1,787	2.6	46	43	43	46	1,399	0	46	1,860	2.5	44.9	1,420.20	3.2	44	1,909	2.3	47	2,205	2.1	183	2,217	8.3
Total	**4,112**	**54,206**	**7.60%**	**4,112**	**54,206**	**7.6**	**4,112**	**4,593**	**4593**	**4,112**	**54,206**	**7.6**	**4,112**	**54,206**	**7.6**	**4,112**	**54,206**	**7.6**	**4,063**	**54,206**	**7.5**	**5,052**	**54,206**	**9.3**	**5,154**	**54,206**	**9.5**

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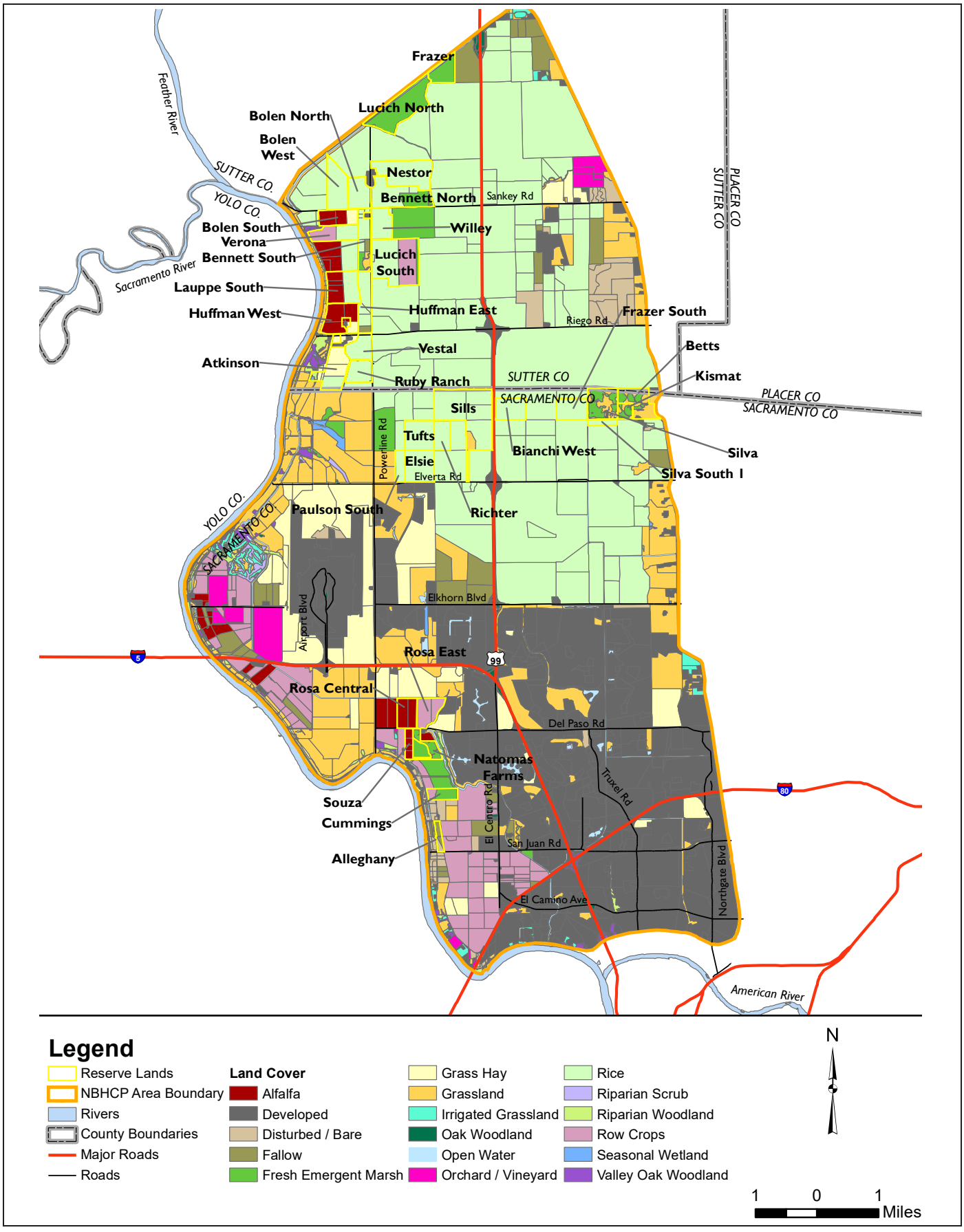

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FIGURE 2-1
Distribution of Land Cover Types in the Natomas Basin, 2023

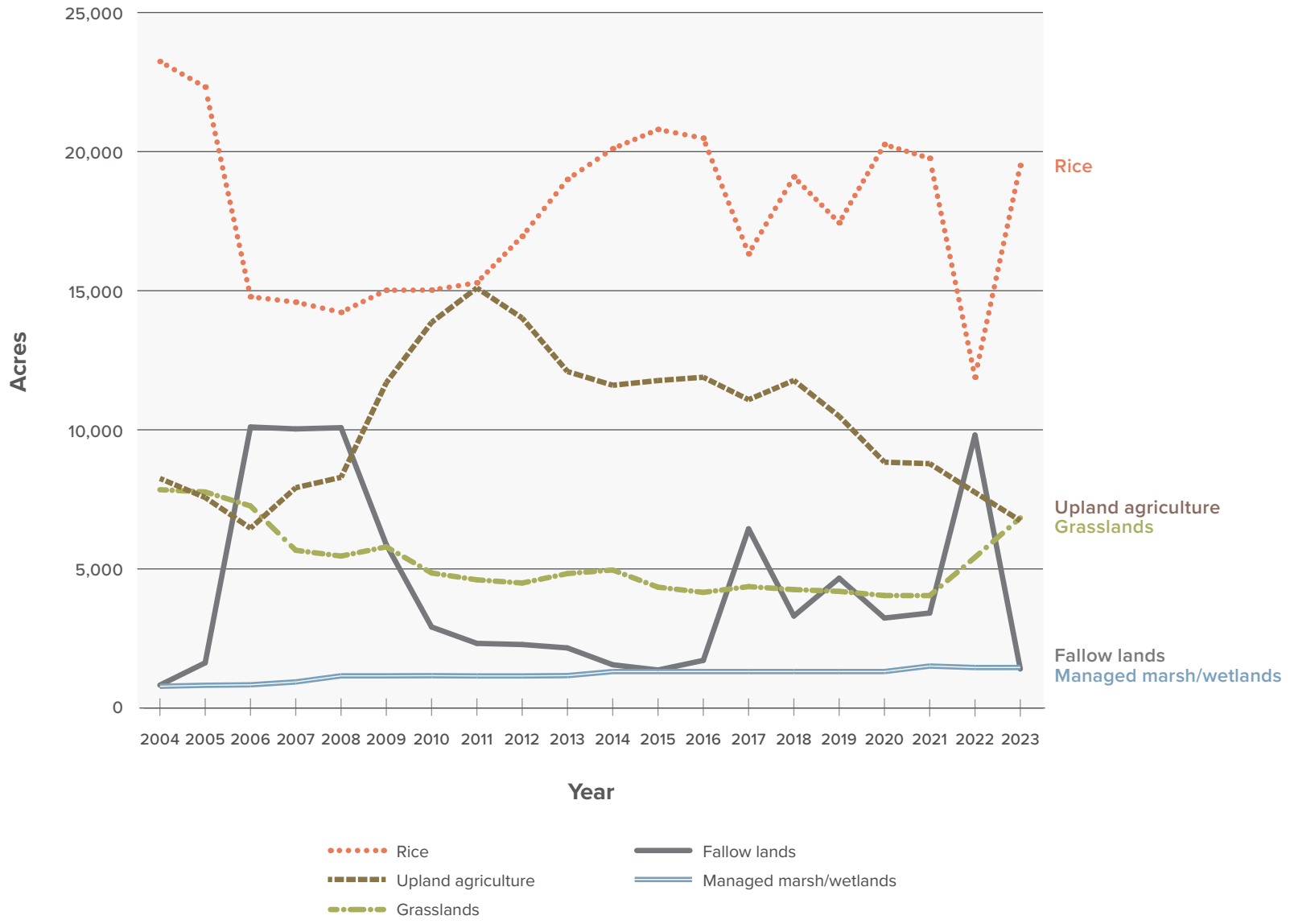

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FIGURE 2-2

Changes in Acreage of the Major Habitat Types in the Natomas Basin, 2004–2023

Chapter 3
Giant Garter Snake

CHAPTER HIGHLIGHTS

- The trapping season (May–August) and sampling period (21 days) has been consistent since 2021. The number of sites sampled in 2023 was comparable to past years: 40 in 2020, 45 in 2021, 41 in 2022, and 40 in 2023 in a random stratified design in suitable wetland or canal habitat adjacent to rice. Sampling in this way allows inferences across TNBC reserves as a whole.
- The size distribution of captured snakes in 2023 was consistent with what is expected in a healthy population.
- Based on the dynamic occupancy model, the proportion of occupied wetland units on reserve lands has decreased annually by an average of 4% from 2011 through 2023. In 2011, giant garter snake occupied 14 of 23 (60.1%) surveyed wetland units on reserve lands; whereas giant garter snake occupied 17 of 40 (42.5%) surveyed wetland units on reserve lands in 2023. These data indicate a 17.6% reduction in occupancy across wetland units on reserve lands.
- The point estimate of density of giant garter snake was approximately five times greater in created marsh habitats in the BKS tract compared to the estimates for rice and associated canals on the Sills tract. The rice dominated Lucich South, Bianchi West, and Frazer South tracts had the second, third, and fourth highest density estimates, respectively, of giant garter snake in 2023, illustrating the importance of agricultural rice habitat in the Natomas Basin.
- Giant garter snake density in the Lucich North cluster of sites, which is dominated by created marsh, was lower than many rice sites and almost two orders of magnitude less than the giant garter snake density at BKS.
- Most tracts in TNBC's reserve system are well-connected and provide ample opportunity for snakes to move between tracts. However, connections between the Fisherman's Lake Reserve Area and the rest of the reserve system are tenuous. Although connectivity overall is improving, current data indicate that it is unlikely that the Fisherman's Lake Reserve is demographically connected to the other reserves.
- Overall, giant garter snake populations in the Central Basin Reserve appear healthy. Fewer individuals were captured in the North Basin Reserve, and no giant garter snakes were captured in the Fisherman's Lake Reserve.
- Specific management recommendations are provided at the end of this chapter.

3.1 Introduction

3.1.1 Background

The NBHCP (City of Sacramento et al. 2003) and its Implementing Agreement required implementing monitoring programs with qualitative and/or quantitative monitoring methods to evaluate management objectives and strategies for the reserve system. The Plan requires an annual assessment of giant garter snake populations within the Natomas Basin (Chapter VI, Section E [2][a][2] of the 2003 NBHCP) and an assessment of habitat connectivity for giant garter snake within and between reserves. This chapter presents the findings related to these requirements.

Studies from 2001 through 2003 focused on the distribution of giant garter snake in the Natomas Basin (Wylie et al. 2003:21). Subsequent surveys attempted to assess population trends across a broad array of habitats and geographic areas, but detection probabilities were too low and the range of environmental conditions too variable to allow for an estimation of abundance that accounted for variable detection probabilities. In 2011, the surveys were redesigned to increase sample sizes and account for the detection and capture process in a more statistically rigorous and scientifically defensible manner. In 2018, the study design was further modified based on advances in methods of wildlife populations analyses and scientific information obtained on giant garter snake since 2011. The 2018 revision allows for estimation of giant garter snake occupancy, abundance, and demographic parameters from a larger sample of sites throughout the Basin, increases sampling efficiency, and provides the means to evaluate the effects of management actions (e.g., releasing or withholding water, vegetation clearance, channel or marsh design, etc.) on giant garter snake. In combination with the new analytical techniques, the revised sampling design also facilitates estimation of density from a broader array of areas and increases the validity of comparisons of density among sites.

3.1.2 Goals and Objectives

Monitoring protocol revisions implemented in 2011 were designed to assess progress toward achieving the goals of the NBHCP. Components of the BEMP as required by the Plan are specified in Pages VI-15 through VI 17. In particular, the revised protocol was designed to:

- Examine the demography of giant garter snake populations within the Basin, with an emphasis on measuring abundance and estimating survival, recruitment, and population growth rate.
- Quantify the effects of management actions on giant garter snake demography and evaluate whether those actions have promoted positive population growth.
- Examine the distribution of giant garter snake across TNBC reserves, with an emphasis on evaluating patterns in the proportion of reserves occupied, and quantify environmental variables associated with the occurrence or lack of occurrence of giant garter snake.

Subsequent revisions to the study plan in 2018 were designed to increase the accuracy of evaluating the parameters outlined above. Changes in the study plan included adopting an occupancy and abundance sampling approach and extending the trapping period at each sample location to 21–29 days to provide an opportunity for recaptures of sufficient quantity to estimate abundance and demographic rates. With the revised sampling method, the data from adjacent or nearly adjacent traplines in wetland units or rice canals can be combined, resulting in greater precision to estimates

of abundance and demographic rates and increasing the probability of recapture because a larger area was being sampled. By increasing sample sizes, the new design also allows for accurate evaluations of the effects of habitat variables on giant garter snake and the effects of management actions.

The change in sampling design precludes comparison of results from previous years' sampling under the old design. Accordingly, it is not possible to track changes in abundance or demographic rates from years prior to 2019.

The purpose of monitoring giant garter snake demography is to determine the abundance, apparent survival (the probability of surviving from one year to the next), recruitment (the rate at which individuals are born and survive their first year in the sampled area, or migrate to the sampled area), and population growth rate of the species at occupied sites in the Basin. The management goal of the NBHCP as it relates to demography is to demonstrate a stable population or to show positive population growth.

The purposes of monitoring the distribution of giant garter snake on TNBC reserve lands are to determine the proportion of sites within reserve lands are occupied, which variables correlate with the probability that a site is occupied, and – ultimately - to calculate patterns in occurrence probability. The management goal as it relates to occupancy is to maintain a stable or increasing probability of occurrence throughout the reserve system.

3.1.3 Life History and Habitat Requirements

Giant garter snake (Figure 3-1) is a large aquatic snake endemic to the wetlands of California's Central Valley that was first described in the southern San Joaquin Valley by Fitch (1940) as a subspecies of the aquatic garter snake (at that time, *Thamnophis ordinoides*). Later taxonomic revisions resulted in the consideration of giant garter snake as a subspecies of Sierra garter snake (*Thamnophis couchii*). Because giant garter snake is morphologically distinguishable from, and allopatric with, its most closely related species, aquatic garter snake (*Thamnophis atratus*) and Sierra garter snake, it was recognized as a full species in 1987 (Rossman and Stewart 1987).

Giant garter snake is highly aquatic and historically occurred in marshes, sloughs, and other habitats with slow-moving, relatively warm water and emergent vegetation, especially tules (*Schoenoplectus acutus*). Although conversion of wetlands to agriculture has nearly extirpated giant garter snake from the San Joaquin Valley, the species persists in rice fields and nearby agricultural canals in the Sacramento Valley (Halstead et al. 2010). Canals associated with rice cultivation can provide marsh-like habitat conditions (i.e., emergent wetlands) for a portion of the giant garter snake active season (late March through early October) (Wylie et al. 2009). The quality of rice fields as giant garter snake habitat compared to natural or restored marshes is an area of active research. Recent research has shown that although giant garter snake does not spend much time in rice fields when compared to irrigation canals, individuals do have higher survival when inhabiting areas with more active rice fields surrounding them (Halstead et al. 2019).

Giant garter snake feeds primarily on small fish, frogs, and larvae (Rossman et al. 1996). Specific prey items may include larvae and small adults of American bullfrog (*Lithobates catesbeianus*) and Sierra treefrog (*Pseudacris sierra*). Fish prey items include mosquitofish (*Gambusia affinis*) and small cyprinid and centrarchid fishes. Little is known about the diet of juvenile giant garter snake, but neonates preferred amphibian larvae to fish in laboratory feeding trials (Ersan et al. 2020a, 2020b).

Giant garter snake is the longest of the garter snakes (Rossman et al. 1996), and is sexually dimorphic, with females as the larger sex (Wylie et al. 2010). Smaller giant garter snakes grow more rapidly than larger giant garter snakes (Coates et al. 2009; Rose et al. 2018d). Males and females exhibit differing patterns of seasonal growth, as males forgo foraging (and growth) for reproductive opportunities in the early spring (Coates et al. 2009). Similarly, male body condition is significantly lower than that of females during the spring mating season, but males and females enter hibernation in similar condition (Coates et al. 2009). Body condition might be related to the thermal ecology of giant garter snake. Females exhibit elevated body temperatures during their gravid period from June, July, and August (Wylie et al. 2009) whereas males exhibit an elevated body temperature in the winter and early spring (Wylie et al. 2009), likely in preparation for the spring mating season. Elevated body temperatures in male snakes may be metabolically costly, resulting in decreased body condition in spring.

Although some aspects of giant garter snake demography remain elusive, detailed studies of populations in the Sacramento Valley have yielded some insight into the population ecology of giant garter snake. Giant garter snakes in the Sacramento Valley tend to produce smaller litters than those historically observed in the San Joaquin Valley where mean litter size was 23 in one study (Hansen and Hansen 1990). In the Sacramento Valley, mean litter size was 17 (95% credible interval[1] = 13–21) based on females captured from 1995 to 1997 (Halstead et al. 2011a) and 16 (range = 5–35) based on females examined from 2013 to 2016 (Rose et al. 2018a). Mean parturition date in the Sacramento Valley was August 13, although parturition can occur from early July through early October (Halstead et al. 2011a). Neonates in the Sacramento Valley are born at approximately 209 millimeters (mm) snout–vent length (SVL) with a mass of 4.9 grams (g) (Halstead et al. 2011a). Litter size varies temporally, potentially with resources, and larger females produce more, rather than larger, offspring (Halstead et al. 2011a; Rose et al. 2018a).

Survival of adult females in the Sacramento Valley varies among sites, years, and conditions. The annual survival probability of adult females over 180 g was 0.61 (0.41–0.79) at an average site in an average year (Halstead et al. 2012). Individuals are at 2.6 (1.1–11.1) times greater daily risk of mortality in aquatic habitats compared with terrestrial habitats (Halstead et al. 2012), likely due to terrestrial locations consisting of subterranean refugia. The effect of linear habitats on daily risk of mortality vary with context: in agricultural rice systems, daily risk of mortality was lower in canals than away from canals, but in two-dimensional habitats with natural or restored marshes, risk of mortality was lower than in simple linear canals (Halstead et al. 2012). Overall survival was greatest in a site with a relatively large network of restored marshes (Halstead et al. 2012). A recent capture-mark-recapture (CMR) study found survival of giant garter snake is also positively related to SVL up to a peak, after which survival likely plateaus for the largest individuals (Rose et al. 2018b). This study also found a positive relationship between snake survival and cover of emergent vegetation at a site (up to approximately 40% emergent vegetation cover; Rose et al. 2018b). Giant garter snake population growth is highly dependent on the survival rate of adult females (Rose et al. 2019); therefore, fostering wetland characteristics that support high adult female survival is important for population persistence.

Abundance, density, and body condition of giant garter snake vary by site, presumably as a result of local differences in habitat. Abundances and densities were greatest at a natural wetland, lower in a natural wetland modified for agricultural uses, lower still in rice agriculture, and lowest in seasonal

[1] *Credible intervals* are the Bayesian equivalent of confidence intervals in traditional frequentist statistics. All ranges reported in this chapter represent 95% credible intervals.

marshes managed for waterfowl (moist soil management in summer, flooded in winter; Wylie et al. 2010). Body condition of females followed a similar pattern (Wylie et al. 2010). Habitats that most closely approximate natural marshes are therefore most likely to support dense populations of healthy giant garter snakes.

The historical range of giant garter snake once extended from Butte County in the north to Kern County in the south (Fitch 1940; Hansen and Brode 1980). The draining of wetlands and subsequent urban and agricultural development have contributed to the loss of over 95% of giant garter snake's original habitat (Frayer et al. 1989). The few remaining natural wetlands are fragmented, the natural cycle of seasonal valley flooding by high Sierra Nevada snowmelt has been limited, and waters have been diverted by a network of dams and levees. As a result, giant garter snake populations have become fragmented with only small, isolated populations remaining in the San Joaquin Valley. These factors precipitated the listing of giant garter snake by the State of California (California Department of Fish and Game Commission 1971) and later by the U.S. Fish and Wildlife Service as a threatened species with a recovery priority designation of 2C: full species, high degree of threat, and high recovery potential (U.S. Fish and Wildlife Service 1993, 1999). The recovery of giant garter snake will require the restoration, protection, and adaptive management of marsh habitats, a reliable (but non-flooding) year-round supply of water, and further research into the most effective conservation practices for this species.

3.1.4 History of the Natomas Basin

Lands of the Basin were historically subject to frequent flooding events due to proximity to the American and Sacramento Rivers. Situated just north of the confluence of these major river systems, the Basin was characterized by abundant marshlands, small streams, and a mixture of riparian, oak woodland, and grassland vegetation. Available information about the historical range of giant garter snake indicates that the Basin would have been part of that range and was likely home to an abundant population of giant garter snake.

3.2 Methods

3.2.1 Trapping Giant Garter Snake

All aspects of giant garter snake monitoring are based on livetrap transects composed of floating galvanized minnow traps (Casazza et al. 2000). Traps were modified in 2012 to contain one-way valves constructed from cable ties placed in the small opening of the funnels and were further modified in 2013 to include two pieces of hardware cloth attached to each end of the funnel using zip ties (Halstead et al. 2013a). These modifications help to direct snakes moving along habitat edges into the trap and keep the snake within the trap, thus increasing capture probability.

Giant garter snake occurrence and demography were monitored at 60 sites in 2018 and 2019, 40 sites in 2020 and 2023, 45 sites in 2021, and 41 sites in 2022. Between 2020 and 2022, substantial challenges were caused by the COVID-19 pandemic as well as heat waves and drought that resulted in low water levels and increased water temperatures. 2020 trapping efforts consisted of a 14-day period. In 2023, unprecedented rainstorms and flooding resulted in inaccessible roads and delays in setting certain traplines; however, as in the previous 2 years, a sampling period of up to 21-days was successfully completed.

In all years, sample sites were selected to ensure a random, spatially dispersed sample by using a Generalized Random Tessellation Stratified approach (Table 3-1; Figure 3-2). Random selection of sites allows inference to TNBC reserves as a whole. Sampled sites consisted of individual wetland units (defined as contained within water control structures) and canals adjacent to rice. Site selection was stratified by reserve area (22 sites in the North Basin Reserve, 10 sites in the Central Basin Reserve, and eight sites in the Fisherman's Lake Reserve) to ensure adequate representation of each reserve. At each site, one 50-trap transect was established, with traps spaced approximately 10–20 meters apart. In 2023, each transect was deployed for approximately 15–21 days beginning May 3, 2023 and ending August 31, 2023. Sampling did not occur on Memorial Day, Juneteenth, or Independence Day.

For sites that had been sampled as "occupancy traplines" pre- 2018, transects were generally placed in the same location in 2023; this approach maintained the same extent of sampling to provide inference about giant garter snake occurrence to the same areas. However, at the five "demography sites" on the BKS, Lucich North, Lucich South, Natomas Farms, and Sills tracts, sampling from 2018 to 2023 differed from the areas sampled from 2011 to 2017. From 2011 to 2017, three transects were sampled at each demography site each year. In 2018 and 2019 at the BKS tract, all three "old" demography transects were sampled, along with an additional five transects placed in other wetland units, while beginning in 2020 only two "old" demography transects (BKS 2 and 3) were sampled, along with three of the additional transects sampled in 2018 and 2019. These same five transects sampled at BKS in 2020 were also sampled from 2021 to 2023, except for one of the additional transects, which was not sampled in 2021 (only four BKS transects were sampled in 2021).

At Lucich North, only one of the three "old" demography transects (Lucich North 4) has been sampled during the past 6 years; however, seven additional transects were added to wetlands at this tract in 2018. Lucich North 4 was sampled every year from 2018 to 2023 except for 2021. The seven additional transects added at Lucich North in 2018 were all sampled in 2018 and 2019, six were sampled in 2020 and 2022, five were sampled in 2023, and four were sampled in 2021. Within Lucich South, one of the three "old" demography transects (Lucich South 3) was sampled each year from 2018–2023, and two additional transects were added to canals in 2018. Both of these additional transects were sampled in 2018, 2019, 2022, and 2023, while only one was sampled in 2020 and 2021. At the Natomas Farms tract, one "old" demography transect (Natomas Farms 1) was sampled in 2018, 2019, 2020, and 2023, three "old" demography transects (Natomas Farms 1, 2, and 3) were sampled in 2021, and two "old" demography transects (Natomas Farms 1 and 2) were sampled in 2022. In addition to these "old" demography transects, one additional wetland transect was sampled at Natomas Farms in each year from 2018 to 2023. At the Sills tract, two "old" demography transects (Sills 2 and 3) were sampled in 2018 and 2019 while no "old" demography transects were sampled from 2020–2023. However, three additional transects were added to canals at Sills in 2018 and all three were sampled each year from 2018–2023.

These changes made to the study's sampling methods allowed a broader area to be surveyed at most of the "old" demography sites (except in 2020 when the entire study was truncated); however, they also meant that some areas sampled from 2011–2017 were not covered by trap arrays from 2018–2023. As noted above, these changes present ramifications for modeling giant garter snake demography and interpreting changes in abundance estimates, as described below in Section 3.2.2, *Analytical Methods.*

Livetrap transects were positioned along banks of aquatic habitat, edges of emergent vegetation in wetlands, or along the edges of canals as giant garter snake forages along habitat edges. Habitat edges also act as natural drift fences that direct snakes to traps. Traps were checked daily.

Environmental conditions relevant to giant garter snake behaviors were monitored daily at each transect including water and air temperatures and fluctuations in water level. Contents of every fifth trap were recorded to obtain a measure of the relative abundance and diversity of potential local aquatic prey. All other traps were monitored, but prey items such as fish, amphibian larvae, and small frogs were left in the traps so that they became naturally "baited" over time. In some instances, large fluctuations in water level (draining of wetlands, canals, or ditches) necessitated opening traps temporarily or relocating transects to a suitable nearby location within the selected site.

Universal Transverse Mercator (UTM) coordinates of all trap locations were recorded, and vegetation and habitat surveys were conducted at points within and adjacent to each transect. Percent cover of habitat types (water, submerged aquatic vegetation, floating aquatic vegetation, emergent vegetation, terrestrial vegetation, rock, or bare ground) and vegetative composition (species or higher taxonomic category) were estimated within a 0.5-meter radius of every fifth trap. A point was selected at a random perpendicular distance of 2–5 meters towards the terrestrial-side or the aquatic-side of the transect within each habitat and vegetation type along the transect, and percent cover of habitats and vegetative composition was estimated within a 1-meter radius of this point to better characterize microhabitat characteristics of the trap locations.

Each giant garter snake captured was measured, sexed, weighed, and uniquely marked. Scale measurements in Rossman et al. (1996) were used to verify the species of each captured animal. The snout-vent length (SVL) and tail-vent length (TVL) of each individual were measured to the nearest millimeter, and each individual was weighed to the nearest gram. Sex was determined by probing the cloaca to detect the presence or absence of hemipenes. After examination, individuals showing no sign of previous capture were given a unique brand on the ventral scutes (Winne et al. 2006) and, if large enough (>35 grams), implanted with a passive integrated transponder (PIT) tag. PIT tags were implanted using syringe injector needles swabbed with alcohol before each use, and the injection site on the snake was swabbed with alcohol prior to tag insertion. The tag was injected subcutaneously, approximately one-third of the SVL anterior to the cloaca. After insertion of the tag, cyanoacrylate glue was applied to the insertion site to seal the dermis and prevent tag loss. Most individuals were processed in the field within a few minutes of their capture. Snakes held for more than a few minutes were kept in the shade in cooled and insulated containers to prevent overheating until they could be examined and released. Each individual was released at its capture location immediately after processing.

3.2.2 Analytical Methods

Most analyses were conducted in a Bayesian analytical framework. In Bayesian analyses, the probabilities are interpreted slightly differently than traditional frequentist statistical analyses. The *posterior probability* is the probability of a random event or uncertain proposition given the data at hand and is most analogous to the probabilities used in frequentist statistics. The posterior probability is how most people intuitively think about probability (e.g., how people interpret a weather forecast). Bayesian analyses also require specification of a *prior* probability distribution, which allows for the inclusion of information obtained through other sources into the analysis. The prior can be an *informative prior* (i.e., a distribution based on previously collected data or a hypothesis about the probability distribution of interest) or an *uninformative prior* (i.e., a probability

distribution that will have no effect on the outcome of the analysis). Unless otherwise noted, for all parameter estimates posterior medians are reported with equal-tailed 95% credible intervals in parentheses.

3.2.2.1 Demography

Abundance of giant garter snake was estimated at each site where the species was detected using Bayesian analysis of CMR data, closed population models, and data augmentation (Royle and Dorazio 2008; Kéry and Royle 2016).[2] In contrast to occurrence, where site was defined as the area between two water control structures, for the purposes of this analysis, site refers to clusters of transects that snakes could likely move between (see below). Closed population models are those that assume no migration in or out of the population of interest over the sampling period. These models are used to estimate abundance using simplifying assumptions. A single model was used to estimate abundance for each site, and information on capture probability was shared among sites which resulted in more precise estimates of abundance at each site.[3] The effects of water temperature, SVL, sex, and a behavioral response on capture probabilities were tested. Models also included temporal variation in capture probability (i.e., variation in capture probability among days of sampling) and individual heterogeneity in capture probability (i.e., variation in capture probability among individual snakes).

Because some transects were proximate to one another, seven snakes were caught in multiple transects, and it is likely that other individuals moved between transects as well. To account for demographic linkage between nearby transects, captures of snakes were grouped into eight "demographic clusters," and abundance was estimated for each cluster. Clustering transects avoided duplicate counting of snakes captured at more than one transect and provided abundance estimates relevant to larger reserve areas rather than a single section of a canal or wetland. Because larger areas were sampled at BKS, Lucich North, and Sills in 2018 and 2019 compared to 2011–2017, less area was sampled overall in 2020 due to the COVID-19 pandemic, and because not all of the old demography transects were sampled from 2018 to 2023, abundance estimates for these tracts from 2018 to 2023 are not directly comparable to previous years.

[2] Data augmentation is an approach to CMR analysis in which a large number of all-zero capture histories is appended to the observed capture histories. This approach is much more flexible than other approaches to estimation of demographic rates and allows a unified framework for analysis of detection-nondetection and CMR data (Royle and Dorazio 2008).

[3] To estimate abundance accurately, the probability of capturing a giant garter snake must also be estimated. Investigators fit a single "multinomial N-mixture model" (Kéry & Royle 2016) using capture data from all eight demographic cluster sites, with random effects of site, date, and individual on capture probability. This type of joint model has the advantage of sharing information on capture probability among sites, which allows for more precise estimates of capture probability and abundance at each site. This model has proven effective at estimating abundance of giant garter snake (Rose et al. 2018c). The capture histories of trapped individuals were augmented with enough all-zero capture histories to give a total pool of 1,200 individual snakes. The number of pseudo-individuals was deemed adequate because the posterior density for abundance fell far below the number of augmented individuals. Uninformative priors were used for all parameters of all models: Uniform (0,1) for probabilities, N (0,1.648) for regression coefficients, and half-Cauchy (0,1) for standard deviations. The closed population model was run on four independent chains of 25,000 iterations after a burn-in of 10,000; each chain was thinned by a factor of 10 to give a final output of 10,000 samples for inference. The model was analyzed by calling JAGS 4.3.0 (Plummer 2003) from R 4.2.2 (R Core Team 2021) using the package "runjags" (Denwood 2016). Posterior distributions were summarized with the posterior median and 95% credible interval (2.5% and 97.5% quantiles of the posterior distribution).

In addition to abundance estimates from closed population models, we estimated the density of giant garter snake in all tracts sampled from 2018 to 2023 using spatially-explicit capture-recapture (SECR) models. SECR models use the spatial locations where animals are captured or observed to estimate their "activity centers" as a measure of their use of space. Importantly, SECR models account for both the location of traps and the period during which each trap was active and therefore able to capture an animal. A separate SECR model was fit for each year from 2018 to 2023 in which capture probability and movement scale parameters differed between wetland and canal traplines and allowed snake density (*D*) to vary among tracts. If a tract included both wetland and canal traplines (e.g., at BKS we trapped in one canal and three wetland units), separate snake density values were estimated for the canals and wetlands. Giant garter snake habitat was defined by creating polylines corresponding to canal habitat in ArcMap version 10.8 (ESRI®). For habitat in wetlands, the wetland edge was digitized as a line feature, and density was calculated as the number of snakes per kilometer (snakes/km) of edge habitat. This approach for habitat in wetlands enabled all data to be fit in the same model. The most prudent comparison of snake densities from these models is within the same habitat type among tracts (i.e., canals compared to canals, wetlands compared to wetlands). SECR models were fit using the "secr" R package version 4.6.4 (Efford 2023) and report the mean, standard error, and 95% credible interval of the density of snakes.

Since the revision of the study design implemented in 2018, five annual intervals of mark-recapture data have been collected. This allowed estimating apparent survival using open-population models. Although there is overlap between the areas sampled from 2011 to 2017 and the areas sampled from 2018 to 2023, the change in spatial coverage could lead to biased estimates of these vital rates. For example, individual giant garter snakes with home ranges overlapping trapping arrays in 2016 and 2017 that were not captured in subsequent years could be treated as mortalities by the open-population CMR model, when in reality they survived this time interval but were unlikely to be caught in traps based on the new trapping locations from 2018 to 2023. Therefore, estimates of apparent survival, annual recapture probability, and availability for capture (i.e., presence "on site") are only based on capture data from 2018 to 2023.

Estimates of apparent survival were calculated using CMR data each year from 2018 to 2023 at four tracts (BKS, Lucich North, Lucich South, and Sills) that had greater than 15 individual giant garter snakes captured over this period and more than one giant garter snake recaptured subsequent to its first year of capture. All other tracts had fewer than 15 individuals captured over the period from 2018 to 2023. Apparent survival (ϕ) was estimated using a robust-design CMR model designed to give unbiased estimates of survival by accounting for availability of individuals for capture (γ, i.e., temporary emigration) in addition to recapture probability (Riecke et al. 2018). Separate survival rates were estimated for female and male giant garter snake, and the apparent survival estimate also varied by site and year according to random effects of each. A single shared recapture probability parameter (*p*) was estimated for the two sexes, because preliminary model runs and analyses from previous years indicated no difference in recapture probability between female and male giant garter snake.[4]

[4] The robust-design model used uninformative Beta(1,1) prior distributions for the probabilities of apparent survival (ϕ), recapture (*p*), and availability on site during sampling (γ). All random effects parameters were drawn from normal distributions centered on zero with a standard deviation estimated from the data. Standard deviation parameters had Exponential(1) priors to shrink values toward zero if variation among sites and years was minimal but allow for larger values if warranted by the data. The model included random effects of year and site on ϕ, *p*, and γ. The robust-design model was fit using JAGS 4.3.0 (Plummer 2003) from R 4.2.2 (R Core Team 2021) using the R package runjags (Denwood 2016). The model was fit using five independent chains of 20,000 iterations each after a

Sex ratios and size distributions were calculated using data from all captured individuals, regardless of method or date of capture. Bayesian analytical methods were used to estimate sex ratios with binomial tests of proportions for all sampling locations within the Basin.[5] Bayesian methods were also used to describe the mean SVL and mass of giant garter snakes of each sex from all sampling locations within the Basin.[6] Sexual size dimorphism in SVL and mass was examined throughout the Basin using separate means and variances for males and females. These tests are equivalent to t-tests with unequal variances (Kéry 2010).[7] Sexual size dimorphism, sex ratios, mean SVL, and mass were not examined at individual sites because of the uncertainty associated with estimating means using small sample sizes.

3.2.2.2 Distribution of Giant Garter Snake on Reserve Lands

The probability of occurrence of giant garter snake on TNBC reserves in 2023 was estimated using Bayesian analysis of single-season occupancy models (Royle and Dorazio 2008; Kéry 2010). The probability of occurrence was modeled as a linear function of selected habitat variables, and the probability of occurrence was allowed to vary among reserve areas (North Basin, Central Basin, and Fisherman's Lake). Habitat effects were initially modeled only to identify supported habitat variables, then a fixed effect of reserve area was added to a model containing only supported habitat variables. The habitat variables included effects of wetland or rice habitat and the percent cover of emergent vegetation, floating aquatic vegetation, open water, and terrestrial vegetation on the probability of occurrence of giant garter snake. Priors for the occupancy component of each model were chosen to be uninformative (Table 32-).[8]

In addition to the single-season occupancy models evaluated above, a Bayesian state-space dynamic occupancy model (MacKenzie et al. 2006; Royle and Kéry 2007; Kéry and Schaub 2011) was evaluated to identify any evidence for changes in the probability of occurrence of giant garter snake on TNBC reserves over time from 2011 to 2023. Occurrence of giant garter snake among various wetland units can change between years due to colonization of sites that were previously unoccupied and extinction at sites that were previously occupied. Accordingly, the dynamic occupancy models account for these changes and are used to estimate the rates at which these

burn-in of 10,000 iterations. Each chain was thinned by a factor of 10, resulting in a final posterior sample of 10,000 iterations.

[5] The binomial model assumes sampling with replacement (Skalski et al. 2005); accordingly, counts of captures rather than individuals were used for analysis.

[6] Lognormal models were fit for each size measurement (mass and SVL), and the goodness of fit of each model was examined with a Bayesian p-value. Normal models fit well to the mass and SVL data, with Bayesian p-values of 0.645 and 0.544 for mass and SVL, respectively.

[7] Each model was run on three independent chains of 22,000 iterations after a burn-in of 2,000; each chain was thinned by a factor of five. Each model was analyzed by calling JAGS 4.3.1 (Plummer 2003) from R 4.3.2 (R Core Team 2023) using the R package jagsUI (Kellner 2016). Posterior distributions were summarized with the posterior median and 95% credible interval.

[8] All continuous variables were standardized to improve behavior of the Markov Chain Monte Carlo (MCMC) algorithm and to allow direct comparison of model coefficients. The posterior probability of each subset of the full model was calculated using indicator variables on model parameters (Kuo and Mallick 1998; Royle and Dorazio 2008). The single-season occupancy model was run on three independent chains of 44,000 iterations each after a burn-in of 2,000; each chain was thinned by a factor of 5, resulting in a final total of 132,000 samples for inference after pooling chains. Each model was analyzed by calling JAGS 4.3.1 (Plummer 2003) from R 4.3.2 (R Core Team 2023) using the package runjags (Denwood 2016). Posterior distributions were summarized with the posterior omedian and 95% symmetrical credible interval.

changes occur and the annually varying colonization and extirpation probabilities.[9] The effects of the same habitat variables that were evaluated using static occupancy models were evaluated to determine if they were related to extinction and colonization probabilities, and we used uninformative priors for the parameters related to occurrence, site-survival, site-colonization, and detection components of the model.

3.2.3 Habitat Assessment

3.2.3.1 Habitat Distribution and Abundance

The distribution and abundance of land cover/crop types throughout the Natomas Basin, both on and off reserve lands, are documented annually (see Chapter 2, *Land Cover Tracking*). These data are used to identify and document large-scale changes in the distribution and abundance of suitable giant garter snake habitat on reserve lands and throughout the Basin.

3.2.3.2 Habitat Connectivity

Connectivity among and between tracts and reserves was assessed by examining habitat variables along the major linear water conveyance features based on assessment in the field and using aerial imagery available from Google Earth®. All culverts crossing major roadways were examined during field checks.

3.3 Results

In 2023, 166 individual giant garter snakes were captured 271 times by hand or trap at 40 sites on TNBC reserve tracts over the course of 41,179 trap days in 2023 (Table 3-1; Figure 3-2). The 2023 monitoring year had a similar number of trap days to 2022 (42,997) but was still lower than any year from 2011 to 2019, likely contributing to low numbers of both unique giant garter snake individuals captured, and total captures compared to the years prior to the COVID-19 pandemic. The catch-per-unit effort (snakes captured per trap-night) across the Basin was 0.0066 in 2023. For comparison, catch-per-unit effort was 0.0037 in 2022; 0.0049 in 2021; 0.0068 in 2020; 0.0062 in 2019; and 0.0056 in 2018. In comparison, catch-per-unit effort prior to the recent revisions in study design in 2018 was 0.0047 in 2017, 0.0037 in 2016, 0.0017 in 2015, 0.0033 in 2014, 0.0035 in 2013, 0.0028 in 2012, and 0.0031 in 2011. Appendix C contains giant garter snake capture data for 2023.

3.3.1 Demography

3.3.1.1 Estimates of Abundance Using Closed Population Models

Capture probability - the most influential variable on estimates of all demographic parameters - averaged was 0.008 (0.003–0.023) over all sites. Standard deviation of capture probability among sites (0.008 [0.002–0.035]) was slightly higher than the standard deviation of capture probability

[9] All probabilities were given U(0,1) priors. The dynamic occupancy model was run on five independent chains of 820,000 iterations each after a burn-in of 20,000; each chain was thinned by a factor of 400, resulting in 10,000 samples for inference. Each model was analyzed by calling JAGS 4.3.0 (Plummer 2003) from R 4.2.2 (R Core Team 2021) using the package R2jags (Su and Yajima 2015). Posterior distributions were summarized with the posterior median and 95% symmetrical credible interval (2.5% and 97.5% quantiles of the posterior distribution).

among days (0.005 [0.002–0.015]) and individuals (0.004 [0.001–0.010]). There was evidence for a positive ephemeral behavioral response to capture and a positive effect of water temperature on capture probability (Figure 3-3; Table 3-3).

Seven instances of giant garter snakes moving between transects were detected in 2023. Five snakes were captured in multiple traplines within the Sills tract, one snake was detected moving between a trapline in the BKS tract to a trapline in the Frazer South tract, and one snake moved from a transect in the Bennett North tract to a transect in the Nestor tract. Transects in close enough proximity that giant garter snakes did or would be expected to move between transects were grouped together and treated as a single site for this analysis (e.g., all transects in the Lucich North wetland complex; one transect in the Frazer South tract was grouped with transects in the BKS tract), resulting in seven demographic "clusters." Estimates of abundance at each of the seven demographic clusters where giant garter snakes were captured are summarized in Table 3-4.

At the five transects within the BKS cluster (including one transect from Frazer South), 68 individuals were captured 97 times over 5,249 trap days (Table 3-4). For comparison, in 2022, 79 individuals were captured 87 times over 6,300 trap days at six transects. Of the 79 individuals that were captured in 2022, 5 were recaptured in 2023. Six snakes captured at BKS in 2021 were recaptured in 2023, three snakes captured in 2020 were recaptured in 2023, two snakes captured in 2019 were recaptured in 2023, and two snakes first captured in 2018 were recaptured in 2023. The estimated abundance in sampled areas at BKS in 2023 was 115 (82–172) individuals (Figure 3-4, Table 3-4). The estimated abundance at BKS was 385 (211–681) in 2022, 200 (147–352) individuals in 2021, 566 (256–1,303) individuals in 2020, and 559 (374–944) individuals in 2019.

At four transects within the Sills cluster (including one transect in the Tufts tract), 37 individuals were captured 67 times over 4,163 trap days in 2023 (Table 3-4). For comparison, 31 individuals were captured 48 times over 4,752 trap days in 2022. Of the 31 individuals captured at Sills in 2022, 9 were recaptured in 2023. Five snakes captured at Sills in 2021 were recaptured in 2023, two snakes captured at Sills in 2020 were recaptured in 2023, and no snakes captured at Sills in 2018 or 2019 were recaptured in 2023. The estimated abundance at Sills in 2023 was 63 (48–93) snakes (Figure 3-5, Table 3-4). The abundance in 2022 was higher, with an estimated 148 (76–267) snakes. In 2021, the abundance was comparable to 2023, with an estimated 74 (51–137) snakes.

At 9 transects within the Lucich North cluster (including two transects in the Frazer North tract and one in the Nestor tract), 19 individuals were captured 30 times over 9,093 trap days in 2023 (Table 3-4). For comparison, in 2022 eight individuals were captured nine times in over 10,241 trap days. Of the eight individuals captured at Lucich North in 2022, none were recaptured in 2023. One snake captured at Lucich North in 2023 was previously captured in 2020. The estimated abundance at Lucich North in 2023 was 34 (25–50) individuals (Figure 3-6, Table 3-4). For comparison, the estimated abundance in 2022 was 46 (23–83) individuals and the estimated abundance in 2021 was 31 (19–55) individuals.

At three transects within the Lucich South demographic cluster, 16 individuals were captured 33 times over 2,981 trap days in 2023 (Table 3-4). In 2022, nine individuals were captured 15 times over 2,788 trap days. One of the 16 snakes captured at Lucich South in 2023 was also captured in 2022, and one individual was previously captured in 2020. The estimated abundance at Lucich South in 2023 was 27 (19–41) individuals (Figure 3-7, Table 3-4). For comparison, the estimated abundance in 2022 was 46 (22–84) individuals, and the estimated abundance at Lucich South in 2021 was 23 (12–43) individuals.

In the Fisherman's Lake Reserve area, no giant garter snakes were captured at 8 transects in the Cummings, Natomas Farms, and Rosa tracts over 8,196 trap days in 2023. Likewise, in 2022, 2021 and 2020, no giant garter snakes were captured at the three tracts (Cummings, Natomas Farms, and Rosa) over 8,293 trap days (2022) 8,335 trap days (2021) and over 2,798 trap days (2020). In 2019, one giant garter snake was captured at two transects, while in 2018, no giant garter snakes were captured at either transect in the Fisherman's Lake Reserve area.

Snakes were also captured at transects in the Bennett North, Bianchi West, and Huffman West tracts. At Bennett North, four individuals were captured a total of five times, and the median estimated abundance was 22 (12–36) snakes (Table 3-4). At Huffman West, three individuals were captured a total of five times, and the median estimated abundance was 23 (13–36) snakes (Table 3-4). At Bianchi West, 19 individuals were captured a total of 35 times, and the median estimated abundance was 32 (23–48) snakes (Table 3-4).

3.3.1.2 Estimates of Density Using SECR Models

Based on SECR analysis of 2023 capture data, the capture probability for giant garter snake was higher in canals (mean = 0.0025, 95% CI = 0.0019–0.0032) than wetlands (mean = 0.0010, 95% CI = 0.0006–0.0014). The 2023 SECR analysis also showed the scale of giant garter snake movement was greater in canals than wetlands, indicating snakes moved longer distances within canals than wetlands. The highest density of giant garter snake in the Natomas Basin in 2023 was in wetlands at BKS, with a mean estimate of 34.5 snakes/km of wetland edge (25.2–47.3 snakes/km). The BKS wetlands had the highest density of giant garter snake each year from 2018 to 2023 (Table 3-5). Snake density was also high in wetlands at Lucich South, with a mean density estimate of 23.4 snakes/km (11.5–47.6 snakes/km). The Lucich North and Bennett North wetlands had very low density estimates of < 0.01 snakes/km (Table 3-5), with very few captures of giant garter snake in 2023 despite substantial trapping effort. Density estimates in occupied canals ranged from highs of 22.9 snakes/km (14.7–35.6 snakes/km) at Bianchi West and 13.8 snakes/km (8.8–21.8 snakes/km) at Frazer South, to lows of < 0.1 snakes/km at a canal in the BKS tract adjacent to wetlands, 2.3 snakes/km (0.7–7.3 snakes/km) at Huffman West, and 2.9 snakes/km (1.1–7.6 snakes/km) at a canal adjacent to the Lucich South wetlands (Table 3-5). Canals in the Nestor East (mean = 8.2 snakes/km, 95% CI = 4.9–13.6 snakes/km) and Sills (mean = 6.7 snakes/km, 95% CI = 4.4–10.2 snakes/km) tracts had intermediate densities of giant garter snake (Table 3-5).

3.3.1.3 Size Distribution and Sex Ratio

The overall sex ratio of captured snakes in the Natomas Basin was slightly female-biased. The sex ratio was 0.89 (0.65–1.19) males per female for all sites in the Basin combined. Basin-wide mean SVL was 567 mm (546–589 mm), and Basin-wide mean mass was 100.28 g (88.94–112.96 g). Mean female SVL (599 mm [563–638 mm]) was 68 mm (27–111 mm) greater than mean male SVL (531 mm [512–551 mm]) and mean female mass (124.72 g [102.79–151.01 g]) was 46.9 g (22.72–74.22 g) greater than mean male mass (77.79 g [69.58–87.08 g]; Figure 3-8).

3.3.1.4 Survival Estimates from 2018–2023

Average annual recapture probabilities, given 21 days of sampling at a site, were 0.20 (0.10–0.47). There was no support for a difference in apparent survival rate between female and male giant garter snake. Apparent survival varied among years and sites. At BKS, apparent survival was highest from 2018 to 2019 and lowest from 2021 to 2022 (Figure 3-9). At Lucich North, apparent survival

was similar over each of the year-long intervals (Figure 3-10). At Lucich South, apparent survival was highest from 2020 to 2021 (Figure 3-11). At the Sills tract, apparent survival estimates were highest for the interval from 2019 to 2020 (Figure 3-12). The probability a snake was available on site for capture (γ) was higher for female than male giant garter snake (Table 3-6). As with the closed CMR model, there was a positive relationship between capture probability and water temperature (Table 3-6).

3.3.2 Distribution of Giant Garter Snake on Reserve Lands

Giant garter snake was detected at 17 of 40 sites sampled in 2023 (Figure 3-2). Of the 36 sites surveyed in both 2022 and 2023, giant garter snake was detected at three sites in 2022 where the species was not detected in 2023. There were no detections of giant garter snake in 2023 at sites where the species was not detected in 2022. Of the four sites that were surveyed in 2023, but not surveyed in 2022, giant garter snake was detected at two sites. Of all the sites monitored in 2023, 18 (17–22) were estimated to be occupied (Figure 3-13).

The effects of habitat variables on the probability of occurrence were not supported in 2023 (Table 3-7). Water temperature had a positive effect on daily detection probability, but the effect of date of sampling on daily detection probability was not supported (Table 3-8; Figure 3-14). Daily detection probabilities for giant garter snake in 2023 at an occupied site on a day with average conditions (e.g., average water temperature) were 0.33 (0.13–0.53). Over 21 days of trapping, this corresponded to a cumulative probability of detecting giant garter snake at least once, given the species occurred at a site in 2023, of 0.99 (0.95 – >0.99).

The probability of occurrence of giant garter snake varied by reserve (i.e., North Basin, Central Basin, and Fisherman's Lake). The probability of occurrence in wetlands in the North Basin Reserve was 0.35 (0.11–0.67), the probability of occurrence in wetlands in the Central Basin Reserve was 0.88 (0.49–0.99), and the probability of occurrence in wetlands in the Fisherman's Lake Reserve was 0.08 (0.01–0.4). Most sites in the Fisherman's Lake Reserve were wetland sites (6 of 8), whereas most sites in the Central Basin Reserve were rice sites (7 of 10), and sites were nearly evenly divided between the two types in the North Basin Reserve (12 of 22 sites were wetlands).

The dynamic occupancy model indicated evidence for a slight decrease in the probability that sites on TNBC reserves were occupied by giant garter snake from 2011 to 2013, followed by a period of stability from 2013 to 2018, an increase from 2018 to 2019, a decrease from 2019 to 2021, and an increase in 2022 that remained stable into 2023. The number of occupied sample sites followed a similar pattern, with a decrease from 2019 to 2021 and an increase in 2022 that was stable in 2023 (Figure 3-15). Both occupancy parameters were estimated with much greater precision in 2018 and 2019, when the number of sites increased to 60 as part of the revised sampling design. Conversely, precision of these parameters was much lower between 2020 and 2023 compared to 2018 and 2019, due to decreasing the number of sites to 40 (2020), 45 (2021), 41 (2022), and 40 (2023) because of the COVID-19 pandemic and stochastic weather patterns.

The annual probability that occupied sites would become unoccupied (site extirpation) was generally low and stable between 2011 and 2019; although it was higher from 2020 to 2023 as compared to previous years, site-extirpation probability has consistently declined since 2020 (Figure 3-14). The annual probability that unoccupied sites were colonized exhibited no trend from 2011 to 2018; increased from 2018 to 2020; decreased from 2020 to 2021; increased from 2021 to 2022; and decreased from 2022 to 2023 (Figure 3-14). The mean intrinsic growth rate of occupancy

from 2011 through 2023 was -0.041 (-0.073 to -0.001; Figure 3-16), indicating a small but significant decline in occupancy over time. The posterior probability that occupancy declined, on average, from 2011 – 2023 was 0.986. Occupancy growth was most negative between 2019 and 2020, potentially because of the reduction in the number of sampled sites, and although it has rebounded slightly since the 2020–2021 period, it remains negative (Figure 3-16).

There was no support for effects of habitat on site-survival probabilities nor strong evidence for effects of habitat variables on occupancy dynamics (Table 3-9).

3.3.3 Habitat Assessment

3.3.3.1 Habitat Distribution and Abundance

TNBC reserve lands provide better giant garter snake habitat than that present in the Basin as a whole. Created marsh, seasonal wetlands, and other emergent wetlands are the highest quality giant garter snake habitat and constituted 12.9%[10] (667 acres) of reserve properties' acreage but just 1.6% (789 acres) of non-reserve lands. TNBC reserves provided 46% of the wetland habitat within the Basin. Rice cultivation, along with its supporting infrastructure of canals, provides the only suitable giant garter snake habitat remaining in the Basin, and comprised 58.7% (3,027.6 acres) of the area of reserve properties compared to 33.6% (16,375.3 acres) of the non-reserve lands. While there was a large reduction of active rice cultivation habitat in 2022 (30.5% [1,573.3 acres]) due to fallowing of rice fields, this was only a transient effect likely caused by low water availability that year, as the amount of rice grown in 2023 is comparable to rice habitat availability in 2021 (56.7% [2,606.4 acres]).

Overall, 3,694.3 (71.7%) of the total acres of TNBC reserve lands were potential giant garter snake habitat (compared to 2,281.3 acres (44.3%) in 2022), while only 35.2% (17,264.4 acres) of the total acres of non-reserve area in the Basin were potential habitat. It should be noted that only marsh and a fraction of the linear water conveyance features that make up a very small proportion of the total acreage in rice cultivation provide suitable giant garter snake habitat in all seasons, and that even these land cover types are only suitable if they contain adequate water to provide usable giant garter snake habitat (i.e., a non-negligible amount of surface water immediately adjacent to emergent vegetation or steep canal banks). Giant garter snake requires enough water to submerge for foraging and predator escape and requires this water to be immediately adjacent to basking and hiding sites, like emergent vegetation and steep canal banks. If water is not properly and actively managed to ensure that all components of giant garter snake habitat are present, marshes and canals do not function as giant garter snake habitat. Rice fields and their associated linear water conveyance features provide almost no giant garter snake habitat for much of the year (i.e., September through June), so the amount of created marsh with adequate water is a better measure of giant garter snake habitat for comparison than the sum of created marsh and rice. As noted above however, the total acreage of created marsh is an overestimate of giant garter snake habitat if it does not contain enough water, or, conversely if it is flooded.

Tracts in the Fisherman's Lake Reserve cover approximately 442 acres of which 109.0 acres (24.7%) were created as marsh in 2023. No rice cultivation existed in the Fisherman's Lake Reserve tracts in

[10] The fresh emergent marsh (created) land cover type includes some, but not all, of the associated uplands for most, but not all, tracts with created marshes. Therefore, this number is not representative of the percentage of reserve lands in created marsh for purposes of assessing compliance with the terms of the NBHCP.

2023. Recently constructed wetlands (SAFCA wetlands plus the Anne Rudin tract) constitute much of the landscape immediately southeast of the Natomas Farms tract and between the Natomas Farms and Cummings tracts, and these wetlands have developed into suitable occupied giant garter snake habitat. Of the seven tracts in the Fisherman's Lake Reserve, three (Alleghany, Rosa Central, and Rosa East) contained no habitat for giant garter snake in 2023 while four contained habitat suitable for the species.

Tracts in the Central Basin Reserve cover approximately 1,423 acres. A total of 140 of these acres (9.8%) were created marsh and 1,058.3 acres (74.3%) were active rice. This represents an increase of 507 acres (47%) compared to the 551 acres (38.7%) of rice cultivation that existed in the Central Basin Reserve in 2022 and is comparable to the amount of rice grown in 2021 (1,058 acres (74.3%). Overall, 1,118.3 acres (83.3%) of the total acreage of the Central Basin Reserve was potential giant garter snake habitat in 2023, although—as noted above—only created marsh and some canals associated with rice agriculture provide suitable habitat in all seasons. All 8 tracts in the Central Basin Reserve contained habitat suitable for giant garter snake in 2023.

In 2023, 18 tracts in the North Basin Reserve covered approximately 2,332 acres of which 414 acres (17.8%) were created as marsh and 1,262 acres (54.1%) were in active rice cultivation. A total of 13.2 acres of the North Basin Reserve were fallowed rice fields in 2023. This represents a decrease of 750.0 acres from the 764.1 acres that were classified as fallowed rice in 2022. Overall, 1,691.9 acres (72.5%) of the total acreage of the North Basin Reserve was potential giant garter snake habitat in 2023. All 18 tracts contained suitable habitat for giant garter snake in 2023.

3.3.3.2 Habitat Connectivity

An assessment of habitat connectivity is incomplete without addressing the different means by which animal populations are connected. Connectivity generally occurs via the dispersal of individuals across the landscape. Little is known about reptile dispersal, but radio-telemetry studies suggest that most giant garter snakes have small home ranges (Valcarcel 2011), although individuals can move several kilometers through appropriate habitat if necessary (Reyes et al. 2017). Two distinct forms of connectivity must also be considered. *Demographic connectivity* refers to the movement of individuals among (sub)populations to the extent that migration plays a role in population dynamics, potentially rescuing local populations from extirpation through migration into them from a source population (Mills 2007). *Genetic connectivity* is the dispersal of enough individuals among populations to prevent genetic differentiation among them. A one-migrant-per-generation rule is often considered an adequate amount of connectivity to avoid the negative effects of inbreeding (Mills 2007). In general, demographic connectivity requires the exchange of far more individuals than genetic connectivity. Both forms of connectivity are addressed in the following discussion.

Although portions of TNBC's reserve system are well-connected, some notable exceptions exist (Figure 3-17). Surface water connects the Fisherman's Lake Reserve with other reserve areas as the northernmost suitable Fisherman's Lake Reserve tract (Natomas Farms), is approximately 15 kilometers (by canal) south of the nearest suitable Central Basin Reserve tract known to be occupied by giant garter snake (Elsie). Giant garter snakes have small home ranges and typically move relatively short distances (Valcarcel 2011; Reyes et al. 2017), but nonetheless can exhibit movements up to 5 kilometers over multiple days (U.S. Geological Survey unpublished data).

Given the stretches of marginal habitat in canals that connect tracts, the surrounding land uses that are inhospitable to giant garter snake, potential fragmentation caused by I-5, and the distance between tracts of the Central Basin Reserve and the Fisherman's Lake Reserve, it is unlikely that the Fisherman's Lake Reserve is currently demographically connected to the other reserves. Connectivity between the Fisherman's Lake Reserve and other habitats north of I-5 may have improved with the completion of the Giant Garter Snake Drainage Canal, constructed as mitigation for the NLIP project that connects the North Drainage Canal just south of the Sacramento/Sutter County line with the West Drainage Canal just north of I-5. The majority of this new canal was categorized as suitable habitat for giant garter snake from 2020 to 2023. The canal connects to the Fisherman's Lake Reserve through the West Drainage Canal, which was categorized as suitable habitat from 2020 to 2023 (Figure 3-17).

Within the Fisherman's Lake Reserve, three of the suitable tracts (Natomas Farms, Anne Rudin Preserve, and Cummings) are connected by approximately 3.5 kilometers of canal habitats that compose Fisherman's Lake, and by the intervening SAFCA wetlands. The eastern boundary of the fourth suitable tract, Souza, is adjacent to the northernmost wetlands of the Natomas Farms and SAFCA tracts. The creation of the SAFCA wetlands provides much greater continuity of habitat within the Fisherman's Lake area than was previously present. Movement data from radio-tagged snakes translocated to the SAFCA wetlands between 2019 and 2021 showed individual snakes moved between the Natomas Farms, SAFCA, and Cummings wetlands, but did not show signs of migration out of Fisherman's Lake Reserve (Nguyen 2023a).

In contrast to the Fisherman's Lake Reserve tracts, the Central Basin Reserve Tracts are near those of the North Basin Reserve, and these two areas are linked by a dense network of canals. The tract at the eastern edge of Ruby Ranch in the North Basin Reserve is only approximately 3 kilometers (by canal) from the Sills and Tufts tracts of the Central Basin Reserve. Within the Central Basin Reserve, tracts are nearly contiguous, with the exception of a 0.8-kilometer gap between the Bianchi West and Frazer South tracts. The intervening tract consists of rice agriculture and a canal with marginal habitat, so demographic connectivity among these tracts is likely and genetic connectivity is nearly certain. Perhaps a greater barrier to connectivity among Central Basin tracts is SR 99, which lies between the Bianchi West and Sills tracts.

Although this highway is a formidable barrier, it is possible for giant garter snakes to cross it. A female giant garter snake initially marked in 2010 at Bianchi West (east of SR 99) was captured at Sills (west of SR 99) three times in 2011. This individual almost certainly crossed through the 132-meter-long single box culvert under SR 99, providing strong evidence for genetic (and possibly even demographic) connectivity across SR 99 in the Basin (Halstead et al. 2013b). No such movements were detected in 2023. Given that the Sills tract and BKS tract contain the two most abundant populations of giant garter snake in the Central Basin Reserve, connectivity across SR 99 could increase the probability of persistence of giant garter snake in this region as a whole.

Like the Central Basin Reserve tracts, the North Basin Reserve tracts are well-connected. No major highways fragment the North Basin tracts, and the only discontinuity between tracts containing suitable habitat is 1 kilometer between the Lucich North and Nestor tracts. This gap occurs along the North Drain, which has improved from marginal giant garter snake habitat in 2020 to suitable habitat in 2021 and has remained suitable through 2023; this improvement of habitat suitability will likely contribute to improved connectivity between the two areas. A snake was captured in the Nestor tract in 2018 that was originally marked in the Lucich North tract in 2012, demonstrating connectivity between these two areas. It is highly likely that all tracts in the

North Basin Reserve are genetically connected, and nearly all tracts are demographically connected with at least one other tract as well. Resumption of rice agriculture on the Nestor tract likely enhances the connectivity of the North Basin Reserve tracts.

Overall, it is very likely that all tracts in the Central Basin and North Basin Reserves are genetically connected and that these tracts are also demographically connected to at least one other tract. These conditions help to promote genetic diversity, limit the effects of genetic drift and inbreeding depression, and may rescue small populations on some reserves by the migration of individual giant garter snakes from neighboring reserves. In the future, maintaining this connectivity and its benefits to giant garter snake will require the continued availability of suitable habitat in canals that link wetland reserves.

In contrast to the North Basin and Central Basin Reserves, connectivity between the Fisherman's Lake Reserve and the other reserves is far more tenuous. Although Natomas Farms and Cummings are almost certainly genetically connected and possibly demographically connected, the very small population in this area and isolation of these reserves from demographic rescue and genetic input from other, more abundant giant garter snake populations to the north leaves them at risk for founder effects, inbreeding depression, and fixation of deleterious alleles through genetic drift, and it renders them very sensitive to both demographic and environmental stochasticity (e.g., random variation in birth/death rates or climatic conditions).

It is hoped that the establishment of these reserves and the additional marsh habitat created by SAFCA can provide the conditions that will allow this population to recover, but detailed demographic study of this population will ascertain whether more intensive management strategies (such as augmentation of the population with genetically distinct individuals to increase genetic diversity [Madsen et al. 1996, 2004]) are warranted in the Fisherman's Lake area.

The radio-telemetry study that began in 2018 is an important first step to determine the potential effectiveness of translocation of individuals from more abundant and presumably more genetically diverse populations, as a means to "rescue" sparse populations in the Fisherman's Lake Reserve. Individuals from the Central Basin Reserve were translocated to the SAFCA wetlands in the Fisherman's Lake Reserve in 2019 and 2020 and tracked using radio-telemetry through 2021. Survival was much lower for these translocated individuals (8% of adult snakes survived >801 days) when compared to resident snakes (39% of adult snakes survived >1,154 days); however, juvenile snakes raised in captivity and released into the SAFCA wetlands had a relatively high survival rate of 60% during the 4-month period in which they were monitored (Nguyen 2023b). Based on these results, captive rearing might be an effective method for supplementing populations within the Fisherman's Lake Reserve, but more research is needed, particularly on how these supplemented individuals might affect the genetic makeup of the local population.

Although some sections of canal in each reserve were downgraded from suitable to marginal habitat from 2022 to 2023, many canals in each reserve were upgraded from marginal to suitable habitat in 2023; overall, the continuity of suitable habitat for giant garter snakes remained similar from 2022 to 2023. The most notable downgrade in habitat suitability in the North Basin Reserve occurred in the Frazer North tract where a section of canal classified as unsuitable in 2021 that had improved to suitable in 2022 returned to unsuitable in 2023.

Throughout the rest of the North Basin Reserve there were relatively equal numbers of canals that switched from marginal to suitable habitat and vice versa from 2022 to 2023. There was no apparent pattern to these changes, likely indicating expected fluctuations in habitat quality between

years due to vegetation growth and habitat changes related to fallowing of rice fields in 2022. No canal sections were downgraded to unsuitable habitat in the Fisherman's Lake and Central Basin Reserves tracts. One section of canal along the Elsie and Paulsen South tracts that was as no longer classified a canal in 2021 returned to marginal habitat in 2022 and remained so in 2023.

For the remainder of the Central Basin Reserve there was a roughly equal split between habitat that switched from marginal to suitable and habitat that was downgraded from suitable to marginal between 2022 and 2023. These changes occurred throughout the Central Basin Reserve and did not appear to be concentrated in a certain area or set of tracts, which could be indicative of natural habitat fluctuations between years. In the Fisherman's Lake Reserve, one section of canal was upgraded from marginal to suitable habitat, one was downgraded from suitable to marginal habitat, and no canal sections were downgraded to unsuitable habitat. As seen in previous years, the habitat dynamics of canals with respect to giant garter snake can both improve or degrade from year to year based on annual fluctuations in water availability and growth of emergent vegetation. Monitoring these changes over time will be important to determine if any long-term trends exist and whether those trends are positive or negative for giant garter snake persistence.

3.4 Discussion

3.4.1 Demography

3.4.1.1 Abundance and Density

Abundance varied substantially among sites. For two of the seven demographic clusters, four or fewer snakes were captured, and abundance was estimated to be 12–36 individuals. Similar abundance estimates were obtained for Lucich North and Lucich South, at which only 19 and 16 individuals were captured in 2023, respectively. For two sites with more than 30 individuals captured, abundance was estimated to be much greater, with more than 60 individuals (Sills), or over 110 individuals (BKS). The daily capture probability of marked giant garter snake in 2023 was higher than in 2022 and the abundance estimates consequently were generally lower and had narrower credible intervals in 2023 compared to 2022. The average number of captures per individual in 2023 (1.63) was higher than in 2022 (1.25 captures per individual) and 2020 (1.26 captures per individual) and more comparable to 2021 (1.57 captures per individual). The number of captures per individual was intermediate in 2019 (1.44) and 2018 (1.41).

Capture probabilities varied substantially in space and time, with more variance attributable to variation among sites than temporal variation (fluctuations from day to day). The random variation in capture probability among days likely reflects day-to-day changes in the weather that influence the behavior of giant garter snake. On cool, cloudy days, snakes are less likely to forage in the water and thus are less likely to be captured in traps than on hot days when they spend more time foraging. Capture probability might differ among sites due to differences in habitat that influence the effectiveness of traps (e.g., how well traps are able to fit flush to the canal or wetland bank to funnel foraging snakes into the trap).

The ability to share information on capture probabilities among sites is valuable as it allows for increased precision in estimates of abundance, as well as the effect of habitat covariates on capture

probability. Heterogeneity in capture probability among individual giant garter snakes could result from differences in behavior, with some individuals foraging along habitat edges more frequently or learning to forage in traps because they contain concentrations of prey. Heterogeneity can also result from spatial overlap between individual home ranges and traplines. Snakes with home ranges centered in the middle of a transect would be expected to be captured more frequently than snakes with a home range that only partially overlaps one end of a transect. This variation in individual home ranges is addressed explicitly in the SECR models used to estimate snake density.

SECR models explicitly account for the spatial locations of traps and where snakes are captured, which enables them to estimate the density of snakes within a defined area. Density estimates from SECR models are more suitable for comparisons among sites because they account for differences in the area sampled at each site. BKS had both the greatest estimated abundance of giant garter snake and the highest density (i.e., snakes/km of edge habitat) in 2023 and previously from 2018 to 2022. A comparison of Sills and Lucich South is instructive of the value of SECR models. The estimated abundance of snakes at Sills was higher than at Lucich South (median value of 63 compared to 27), but the estimated density of snakes was higher in wetlands at Lucich South than in the Sills canals. The higher estimated density in Lucich South reflects that capture probability is lower in wetland habitats than in canals like those at Sills. The density of snakes at Lucich North was estimated to be much lower than the density of snakes at Lucich South in 2023. The lower estimated density at Lucich North from the SECR model results from the much greater area sampled and trapping effort at Lucich North compared to Lucich South. In the future, adding landscape-level covariates on snake density could help inform what habitat management actions are most likely to support dense, healthy populations of giant garter snake.

In contrast to 2018–2021, there was support for an effect of water temperature on capture probabilities in 2022 and 2023. The effect of water temperature on snake behavior is likely more important in the spring, when cooler weather may prevent snakes from reaching a high enough body temperature to forage in cool water. In 2022 and 2023, trapping began a week earlier in May than in 2021, which could partially explain the greater importance of water temperature to snake capture probability in 2022 and 2023.

As in each year from 2018 to 2022, there was evidence of a positive ephemeral behavioral response to capture ("trap-happiness") in 2023. This pattern is likely observed simply because the individuals were in the vicinity of the trap array immediately after release and happened to enter another trap, or because individual snakes might forage for several consecutive days within a relatively small area, then shelter in burrows to digest their meals or shed. The behavioral response could also be caused by individuals that entered traps being rewarded with an easy meal; these individuals were therefore more likely to search for prey within traps the following day—and be trapped—than individuals that had not been trapped the previous day. This effect of behavioral response is a common theme across all years of monitoring. In 2023, there was little support for an effect of giant garter snake sex or SVL on capture probability, which matches our findings in 2022.

3.4.1.2 Size Distribution and Sex Ratio

The sex ratio of giant garter snake in the Natomas Basin in 2023 was slightly lower than one male per female and higher than in 2022. The credible interval overlapped 1 substantially in 2023, indicating no strong sex bias. Regardless, a female-biased sex ratio should not limit the reproductive potential of the species, given the mating system in garter snakes, where both females and males can mate with multiple partners (Schwartz et al. 1989; Shine et al. 2001). The slightly biased sex ratio is

largely a result of a low proportion of males among the snakes captured at two sites: Lucich North (12 females and seven males) and Lucich South (12 females and four males). Trapping within Lucich North in which moderately more female giant garter snakes were captured in 2023 occurred later in the summer (i.e., late June to late August). During this time of year, females are likely to be foraging after giving birth (parturition) to improve their body condition. The likelihood that large adult females foraging after reproduction partially influenced the sex-bias in captures is further supported because the average SVL and mass of captured females were higher in 2023 (599 mm SVL, 124.72 g mass), 2022 (674 mm SVL, 150.9 g mass), 2021 (611 mm SVL, 131.76 g mass), 2020 (616 mm SVL, 117.45 g mass), 2019 (630 mm SVL, 164.5 g mass), and 2018 (665 mm SVL, 161.9 g mass) than in 2017 (586 mm SVL, 115.5 g mass), and the size distribution of females was shifted toward longer and heavier individuals between 2018 and 2023 (with the revised sampling design) than in 2017, when greater trapping effort occurred earlier in the active season. Continued monitoring of giant garter snake sex ratios is warranted, but differences in seasonal activity patterns between the sexes must be considered when interpreting the sex ratio of captured individuals. Although managing unharvested populations for sex ratio is not generally feasible, continued monitoring of sex ratios on TNBC reserves could warn of sex-biased mortality factors (assuming an equal sex ratio at birth [Halstead et al. 2011a; Rose et al. 2018a]).

Size distributions of giant garter snake on TNBC reserves indicate the presence of a mixed-age population. Size distributions indicate the presence of both younger, smaller snakes and larger, older individuals in the population. Small yearling snakes were caught in spring 2023 that were likely born in summer 2022, and neonate snakes likely born in summer 2023 were captured in August 2023. The evidence of recruitment of young individuals provided by size distributions is important supplemental information to determine if recruitment is occurring (at least in part) through in-situ reproduction. It should be noted, however, that inferring the health of a population (i.e., population growth rate) from size (or age) distributions alone is unwarranted (Caughley 1974).

3.4.1.3 Survival Rate of Giant Garter Snake

The additional year of sampling in 2023 provided an opportunity for increased precision in estimates of giant garter snake apparent survival (the probability of surviving and remaining available on site for capture). Although survival varied over time at most sites, there was no clear pattern in survival that applied to all sites. One clear result from the survival estimates was that apparent survival was much higher at BKS from 2018–2019 than in the subsequent years. This decrease in apparent survival could be driven by the decrease in sampling effort in BKS in 2020 (six transects for approximately 14 days each), 2021 (five transects), 2022 (six transects), and 2023 (five transects) compared to 2018 and 2019 (nine transects). The higher sampling effort in 2018 and 2019 led to a higher recapture rate of snakes in 2019 compared to subsequent years.

Therefore, it is possible that some of the snakes that were first captured and marked in 2018 and 2019 survived until later years but either (1) were not available for capture in the more limited area sampled from 2020–2023, or (2) evaded capture during the shorter sampling period in 2020. Trapping effort was more consistent in the Sills tract, and survival was higher from 2019–2020 than in other years. Survival was highest from 2020 to 2021 at Lucich South, despite lower trapping effort in 2020 and 2021 compared to all other years in this study. Trapping effort at Lucich North in 2022 and 2023 was higher and comparable to 2018 and 2019. Despite fluctuations in trapping effort at Lucich North, annual survival was consistent each year from 2018 to 2023. There were no data indicating a difference in survival among male and female giant garter snake. However, data obtained did indicate a higher availability for capture for female giant garter snake than male giant

garter snake. One potential explanation for this finding is that male giant garter snakes disperse farther and are more likely to emigrate from trapped areas.

3.4.2 Distribution of Giant Garter Snake on Reserve Lands

The occupancy analysis for 2023 indicated that giant garter snake is expected to occur in approximately 51% of wetland and rice units on reserve lands, with occupancy highest in the Central Basin Reserve. It is notable that there was great uncertainty on the effects of whether sites classified as "rice" (i.e., canals next to rice) were more or less likely to be occupied than wetland sites, after accounting for variation in occupancy rates among the three reserves. The results suggest that the presence of rice likely did not affect the occurrence of giant garter snake in 2023. This, however, does not minimize the importance of rice agriculture as an alternative wetland habitat for this conservation-reliant species (Halstead et al. 2019). It should also be noted that the Central Basin Reserve has historically had the highest proportion of sites occupied and the highest proportion of sites that are considered rice agriculture; these patterns remained evident in 2023. Because the Central Basin Reserve is dominated by rice and Fisherman's Lake Reserve is dominated by wetlands, it is difficult to fully disentangle the effects of rice cultivation habitat from geographic variation in probability of occurrence.

The lack of a strong effect of emergent vegetation on occurrence was notable in 2023. In 2021 and 2022, emergent vegetation was not found to be an important variable for explaining occurrence probability. In 2020, a negative effect of emergent vegetation on occurrence was seen, but this habitat covariate was found to have an important positive effect in 2016, 2017, and in years prior to 2014. Given the changes in study design and the range of outcomes between years, further research is required to provide a more definitive result.

Based on our years of research, our capture data indicate that emergent vegetation still provides the best habitat for giant garter snake cover from predators and higher prey concentrations. Radio-telemetry study of giant garter snake movement and habitat selection has shown that giant garter snake preferentially select tule over other vegetation types (Halstead et al. 2016). Because tule marsh is historical habitat for giant garter snake, management for emergent vegetation, particularly tule, is important.

The probability of occupancy was greatest in the Central Basin Reserve, moderate in the North Basin Reserve, and lowest in the Fisherman's Lake Reserve. Both the North Basin Reserve and Central Basin Reserve have a mix of rice and wetland habitat, whereas the Fisherman's Lake Reserve is primarily composed of recently created freshwater marsh. Notably, giant garter snake was not detected at three sites (Bennett North Central East, Bennett South East, and Lucich North 4) in the North Basin Reserve in 2023 where it had been detected in 2022.

Based on the dynamic occupancy model, the proportion of occupied wetland units on reserve lands has decreased annually by an average of 4% from 2011 through 2023. Relative to previous years, the probability that occupied sites became unoccupied (site extirpation) declined from 2022 to 2023 but was still higher than in 2019. The probability that unoccupied sites became occupied (site colonization) in 2023 was lower than in 2022, and the lowest of any monitoring year to date. The average 4% decline in occurrence was not steady, with some increases and decreases in the number of sites estimated to be occupied by giant garter snake. The decline in the number of occupied sites was especially notable from 2011 to 2013 and from 2019 to 2021. Although apparently small in

magnitude, if the long-term average decline in giant garter snake occupancy continues, it would result in only 11 (3–58) occupied sites by 2050, assuming 60 occupied sites in 2011.

One potential mechanism leading to a decrease in the proportion of sites occupied is the extreme drought conditions from 2012 to 2015 and from 2021 to 2022. According to the California Department of Water Resources, California experienced the second driest water year (October 2020–September 2021) in 2021. Although water remained on TNBC reserves during the drought, it is unknown to what extent the source of water (surface water vs. groundwater) affects giant garter snake occupancy or demography, and precipitation may influence the productivity of lower trophic levels including giant garter snake prey. Thus far, occupancy does not appear to have completely rebounded to earlier levels (e.g., 2011), but 2022 showed a clear increase after 2 years of decline in 2020 and 2021 and appears to have remained stable in 2023. This was comparable to 2019, which showed a clear increase after 4 years of stability from 2015 to 2018. The rebound in occupancy in 2019 follows 3 out of 4 years of normal to above-average rainfall (2016, 2017, and 2019). Three years of favorable rainfall in a 4-year period might not be long enough for giant garter snake to recolonize every site from which it was extirpated during the drought, but 2019 showed some positive signs of recolonization.

3.5 Effectiveness

The effectiveness of the NBHCP for conserving giant garter snake is assessed on the basis of acquisition of reserve lands; changes in the abundance or, preferably, demographic rates of giant garter snake; and land management activities to increase the distribution and health of giant garter snake in the Basin.

The primary issue affecting giant garter snake throughout its range is habitat, and the Basin is no different in this regard. Marshes that most nearly approximate natural tule marshes provide the best habitat for giant garter snake, promoting both higher densities and greater body condition than other habitats (Wylie et al. 2010). For example, a recent, long-term study of giant garter snake throughout the Sacramento Valley found that survival was positively related to the percent cover of emergent vegetation at a site (Rose et al. 2018b).

The point estimate of density of giant garter snake was approximately five times greater in created marsh habitats in the BKS tract compared to the estimates for rice and associated canals on the Sills tract, which had the sixth highest density (and second highest in abundance) estimate. Although giant garter snake has persisted in a rice agricultural landscape in the Sacramento Valley, the limited duration of rice fields as appropriate habitat (mid-May through August), the restriction of giant garter snake to structurally simple linear canals during the other 4 months of the active season, as well as fallowing of rice fields in response to drought or late spring rains in recent years likely reduces the suitability of agricultural habitats as compared to natural or well-managed created marshes. Nevertheless, rice agricultural habitats are the only agricultural habitats in which giant garter snake can persist (Halstead et al. 2010), and they provide connectivity between other patches of suitable habitat. Also, the survival rate of radio-tracked giant garter snakes has been found to be positively related to the area of active rice growing surrounding their home range (Halstead et al. 2019).

The Lucich South, Bianchi West, and Frazer South tracts had the second, third, and fourth highest density estimates, respectively, of giant garter snake in 2023, illustrating the importance of rice

agricultural habitats in the Natomas Basin, particularly in the Central Basin Reserve. Nonetheless, giant garter snake density in the Lucich North cluster of sites, which is dominated by created marsh, was lower than many rice sites and almost two orders of magnitude less than the giant garter snake density at BKS. In 2022 there were low water levels at this location, with extensive areas of mudflat or shallow, hot water between emergent vegetation and deeper water. Although water levels in the Lucich North cluster improved dramatically in 2023, there may have been a lag effect from the previous year that contributed to lower giant garter snake densities at this cluster.

TNBC has been effective in providing for the continuation of rice agriculture and creating managed marsh habitats in the Basin. Designing and managing marsh habitats to maximize the open water/emergent vegetation interface and improving water management would further benefit giant garter snake.

Managing habitat for giant garter snake is only effective insofar as adequate water is supplied to these habitats. The persistence of water adjacent to upland cover throughout the active season is important for giant garter snake, and increased water availability has been shown to be related to higher rates of survival for adult female giant garter snake (Reyes et al. 2017; Halstead et al. 2019). Drying of marshes, fallowing of rice fields for more than a year, cultivation of alternative crops (especially if accompanied by lack of water in canals), and low or fluctuating water levels in marshes reduce the availability and quality of habitat for giant garter snake. Reducing the amount of rice grown in an area has the potential to negatively affect the survival of adult giant garter snake (Halstead et al. 2019). TNBC has created managed marsh habitats that can provide relatively persistent aquatic habitat throughout the year if water levels are maintained to provide aquatic foraging and escape habitat next to, and importantly, maintained below basking sites and upland refugia. Flooding of upland refugia and basking sites is detrimental to giant garter snake and renders otherwise suitable habitat unsuitable.

Another important component of giant garter snake habitat is refuge from predators and environmental extremes. Mammal burrows, lodges, and crayfish burrows offer important refugia for giant garter snakes and should be maintained in association with marshes and canals to the maximum extent practical. Unless burrows threaten the integrity of the berms and levees required to maintain water in marshes or canals, or they present a major hazard to humans or livestock, they should be maintained in abundance. Muskrats (*Ondatra zibethicus*), California ground squirrels (*Otospermophilus beecheyi*), and crayfish (*Cambarus* spp.) likely improve habitat quality for giant garter snakes by providing refugia in the form of burrows; muskrats further enhance habitat suitability by constructing lodges and reducing the density of cattails (thereby promoting the emergent vegetation/open water interface) through their foraging activity. Similar to muskrat lodges, tule thatch that accumulates naturally in mature tule marshes (like BKS) may also serve as important refuge from predators and temperature extremes and should be maintained in abundance. Giant garter snakes have been found to actively select tule over other microhabitats available in their environment (Halstead et al. 2016).

Overall, giant garter snake populations in the Central Basin Reserve appear healthy. Fewer individuals were captured in the North Basin Reserve, and no giant garter snakes have been captured in the Fisherman's Lake Reserve since 2017 (Table 3-10). Conversion of additional habitats to created marshes and maintaining proper water levels in the marshes would undoubtedly benefit giant garter snake in the long term, and maintenance of rice agriculture will help achieve connectivity, prey production, high adult survival in canals adjacent to rice fields, and other conservation goals. Continuing to minimize ground disturbance, ensuring aquatic habitat is available

in the spring for foraging upon emergence from winter refuges (Halstead et al. 2019) and maintaining stable, high water levels throughout the active season will also enhance the quality of existing habitats for giant garter snake. Lowering water levels in the early fall may also help to concentrate prey prior to giant garter snake hibernation; the effectiveness of this practice as a management strategy warrants further investigation.

3.6 Recommendations

- Maintain and encourage the expansion of emergent vegetation (primarily tule) to maximize the emergent vegetation/open water interface in wetlands and canals. Giant garter snake selection for tules is stronger than the species' selection of other aquatic vegetation (Halstead et al. 2016).
- Maximize the open water/emergent vegetation interface that increases the probability of occurrence of giant garter snake and has been shown in other studies (Valcarcel 2011) to be positively selected by individual giant garter snakes. Maintaining emergent vegetation at wetland edges, clumps of vegetation in open water, and pockets of open water in stands of emergent vegetation would likely benefit giant garter snake. Importantly, managing to maximize the open water/emergent vegetation interface includes ensuring that water levels are high enough that snakes can forage and escape predators immediately below and adjacent to the emergent vegetation.
- Continue to encourage rice agriculture as an important alternative habitat to tule marshes and to improve habitat connectivity between managed marshes.
- Continue to control mosquito fern and other floating aquatic vegetation where possible. Giant garter snake tends to avoid mosquito fern and other floating aquatic vegetation when it occurs at high densities (U.S. Geological Survey unpublished data), despite apparent positive selection at low densities (Halstead et al. 2016)[11].
- Maintain herbaceous terrestrial bankside vegetation to provide cover for giant garter snake when in terrestrial habitats (Halstead et al. 2016). Minimize mowing during the active season near the edge of marshes to the extent practicable to provide tall grasses for snakes to hide in when moving between aquatic and terrestrial habitats.
- To the extent possible, avoid rapid changes in water levels during giant garter snake's inactive season (October through March) to avoid disturbance to hibernating individuals, and restrict changes in water levels to the minimum number of fluctuations possible.
- Maintain as many muskrat burrows, crayfish burrows, and burrows of California ground squirrel and other small mammals as feasible to provide giant garter snakes abundant summer refuges and winter hibernacula (Halstead et al. 2015). Muskrat lodges also provide potential hibernation, basking, and shelter sites.
- Ensure aquatic habitat is available in wetlands and canals by keeping marsh complexes flooded to design specifications and consistent with Site-Specific Management Plans. If draw down in winter is necessary, ensure marsh complexes are fully flooded by early March when giant garter snakes emerge from burrows and begin foraging. Snake body condition (body mass relative to length) is low at this critical point in the year (Coates et al. 2009), when individuals' energy

[11] Apparent selection of floating aquatic vegetation at low densities is likely an artifact of these vegetation types accumulating along the edges of water, where giant garter snakes forage (Halstead et al. 2016).

reserves are depleted from a long period of overwintering. Likely as a result of poor body condition, the risk of mortality is high for giant garter snake during this time of year (Halstead et al. 2019). Having aquatic habitat available for giant garter snake to forage in during the early spring would likely lead to higher survival rates.

- Continue to minimize management activities in marsh habitats to the extent practicable to minimize disturbance. When wetlands must be drained during the giant garter snake active season, it should be done slowly in the late summer (August or September) to more nearly approximate the historical drying cycle of natural wetlands in the Central Valley. Doing so may provide giant garter snake with an abundance of stranded prey and an important source of energy reserves for hibernation. Try to reflood wetlands as soon as possible and maintain stable water levels throughout the hibernation period.
- Attempt to maintain substantial aquatic habitat adjacent to marsh units drained for maintenance to ensure adequate habitat is available to giant garter snake that might be affected by marsh maintenance activities.
- When excavating marshes during maintenance activities, ensure that slopes are gentle enough for snakes to free themselves from excavated channels. If slopes are too steep, snakes will be trapped. If slopes must be steep, provide periodic (i.e., every 50 meters) shallower slopes that allow entrapped snakes to exit the channel.
- Minimize channel-clearing activities to the extent practicable. Clearing water conveyance channels temporarily degrades giant garter snake foraging habitat.

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Table 3-1. Summary of Giant Garter Snake Captures and Sampling Effort at Natomas Basin Conservancy Reserves, 2023.

Reserve Area and Reserve	Number of Giant Garter snakes		Dates Trapped (2023)	Total Trap Days
	Individuals	Captures		
North Basin				
Bennett North Central West (wetland)	0	0	23 Jul – 13 Aug	1050
Bennett North Central (wetland)	4	5	24 May – 16 Jun	1050
Bennett North Central East (wetland)	0	0	15 Jun – 10 Jul	1050
Bennett North (rice)	0	0	10 Jul – 31 Jul	1000
Bennett South East (canal)	0	0	25 May – 17 Jun	1050
Bolen North	0	0	1 Jul – 24 Jul	1050
Frazer North Wetland Central	0	0	11 Jun – 6 Jul	1049
Frazer North Wetland Southeast	4	4	8 Jun – 1 Jul	1049
Huffman West	3	4	24 Jul – 14 Aug	1050
Lucich North South 1	1	1	20 Jun – 13 Jul	1050
Lucich North South2	0	0	22 Jun – 15 Jul	1049
Lucich North East	1	1	13 Jul – 3 Aug	1000
Lucich North Northeast	0	0	10 Aug – 31 Aug	1050
Lucich North Northeast 2	0	0	17 Jun – 12 Jul	1050
Lucich North 4	0	0	16 Aug – 31 Aug	748
Lucich South North (rice)	5	14	31 Jul – 21 Aug	1048
Lucich South South (rice)	0	0	19 May – 11 Jun	884
Lucich South 3	11	19	15 Jul – 5 Aug	1049
Nestor East	14	24	17 Jul – 7 Aug	1048
Ruby Ranch	0	0	8 Aug – 29 Aug	1050
TNBC5	0	0	4 Aug – 25 Aug	1050
TNBC6	0	0	26 May – 18 Jun	1050
Central Basin				
Bianchi West	19	35	25 Jun – 18 Jul	1047
BKS North Central	16	20	4 May – 25 May	1050
BKS Southwest Central	24	27	7 Jul – 28 Jul	1050
BKS2	3	3	3 May – 24 May	1049
BKS3	5	10	3 May – 24 May	1050
Frazer South North	21	37	28 Jul – 18 Aug	1050
Sills4	17	27	30 May – 24 Jun	1019
Sills5	22	34	4 May – 27 May	1048
Sills6	3	6	9 Jun – 7 Jul	1046
Tufts3	0	0	21 Jun – 14 Jul	1050
Fisherman's Lake				
Cummings East	0	0	29 Jul – 19 Aug	1050
Cummings East Central	0	0	4 Aug – 25 Aug	1047
Cummings West	0	0	8 Jul – 29 Jul	1050

Table 3-1. Continued

Reserve Area and Reserve	Number of Giant Garter snakes		Dates Trapped (2023)	Total Trap Days
	Individuals	Captures		
Natomas Farms North	0	0	14 Jul – 4 Aug	1050
Natomas Farms 1	0	0	13 Jun – 8 Jul	1050
Rosa Central	0	0	30 May – 22 Jun	1050
Rosa Central South	0	0	14 Aug – 31 Aug	849
Anne Rudin Preserve	0	0	7 May – 28 May	1050
Total	**166**	**271**	**3 May – 31 Aug**	**41,179**

Note: Some snakes were captured at multiple sites. The number of giant garter snake individuals in each row describes the unique individuals at each site, and the total describes the number of unique individuals across all sites.

Table 3-2. Prior Probabilities for Parameters of Single-Season Occupancy Models for Giant Garter Snake on Natomas Basin Conservancy Reserve Properties, 2023.

Component	Parameter	Uninformative priors
Detection	β_0	*N(0,1.648)*
	β_{temp}	*N(0,1.648)*
	β_{date}	*N(0,1.648)*
	σ_{site}	*U(0,10)*
Occupancy	β_0	*N(0,1.648)*
	β_{rice}	*N(0,1.648)*
	$\beta_{em.vegergent}$	*N(0,1.648)*
	$\beta_{fl.veg}$	*N(0,1.648)*
	$\beta_{open.water}$	*N(0,1.648)*
	$\beta_{terr.veg}$	*N(0,1.648)*
	β_{north}	*N(0,1.648)*
	$\beta_{central}$	*N(0,1.648)*
	β_{south}	*N(0,1.648)*

Table 3-3. Posterior Distributions for Capture Parameters of Closed Abundance Model of Giant Garter Snake in the Natomas Basin, 2023.

Model Component	Parameter	Median (95% CI)
Capture	p_0	0.008 (0.003–0.023)
	α_{temp}	0.298 (0.120–0.482)
	α_{SVL}	0.064 (-0.190–0.333)
	α_{sex}	-0.266 (-0.787–0.258)
	α_{behav}	1.529 (0.903–2.096)
	σ_{site}	0.963 (0.459–2.158)
	σ_{ind}	0.487 (0.112–0.912)
	σ_{day}	0.648 (0.405–0.902)

Table 3-4. Summary of Giant Garter Snake Captures and Abundance Estimates, 2023.

Site	Indiv	Cap	*N*	Trap Days	Shoreline Sampled (kilometers)
Bennett North	4	5	22 (12–36)	4,150	1.84
Bianchi West	19	35	32 (23–48)	1,047	0.67
BKS	68	97	115 (82–172)	5,249	3.25
Huffman West	3	4	23 (13–36)	1,050	0.79
Lucich North	19	30	34 (25–50)	9,093	6.75
Lucich South	16	33	27 (19–41)	2,981	2.36
Sills	37	67	63 (48–93)	4,163	2.28
Total	**166**	**271**	**316 (242–461)**	**27,733**	**17.94**

Table 3-5. Density Estimates of Giant Garter Snake by Site and Habitat Type, 2018–2023.

Site	Habitat	2018	2019	2020	2021	2022	2023
Bennett North	Canal	0	0	0	0	--	0
Bennett South	Canal	2.3 (0.9–5.6)	1.8 (0.6–5.5)	0.8 (0.1–5.8)	0	0	0
Bianchi West	Canal	2.3 (0.4–12.1)	12.9 (5.4–30.8)	--	--	--	22.9 (14.7–35.6)
BKS	Canal	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Bolen North	Canal	0	0	0	--	0	0
Elsie	Canal	8.7 (4.0–19.1)	0	0.3	0.6 (0.0–8.1)	0	--
Frazer South	Canal	4.3 (1.5–12.5)	8.2 (3.7–18.0)	9.7 (4.2–22.0)	3.8 (1.7–8.3)	14.0 (6.6–29.7)	13.8 (8.8–21.8)
Huffman West	Canal	0.8 (0.1–8.7)	0	0	1.5 (0.4–6.0)	1.8 (0.2–13.5)	2.3 (0.7–7.3)
Lucich South	Canal	2.5 (0.9–7.0)	5.1 (2.1–12.5)	0	1.1 (0.1–12.9)	4.7 (1.4–15.6)	2.9 (1.1–7.6)
NACONN	Canal	0	0	0	0	0	--
Nestor East	Canal	8.9 (5.3–15.0)	8.2 (4.4–15.4)	9.6 (4.5–20.6)	3.9 (1.8–8.5)	5.3 (1.8–15.3)	8.2 (4.9–13.6)
Rosa Central	Canal	0	0	0	0	0	0
Ruby Ranch	Canal	0	0	0	0	0	0
Sills	Canal	14.6 (11.0–19.4)	11.4 (7.7–16.8)	14.1 (8.8–22.6)	7.1 (4.8–10.4)	15.6 (9.4–25.9)	6.7 (4.4–10.2)
Vestal	Canal	0	0	--	--	0	0
Tufts	Canal	1.1 (0.1–8.1)	1.8 (0.4–9.2)	0	0	0	0
Bennett North	Wetland	0	0.4 (0.0–9.4)	0	0	1.7 (0.2–12.0)	<0.1
BKS	Wetland	38.3 (31.3–46.9)	54.3 (45.0–65.5)	58.3 (41.8–81.2)	53.8 (41.5–69.9)	29.1 (16.1–52.4)	34.5 (25.2–47.3)
Cummings	Wetland	0	0	0	0	0	0
Frazer North	Wetland	0.9	1.7 (0.5–5.2)	0	0	1.7 (0.2–12.7)	3.8 (1.2–12.1)
Lucich North	Wetland	3.4 (2.0–5.6)	5.0 (2.9–8.4)	2.7 (1.0–7.5)	2.8 (0.9–8.7)	1.3 (0.3–6.0)	<0.1
Lucich South	Wetland	0.1	4.2 (0.6–31.5)	6.8 (1.5–20.6)	0	17.8 (6.1–52.0)	23.4 (11.5–47.6)
Natomas Farms	Wetland	0	1.3 (0.2–8.7)	0	0	0	0
SAFCA	Wetland	0	0	5.4 (1.5–19.6)	1.1 (0.3–3.4)	--	0

Values are mean estimates followed by 95% confidence intervals in parentheses. For three entries, the model could not estimate the 95% confidence interval and only the mean is presented. An entry of "--" indicates the site was not trapped in that year.

Table 3-6. Posterior Summaries for Parameters from the Robust-Design CMR Model, 2018–2023.

Model component	Parameter	Median (95% CI)
Recapture	p	0.011 (0.005–0.030)
	β_{wt}	0.27 (0.16–0.37)
	σ_{site}	0.68 (0.26–1.99)
	σ_{year}	0.34 (0.14–0.62)
Survival	φ_{female}	0.52 (0.38–0.67)
	φ_{male}	0.51 (0.37–0.68)
	σ_{φ}	0.83 (0.39–1.64)
Availability	γ_{female}	0.63 (0.45–0.85)
	γ_{male}	0.33 (0.11–0.78)
	σ_{γ}	0.55 (0.02–1.80)

Table 3-7. Posterior Model Probabilities for Probability of Occurrence of Giant Garter Snake Based on Habitat on Natomas Basin Conservancy Reserves, 2023.

Explanatory Variable					
Rice	Emergent Vegetation	Floating Aquatic Vegetation	Open Water	Terrestrial Vegetation	Posterior Probability
0	0	0	0	0	0.102
0	0	0	0	1	0.086
1	0	0	0	1	0.077
0	1	0	0	0	0.056
1	1	0	0	0	0.052
0	0	1	0	0	0.051

Notes: "1" indicates that the variable was included in the model.
"0" indicates that the variable was left out of the model.
Only those models with posterior probability >0.05 and the null model are presented in the table.

Table 3-8. Posterior Distributions for Parameters of the Final Single-Season Occupancy Habitat Model for Giant Garter Snake on Natomas Basin Conservancy Reserve. Properties, 2023

Model Component	Parameter	Posterior Probability
Detection	μ_p	0.334 (0.132–0.532)
	p*	0.999 (0.949–>0.999)
	α_0	-0.691 (-1.811–0.186)
	α_{temp}	0.541 (0.234–0.839)
	α_{date}	-0.118 (-0.850–0.591)
	σ_{site}	1.535 (0.827–2.666)
Occurrence	$\psi_{North\ wetlands}$	0.353 (0.106–0.674)
	$\psi_{Central\ wetlands}$	0.877 (0.49–0.988)
	$\psi_{Fisherman's\_Lake\ wetlands}$	0.078 (0.006–0.398)
	β_{North}	-0.354 (-2.3–1.609)

Model Component	Parameter	Posterior Probability
	$\beta_{Central}$	2.291 (-0.013–4.537)
	$\beta_{Fisherman's\_Lake}$	-2.238 (-4.685–0.058)
	β_{rice}	0.411 (-2.695–3.252)
	ψ_{all}	0.508 (0.12–0.919)
	N_{occ}	18 (17–22)

Note: Posterior distributions are represented by the posterior median and symmetric 95% credible interval.

Table 3-9. Posterior Model Probabilities for Effects of Habitat on Dynamic Occupancy of Giant Garter Snake on Natomas Basin Conservancy Reserves, 2011–2023.

Explanatory Variable					
Emergent Vegetation	Terrestrial Vegetation	Floating Aquatic Vegetation	Submerged Aquatic Vegetation	Rice	Posterior Probability
0	0	0	0	0	0.2513
0	1	0	0	1	0.2428
0	0	0	0	1	0.0935

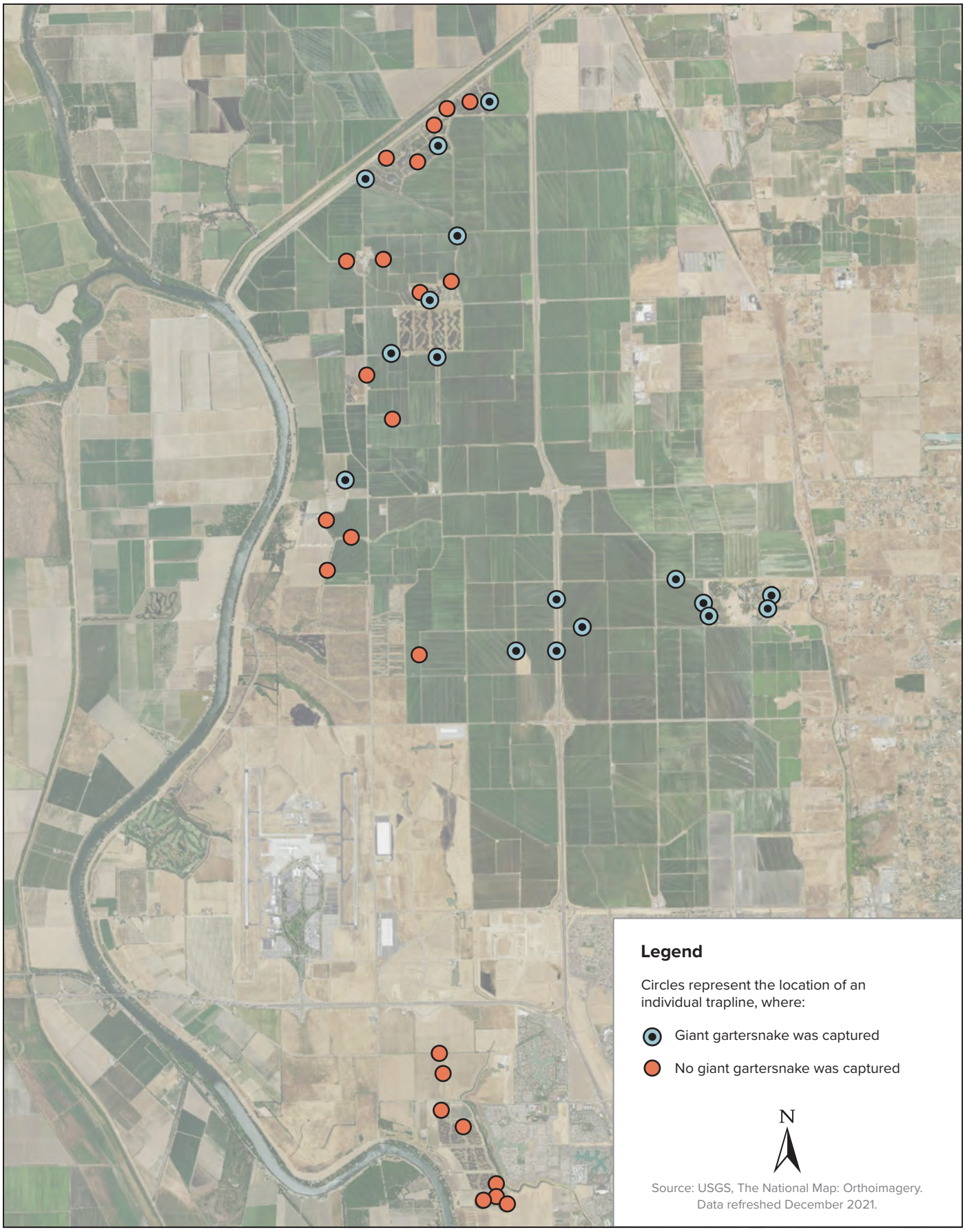
Notes: "1" indicates that the variable was included in the model.
"0" indicates that the variable was left out of the model.
Only those models with posterior probability >0.05 are presented in the table.

Table 3-10. Sampling and Capture History of Giant Garter Snake in the Fisherman's Lake Reserve Area 2005-2023.

Year	Cummings	Natomas Farms	Fisherman's Lake	AKT	Sharma	Natomas Farms West
2005	0	2	4	na	na	na
2006	1	2	5	na	na	na
2007	1	2	0	na	na	na
2008	0	0	18	na	na	na
2009	0	0	15	na	na	na
2010	1	0	8	na	na	na
2011	1	1	2	na	na	na
2012	1	0	1	na	na	na
2013	1	0	1	na	na	na
2014	0	1	4	na	na	na
2015	0	0	1	0	0	0
2016	0	0	1	1	0	0
2017	0	0	2	0	0	0
2018	0	0	na	0	0	0
2019	0	1	na	0	0	0
2020	0	0	na	na	0	3
2021	0	0	na	1	0	2
2022	0	0	na	na	na	na
2023	0	0	na	0	na	na

NBC104332 | 2-9-2023 | TG

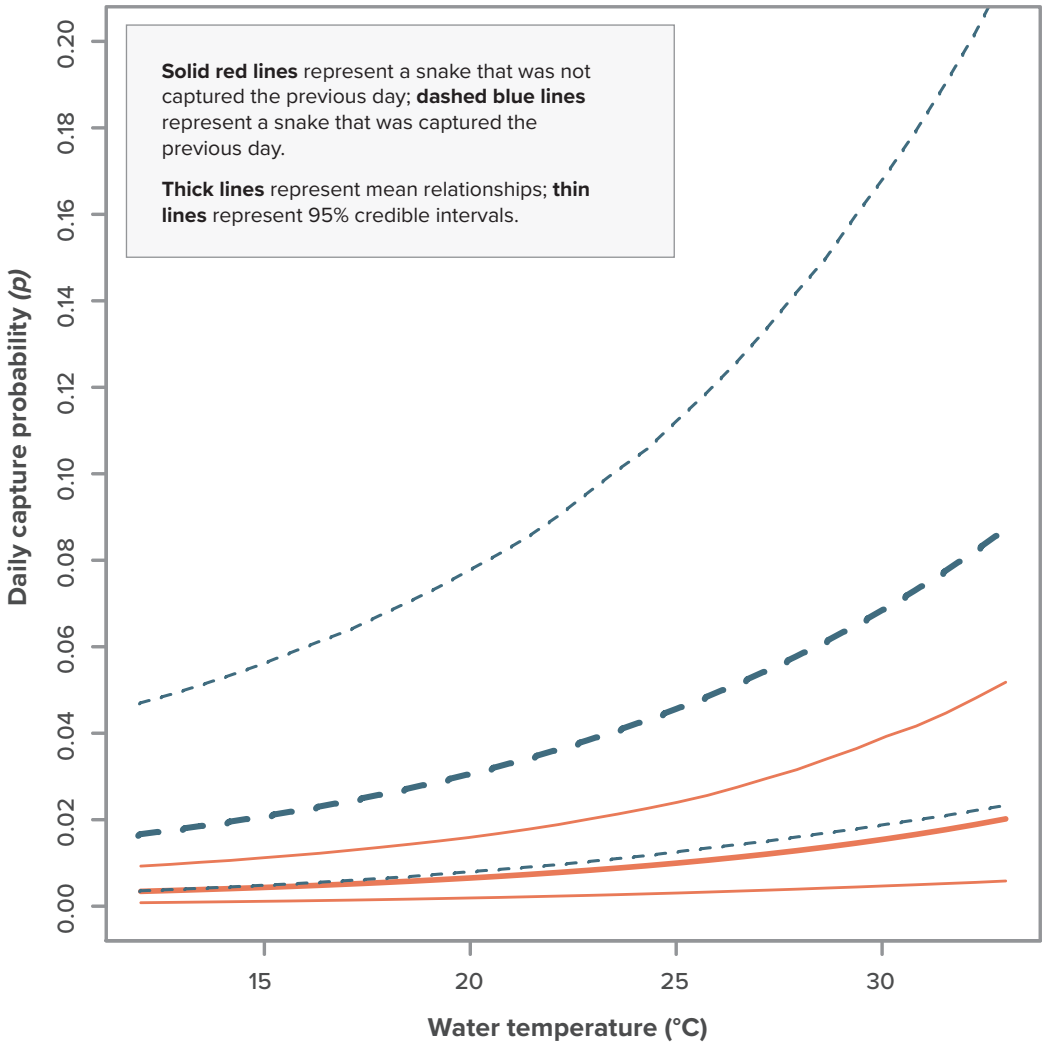
FIGURE 3-1
Giant Gartersnake (*Thamnophis gigas*)



NBC 104332 2023 (2-23-2024) TG

FIGURE 3-2

Areas Sampled for Giant Gartersnake, and Sites Where Giant Gartersnake Was Captured in the Natomas Basin in 2023



NBC 104332 2-16-2024) TG

FIGURE 3-3

Model Averaged Effect of an Ephemeral Behavioral Response and Water Temperature on Giant Gartersnake Capture Probability in the Natomas Basin in 2023

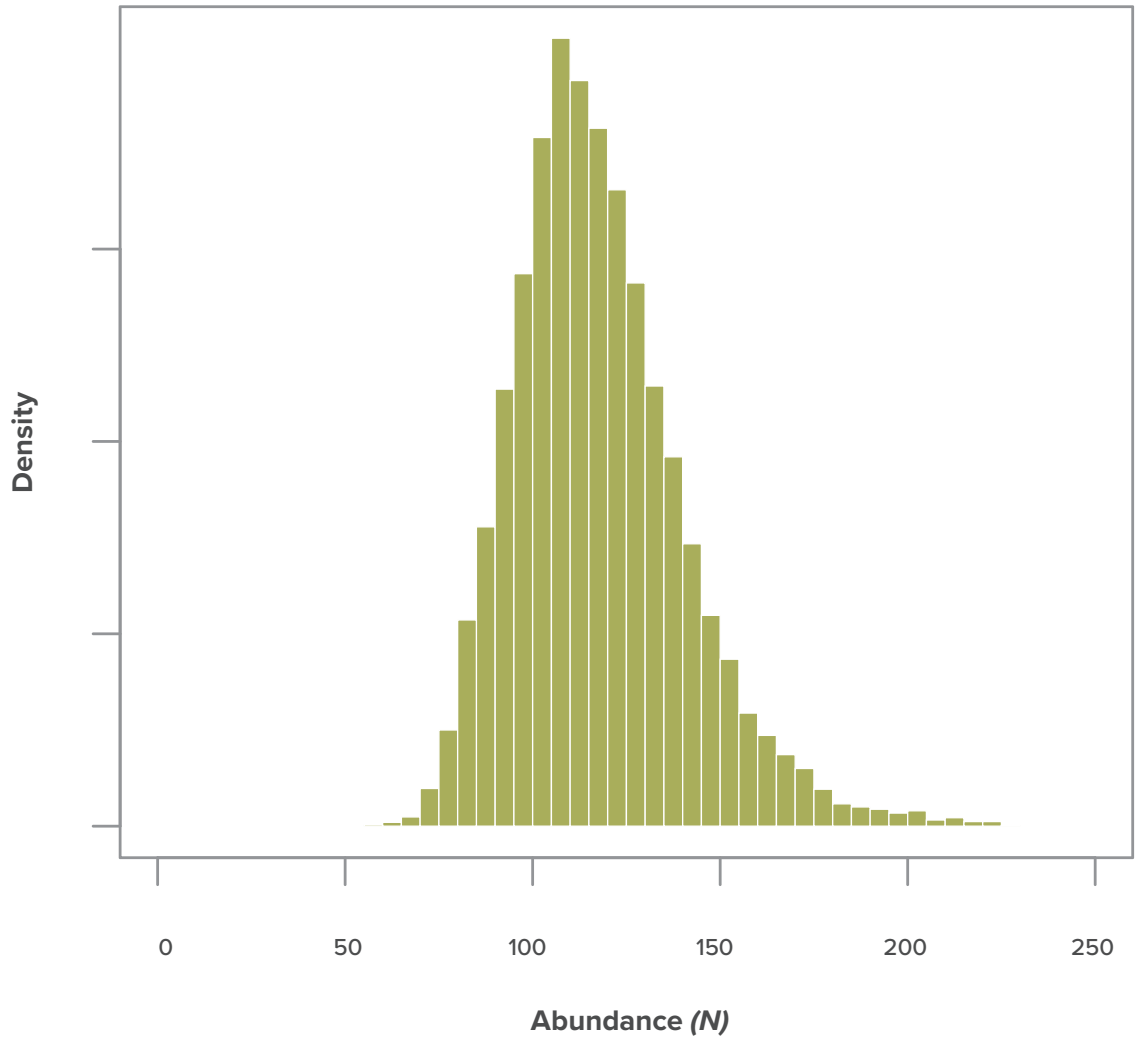
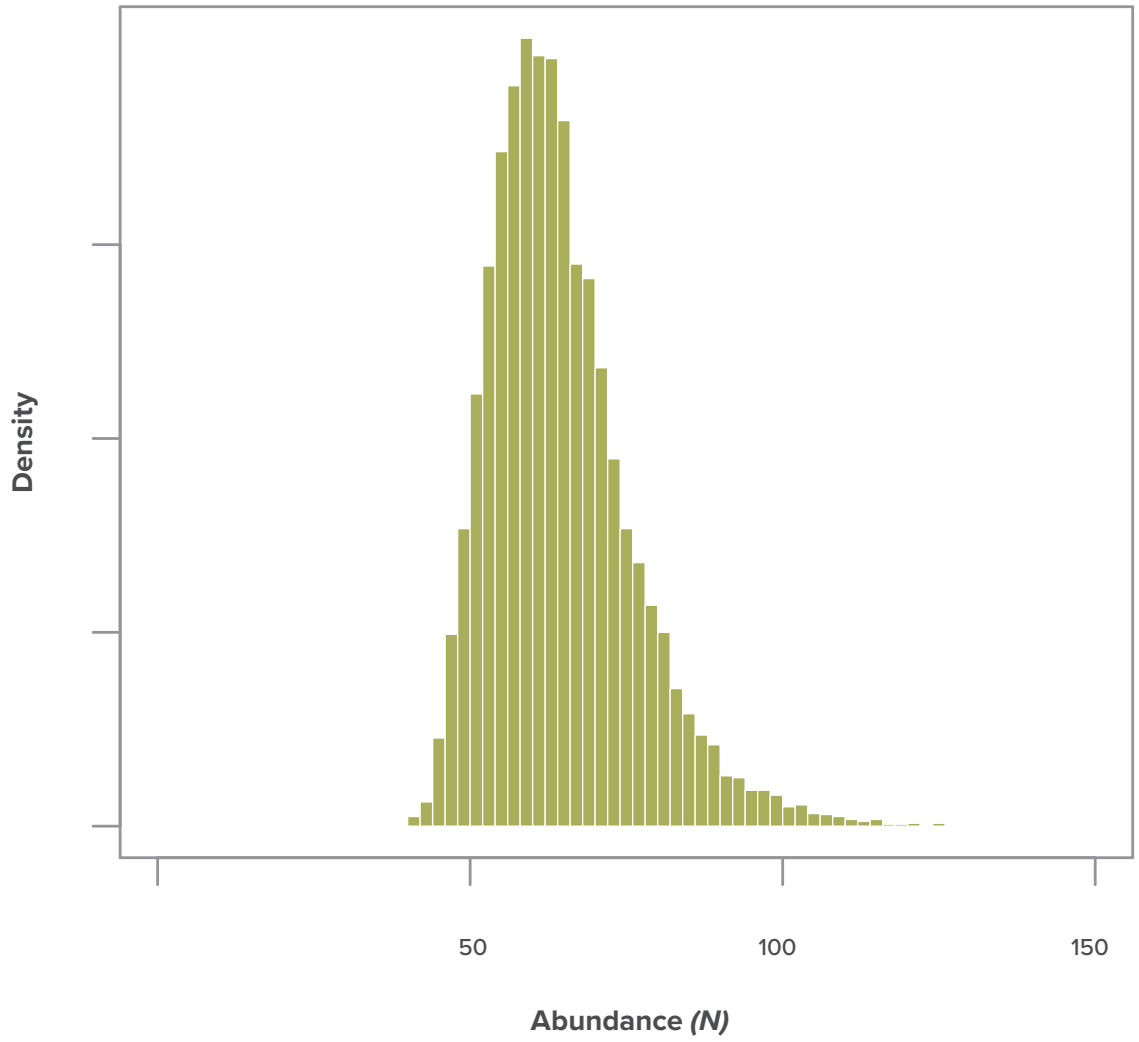


FIGURE 3-4

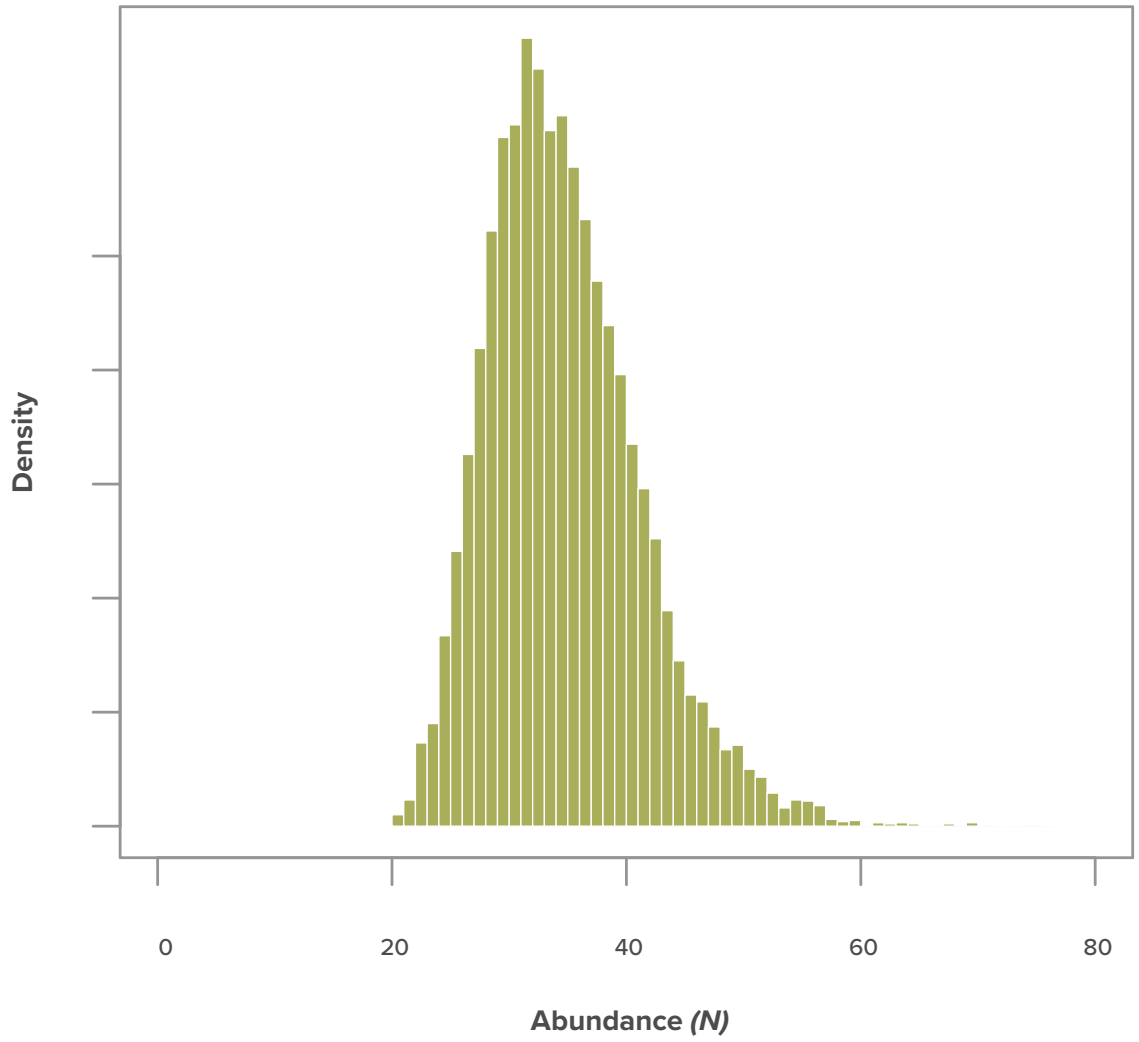
Posterior Distribution of Estimated Giant Gartersnake Abundance in the Sampled Area at BKS Based on Closed Population Models in 2023



NBC 104332 2023 (2-18-2024) TG

FIGURE 3-5

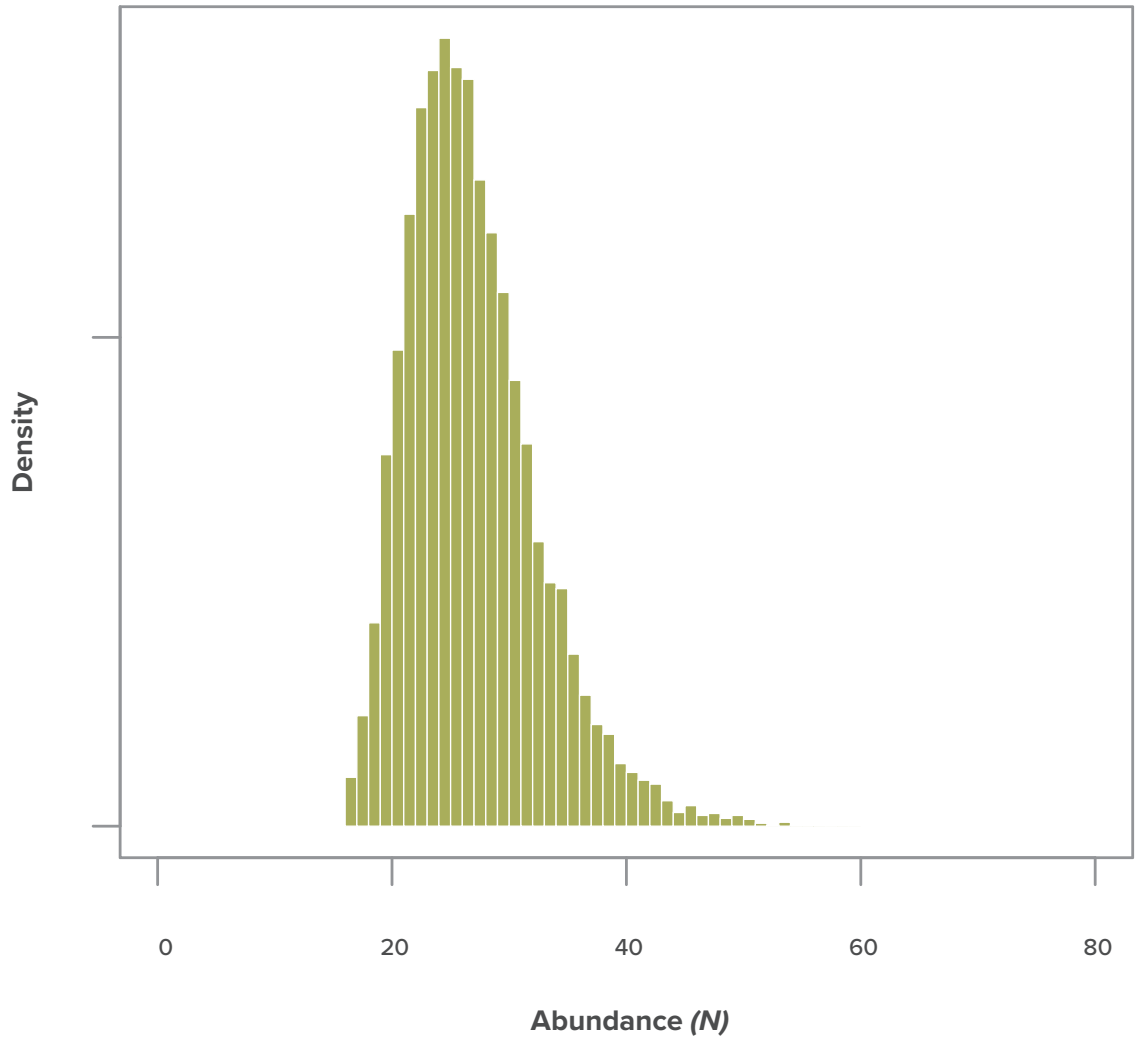
Posterior Distribution of Estimated Giant Gartersnake Abundance in the Sampled Area at Sills Based on Closed Population Models in 2023



NBC 104332 2023 (2-18-2024) TG

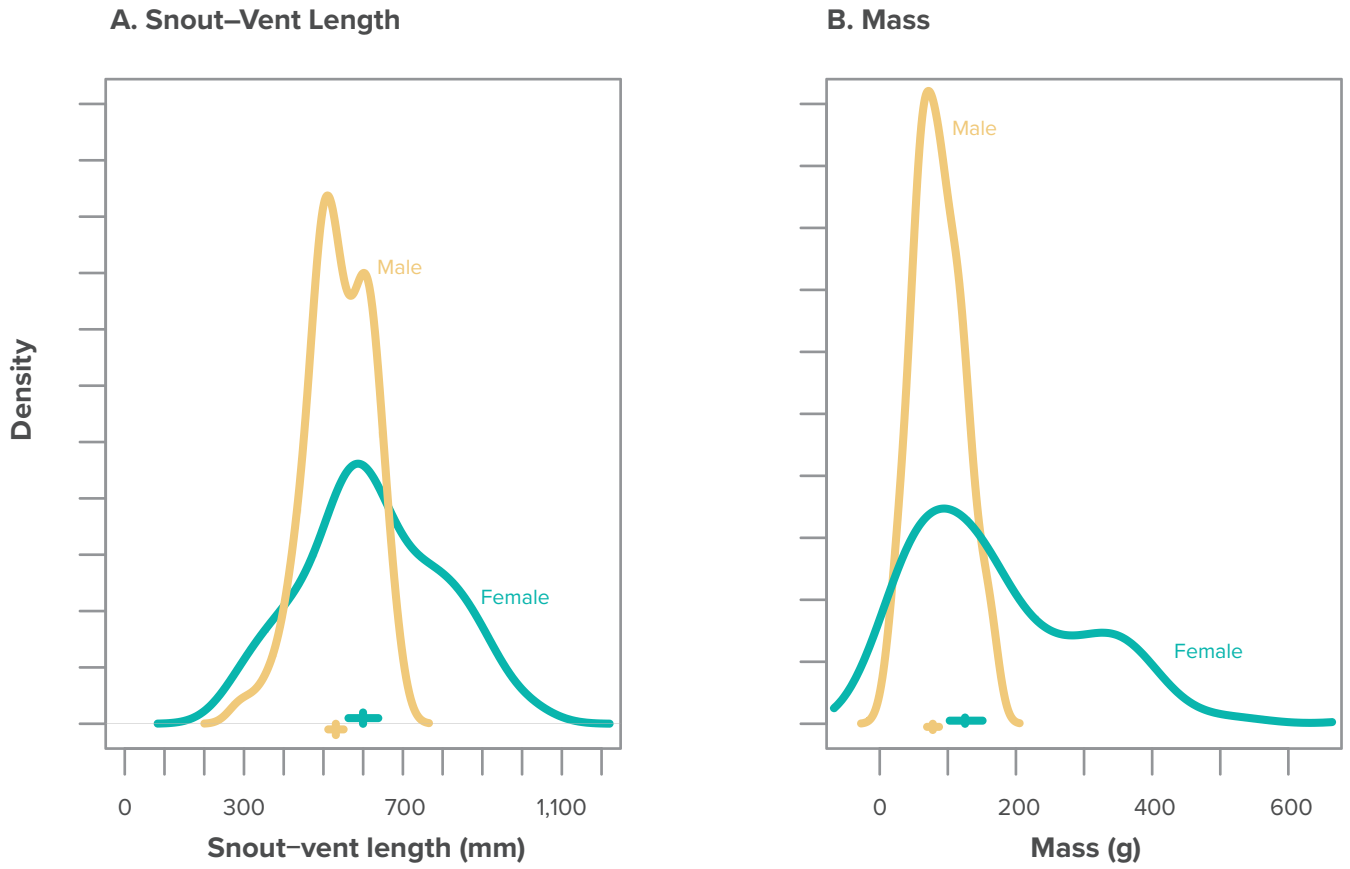
FIGURE 3-6

Posterior Distribution of Estimated Giant Gartersnake Abundance in the Sampled Area at Lucich North Based on Closed Population Models in 2023



NBC 104332 2023 (2-18-2024) TG

FIGURE 3-7
Posterior Distribution of Estimated Giant Gartersnake Abundance in the Sampled Area at Lucich South Based on Closed Population Models in 2023



NBC 104332 2023 (2-18-2024) TG

FIGURE 3-8
Distribution of Male and Female
Snout-Vent Length (A) and Mass (B) in the Natomas Basin, 2023

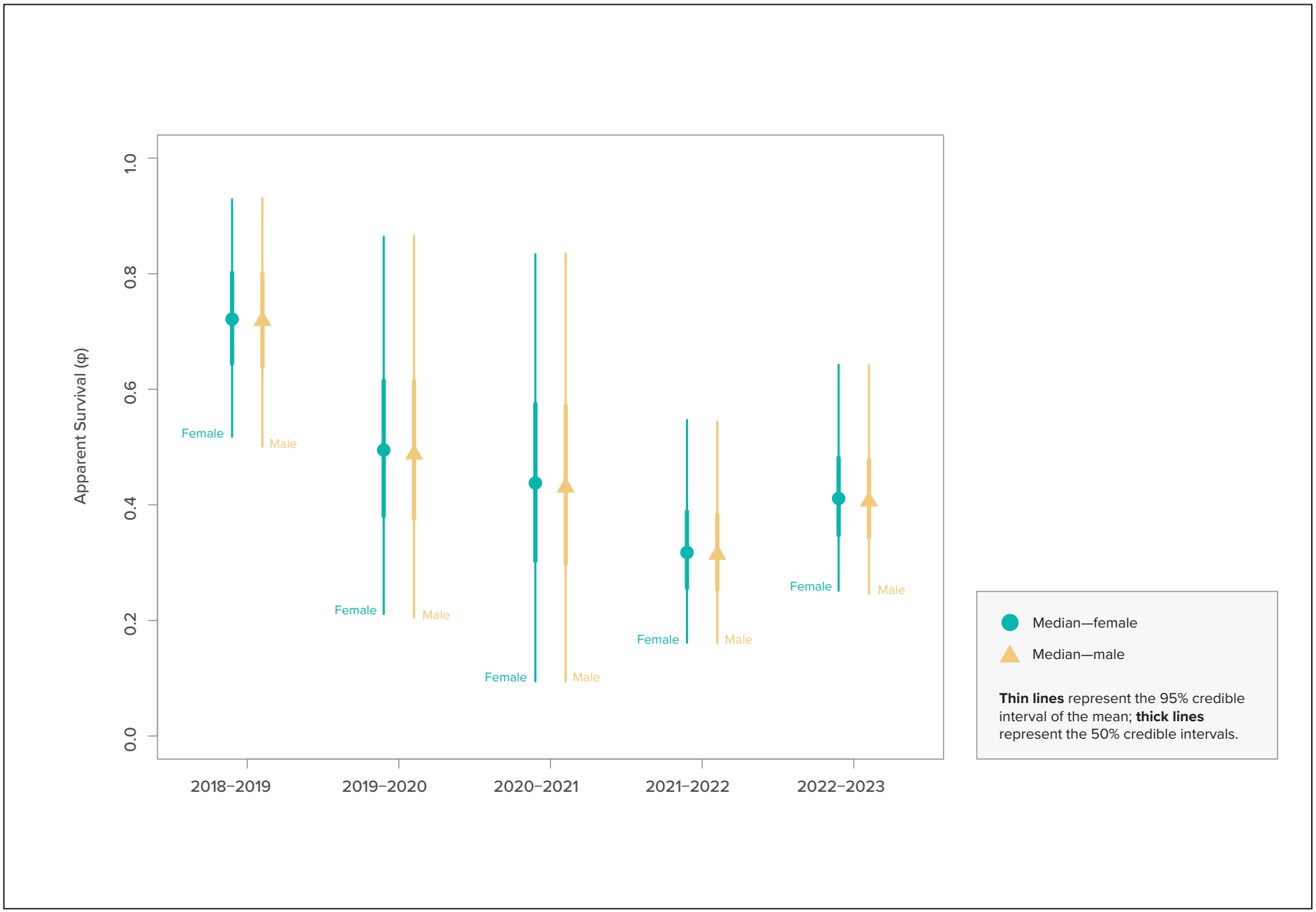
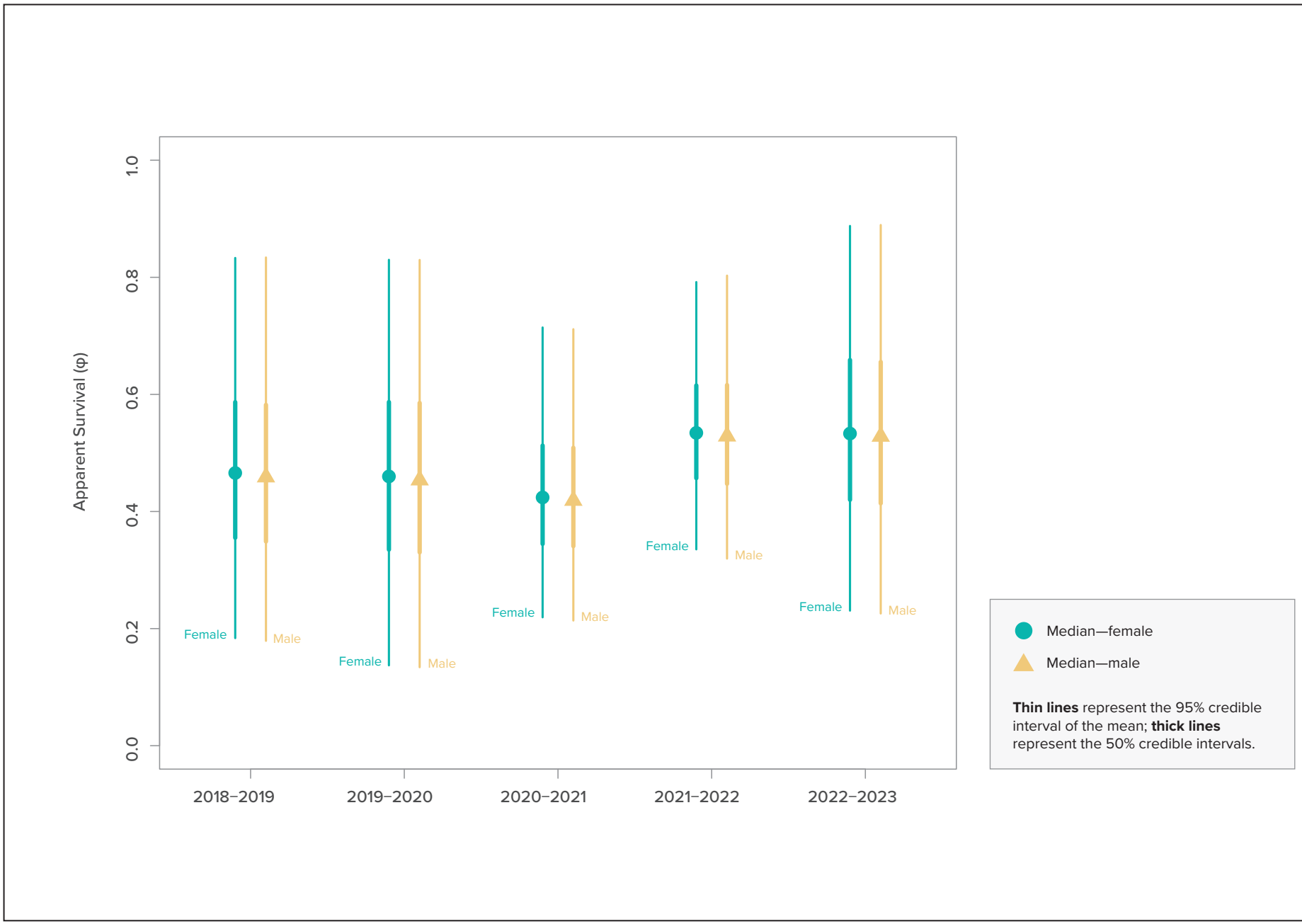


FIGURE 3-9

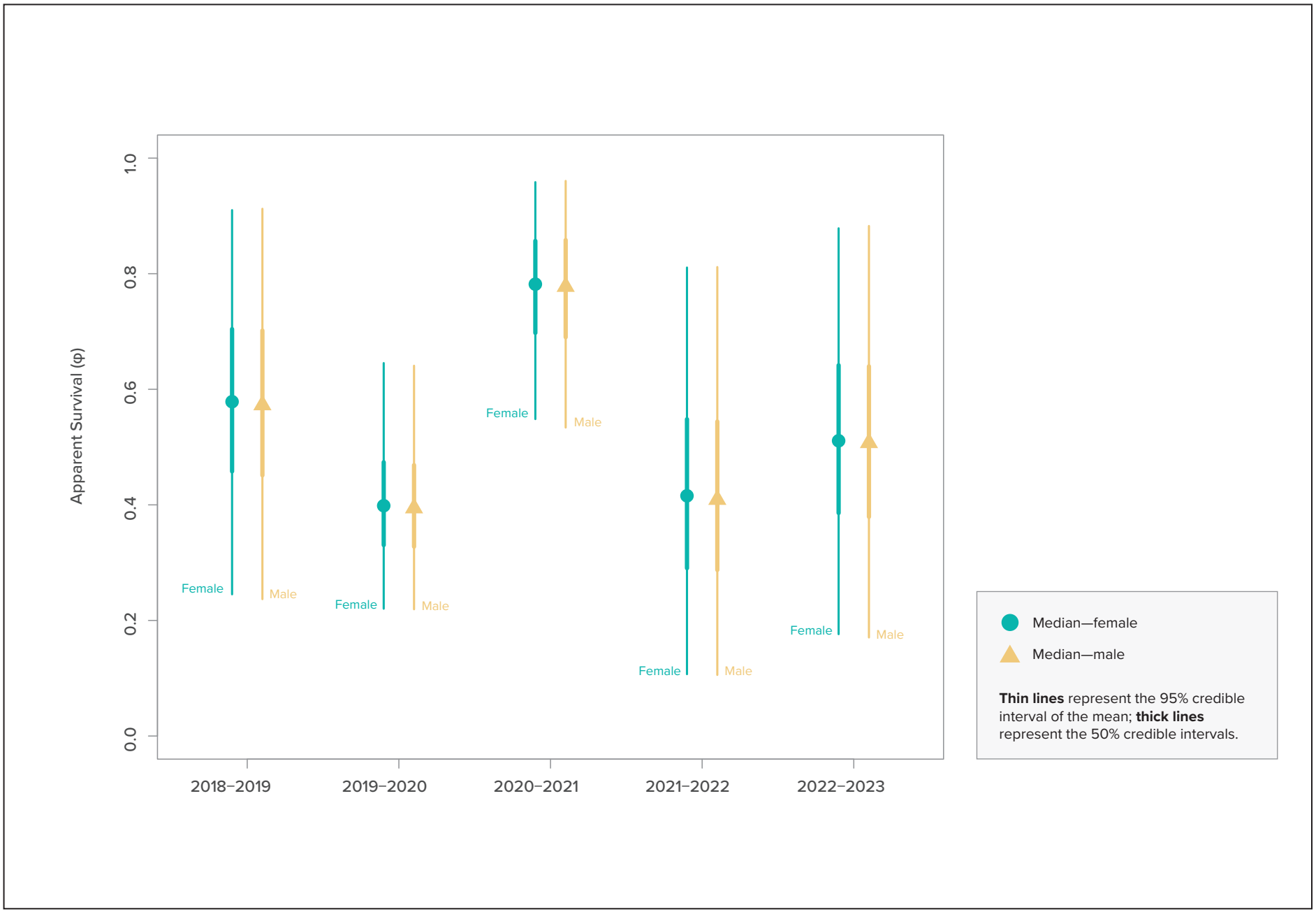
Posterior Distribution of Estimated Giant Gartersnake Survival in the Sampled Area at BKS Based on Spatially-Explicit Capture-Recapture Models, 2018–2023



NBC 104332 2023 (2-19-2024) TG

FIGURE 3-10

Posterior Distribution of Estimated Giant Gartersnake Survival in the Sampled Area at Lucich North Based on Spatially-Explicit Capture-Recapture Models, 2018–2023



NBC 104332 2023 (2-19-2024) TG

FIGURE 3-11

Posterior Distribution of Estimated Giant Gartersnake Survival in the Sampled Area at Sills Based on Spatially-Explicit Capture-Recapture Models, 2018–2023

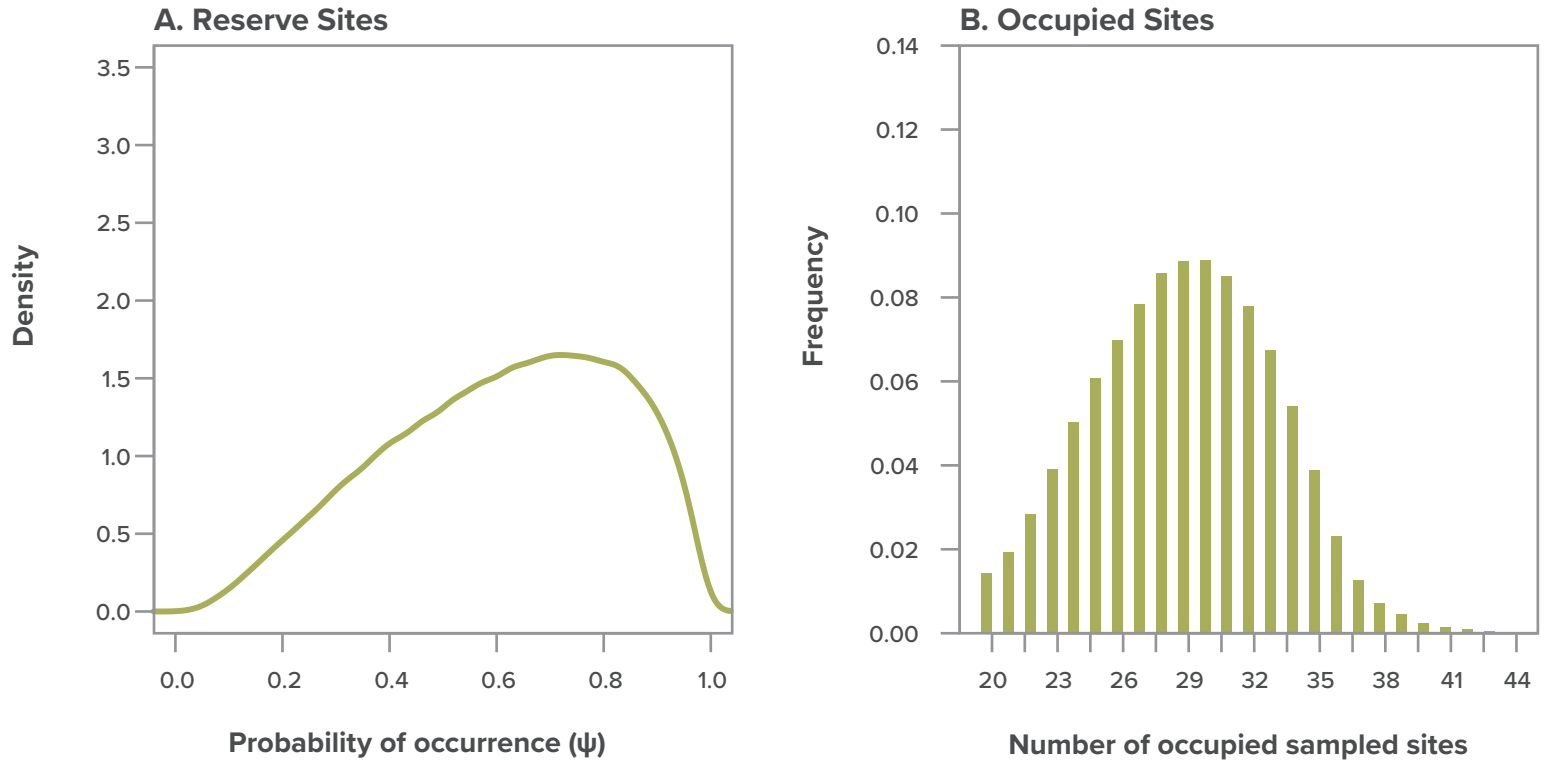
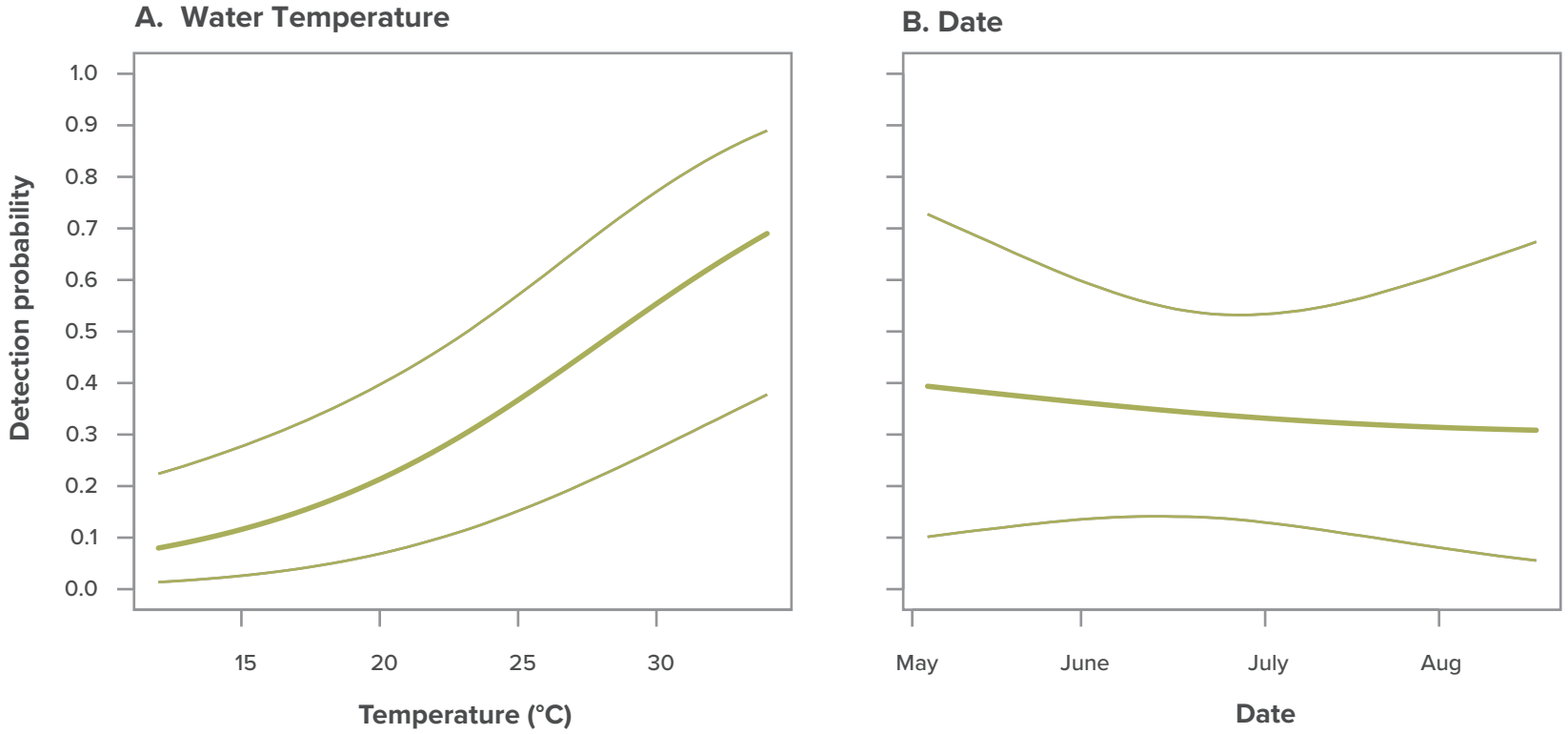


FIGURE 3-12

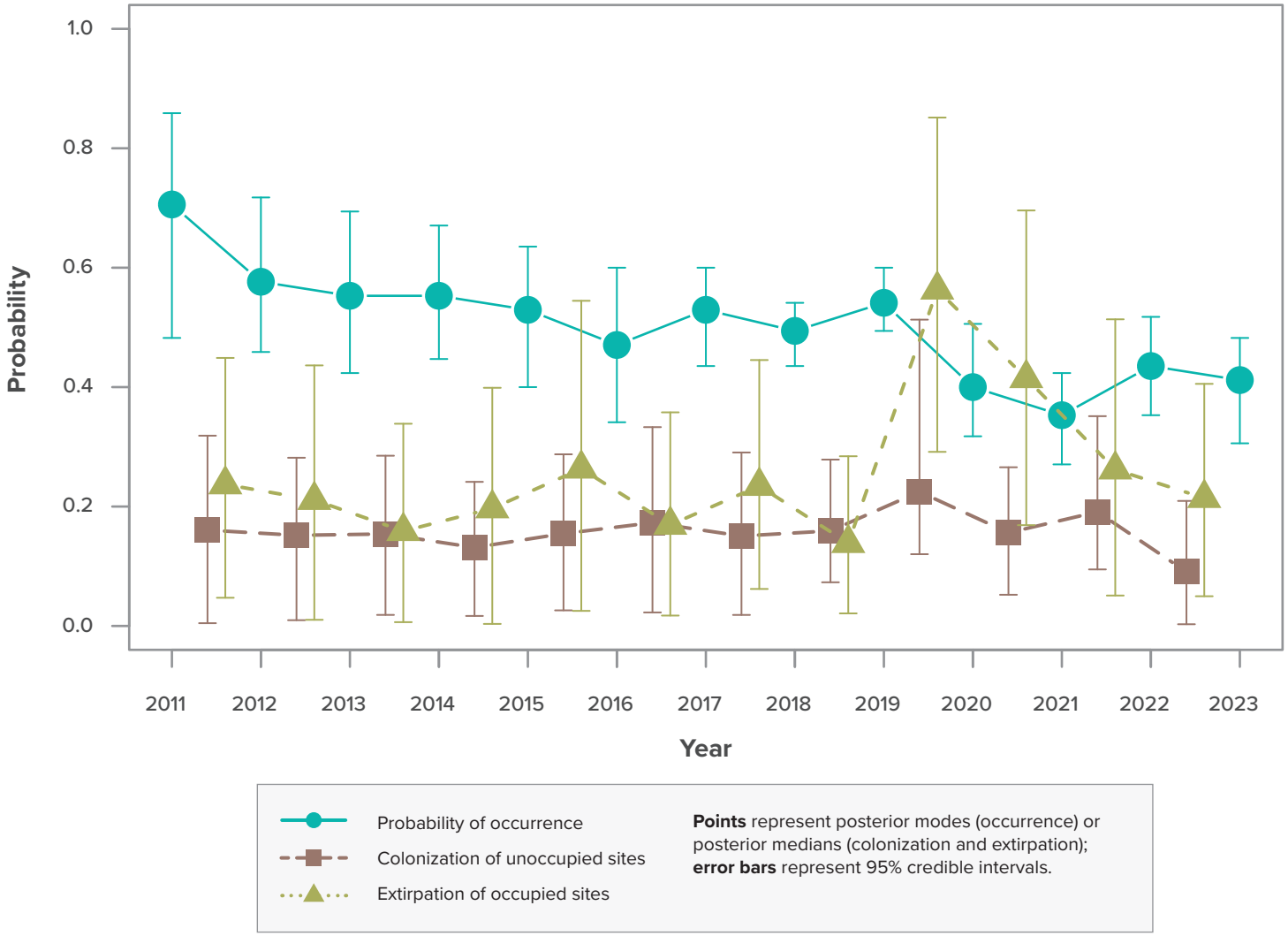
Proportion of Reserve Sites Occupied (A) and Number of Occupied Sites (B) Based on Static Occupancy Models for the Natomas Basin, 2023



Thick lines represent the median detection probability;
thin lines represent 95% credible intervals.

NBC 104332 2023 (2-22-2024) TG

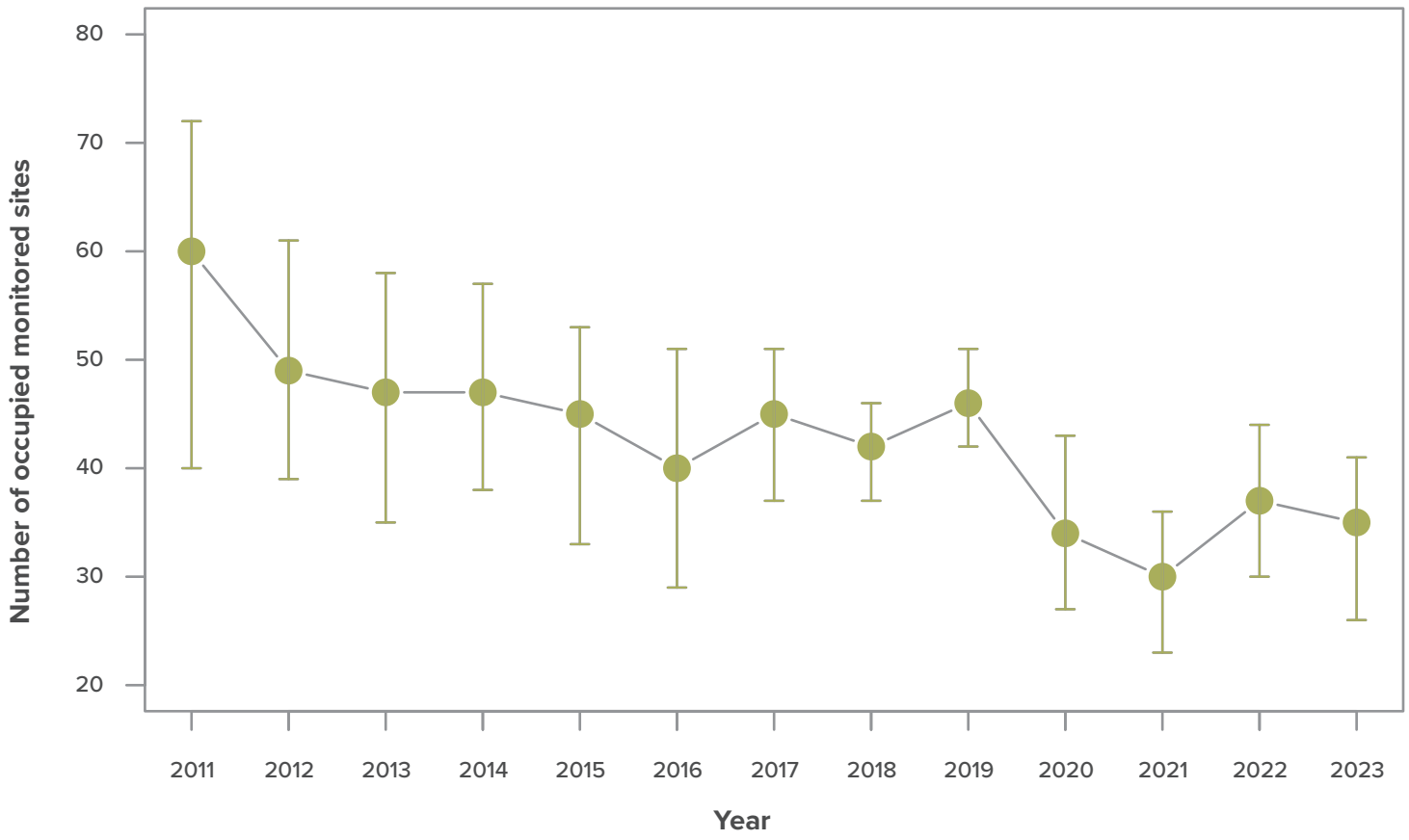
FIGURE 3-13
Effects of (A) Water Temperature and (B) Date on the Detection Probability of Giant Gartersnake in the Natomas Basin, 2023



NBC 104332 2023 (2-22-2024) TG

FIGURE 3-14

Annual Probability of Occurrence of Giant Gartersnake on TNBC Reserves Based on the Dynamic Occupancy Model

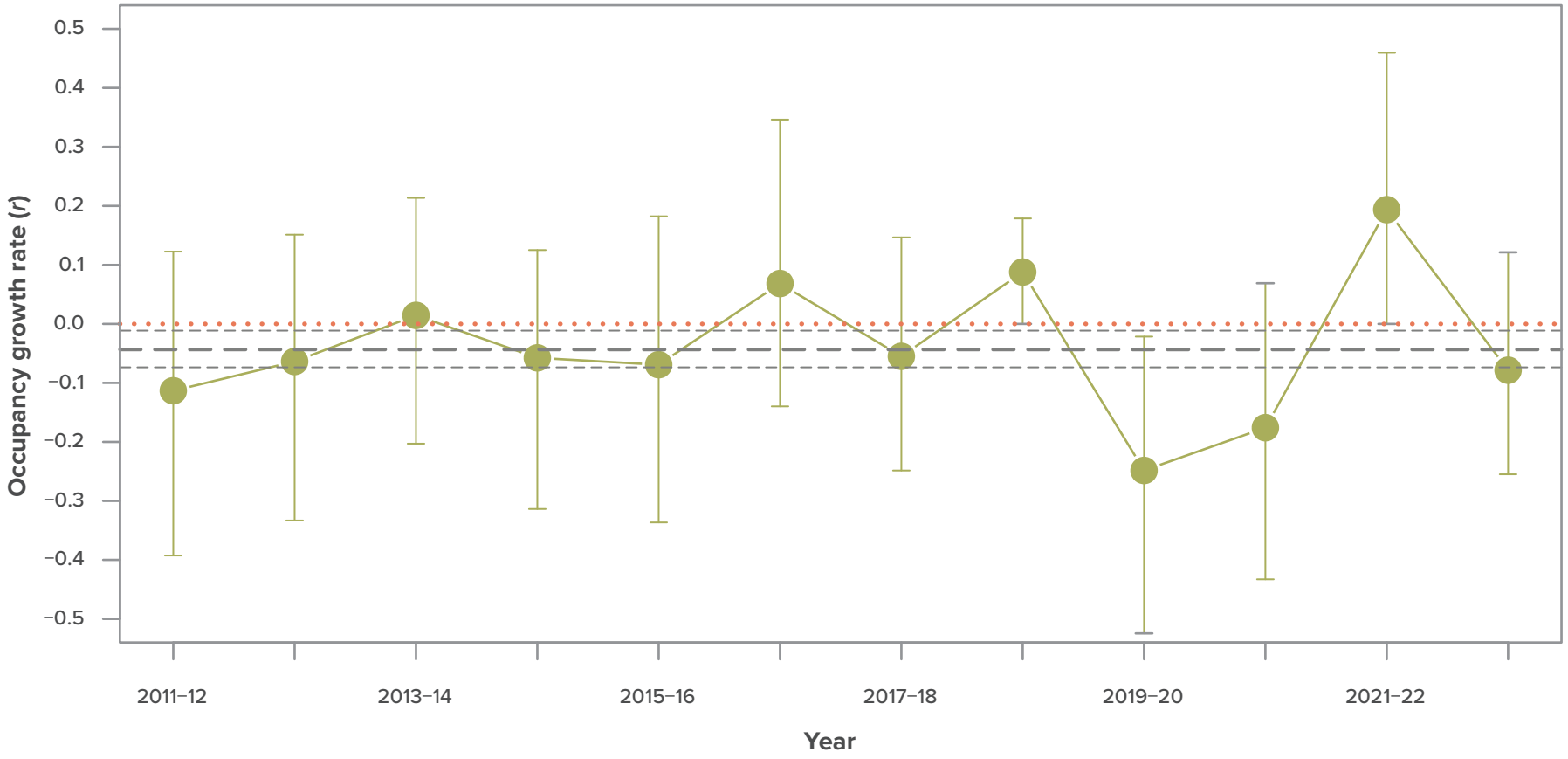


Points represent posterior modes; **error bars** represent 95% credible intervals. Note that 41 sites were sampled in 2022, and a total of 83 unique sites were sampled for giant gartersnake occurrence in at least 1 year from 2011 to 2022.

NBC 104332 2023 (2-22-2024) TG

FIGURE 3-15

Estimated Number of Sampled TNBC Reserve Sites Occupied by Giant Gartersnake



Points represent posterior modes; **error bars** represent 95% credible intervals. The **red dotted line** at 0 indicates no change in occupancy. The mean annual occupancy growth rate from 2011 to 2022 is indicated by the **thick dashed line (mode)** and **thin dashed lines** (95% credible interval).

NBC 104332 2023 (2-22-2024) TG

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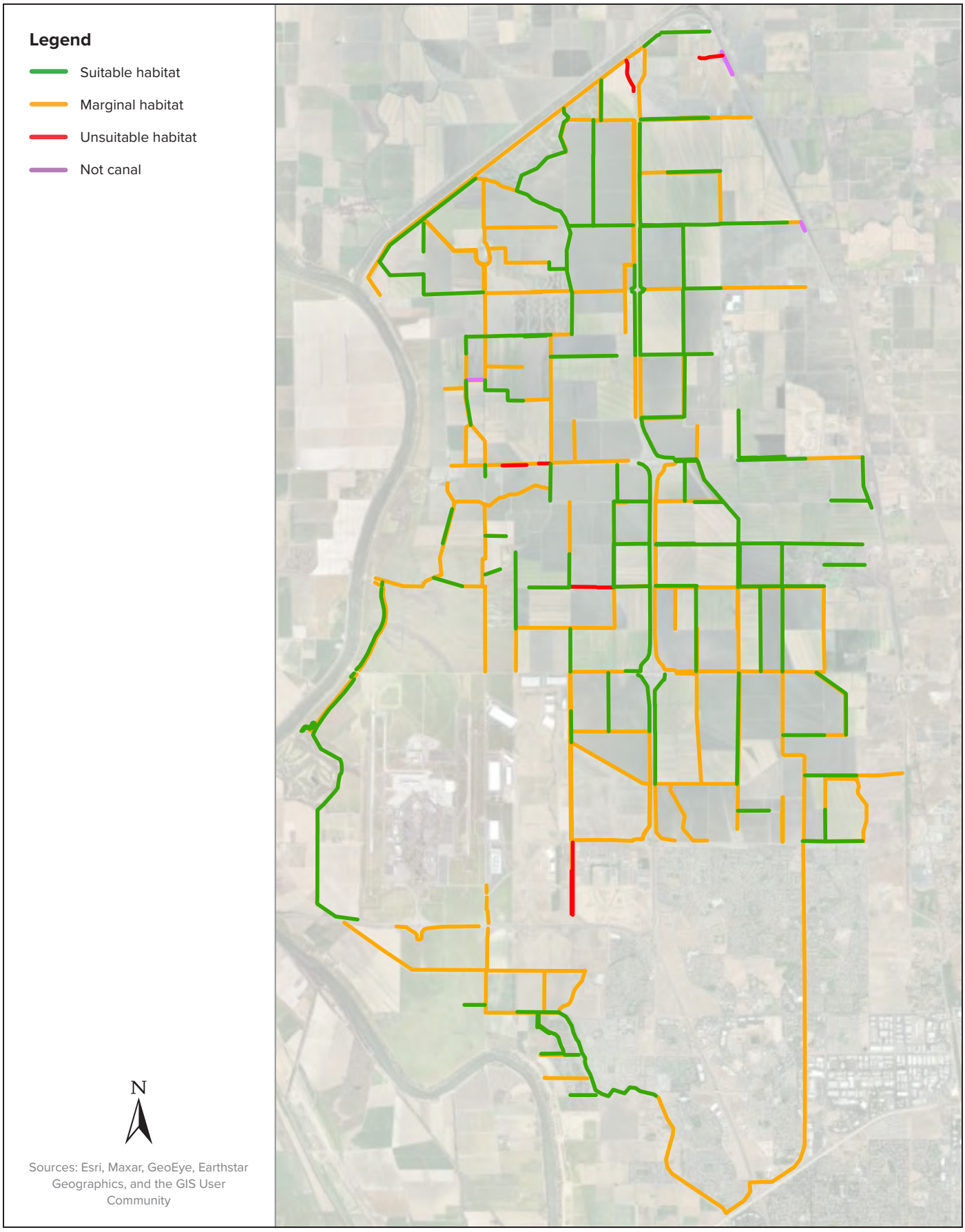
FIGURE 3-16

Annual Intrinsic Rate of Occupancy Growth for Giant Gartersnake in Reserves, 2011–2023



NBC 104332 2023 (2-22-2024) TG

FIGURE 3-17
Suitability of Habitat in the Canals of the Natomas Basin for Giant Gartersnake in 2023

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Chapter 4
Swainson's Hawk

CHAPTER HIGHLIGHTS

- Following the second largest annual increase in 2022, the number of occupied territories declined slightly in 2023, but remained above the average for the 23-year monitoring period. Overall, data obtained from 1999 to 2023 demonstrate a long-term trend of statistically significant increases in number of occupied territories in the Basin. These data indicate a stable but slightly increasing breeding population of Swainson's hawk in the Basin.
- Most measures of reproductive success showed extreme swings in 2023 – a pattern observed annually since 2011 - dropping to the lowest values observed since comprehensive monitoring began. The total number of Swainson's hawk young that fledged in the Basin in 2023 was 2, well below the average of 49. The number of young produced per occupied territory, per active nest, and per successful nest all now exhibit a statistically significant downward trend over the entire monitoring period (1999-2023), a phenomenon observed across the range of the species in California.
- The number of acres of alfalfa and grass hay - crops with the highest value for Swainson's hawk - has increased on reserve lands primarily due to the acquisition of more agricultural reserves. However, the proportion of suitable foraging habitat in the Basin controlled by TNBC (9%) is likely too small to determine if management of reserve lands is contributing significantly to the success of the Swainson's hawk population in the Basin.
- Provision of future nest trees, planting of suitable crops (e.g., alfalfa, grass hay, lightly grazed irrigated pasture, or winter wheat followed by another row crop), and maintenance of vegetative cover on fallow fields are management actions that are most likely to contribute to the effectiveness of reserve lands in supporting the Swainson's hawk population in the Basin.

4.1 Introduction

4.1.1 Background

The NBHCP and its Implementing Agreement (City of Sacramento et al. 2003) require that an annual survey of nesting Swainson's hawks be conducted throughout the Basin (Chapter VI, Section E [2][a][1] of the 2003 NBHCP). In compliance with the conditions described in the NBHCP, this chapter presents the methods, results, and implications of the results of surveys for Swainson's hawk conducted in the Basin from 1999 through 2023.

It should be noted that the study area for this species differs slightly from the study area used in all other monitoring efforts. For the purposes of conducting Swainson's hawk population monitoring, the study area was expanded in 2001 to include the far side of the peripheral water bodies (i.e., the Sacramento River, the Natomas Cross Canal, and Steelhead Creek) because these areas support nesting habitat for Swainson's hawks that forage in the Basin. Moreover, individual pairs may use

alternate nest sites within given territories that span these water bodies. This expanded study area is referred to as *the Basin* in this chapter.

4.1.2 Goals and Objectives

Monitoring efforts for Swainson's hawk are designed to assess the progress of the NBHCP toward meeting the Plan's biological goals and objectives for Swainson's hawk populations and the habitats they use. Swainson's hawk monitoring surveys are designed to achieve the following:

- Document the numbers, distribution, density, and reproductive success of the Swainson's hawk population in the Basin.
- Conduct surveys in a systematic and repeatable manner that will ensure detection of all active Swainson's hawk nests in the Basin from year to year.
- Document changes in land use and availability of foraging habitats throughout the Basin over time.

4.1.3 Life History

4.1.3.1 Status and Range

Swainson's hawk (Figure 4-1) inhabits grassland plains and agricultural regions of western North America during the breeding season and grassland and agricultural regions from Central Mexico to southern South America during the non-breeding season (Bechard et al. 2010; Airola et al. 2019). Early accounts described Swainson's hawk as one of the most common raptors in the state, occurring throughout much of lowland California (Sharp 1902). Since the mid-1800s, the native habitats that supported the species have undergone a gradual conversion to agricultural uses. Today, native grassland habitats are virtually nonexistent in the state, and only remnants of the once-vast riparian forests and oak woodlands still exist (Katibah 1983). This habitat loss contributed to a substantial reduction in the breeding range of the species and has reduced the estimated size of the breeding population by more than 90% in California (Bloom 1980; Bechard et al. 2010).

More recent surveys indicate a larger and possibly expanding breeding population in the Central Valley, which supports approximately 94% of the statewide population (Anderson et al. 2007). The results of the 2005–2006 statewide survey conducted by the California Department of Fish and Wildlife (CDFW) and the Swainson's Hawk Technical Advisory Committee indicated the Central Valley supported an estimated 3,218 (± 947) breeding pairs (Battistone et al. 2019), or between 19% and 80% of the historical population (Bloom 1980). The most recent effort to estimate the statewide population was conducted in 2018 (Furnas et al. 2022) with results suggesting a more substantial recovery of the species in California and an estimated population of 18,810 (95% CI: 11,353–37,228), exceeding the range of the estimated historical population. However, the results are inconsistent with the continuing reduction of suitable foraging habitat in the Central Valley and the results of regional surveys and monitoring efforts, issues which are acknowledged in the Furnas et al. (2022) report. This report also identified potential survey and modeling issues that may have resulted in an overestimation of the size of the population, which led the authors to recommend changes to the protocol for subsequent survey efforts and to caution readers regarding the use of the results to address management implications.

The Central Valley population extends from Tehama County south to Kern County. Yolo, Sacramento, and San Joaquin Counties support the bulk of the Central Valley population (Estep 1989; Battistone et al. 2019) (Figure 4-2). The Central Valley population is geographically isolated from the rest of the breeding population, which extends northward into western and central Canada and eastward to northwestern Illinois (England et al. 1997). Unpublished data from banding studies conducted by R. Anderson, P. Bloom, J. Estep, and B. Woodbridge suggest that no movement occurs between the Central Valley breeding population and other populations. However, results of satellite radio telemetry studies of migratory patterns indicate that birds outside of the Central Valley may occasionally travel through portions of the Central Valley during migration (Kochert et al. 2011).

Despite the loss of native habitats in the Central Valley, Swainson's hawk appears to have adapted relatively well to certain types of agricultural patterns in areas where suitable nesting habitat remains. However, nesting and foraging habitat for Swainson's hawk continues to decline in the Central Valley primarily due to changing agricultural practices and urban expansion.

4.1.3.2 Habitat Use

Swainson's hawks usually nest in large native trees, such as valley oak (*Quercus lobata*), cottonwood (*Populus fremontii*), walnut (*Juglans* spp.), and willow (*Salix* spp.), and with increasing frequency in nonnative trees, such as eucalyptus (*Eucalyptus* spp.). Nests occur in riparian woodlands, roadside trees, trees along field borders, isolated trees, small groves, and on the edges of remnant oak woodlands. Strings of remnant riparian forest along drainages contain the majority of known nests in the Central Valley (Estep 1984; Schlorff and Bloom 1984; Kochert et al. 2011). Nests are usually constructed as high as possible in a tree, providing protection to the nest and increased visibility from the nest (Figure 4-3).

Nesting pairs are highly traditional in their use of nesting territories and nesting trees. Many nest territories in the Central Valley have been occupied annually since 1979, and banding studies conducted since 1986 confirm a high degree of nest site and mate fidelity (Estep unpublished data).

In the Central Valley, Swainson's hawk feeds primarily on small rodents, usually in large fields that support low vegetative cover (providing access to the ground) and high densities of prey (Bechard 1982; Estep 1989, 2009). These habitats are usually hay fields, grain crops, certain row crops, and lightly grazed pasturelands. Fields lacking adequate prey populations (e.g., flooded rice fields) or those that are inaccessible to foraging birds (e.g., vineyards, orchards) are rarely used (Estep 1989, 2009; Babcock 1995; Nur et al. 2019). Urban expansion and conversion of agricultural lands to unsuitable crop types are responsible for a continuing reduction of available Swainson's hawk foraging habitat in the Central Valley.

4.1.3.3 Breeding Season Phenology

Swainson's hawks arrive at the breeding grounds from mid-March to early April (Figure 4-4). Breeding pairs immediately begin constructing new nests or repairing old ones. Eggs are usually laid in mid- to late April, and incubation continues until mid-May when young begin to hatch. The brooding period typically continues through early to mid-July when young begin to fledge (Bechard et al. 2010). Studies conducted in the Sacramento Valley indicate that one or two—and occasionally three—young typically fledge from successful nests (Estep 2007; Estep and Dinsdale 2012; ICF 2019) (Figure 4-5). After fledging, young remain near the nest and are dependent on the adults for approximately 4 weeks, after which they permanently leave the breeding territory (Anderson and

Estep unpublished telemetry data). By mid-August, breeding territories are no longer defended, and Swainson's hawks begin to form communal groups. These groups begin their fall migration from late August to mid-September. Unlike most other Swainson's hawk populations, which migrate to southern Argentina for the winter, the Central Valley population winters from Central Mexico to central South America (Airola et al. 2019).

4.2 Methods

4.2.1 Population Assessment

Surveys were conducted by systematically driving all available roads within the Basin, including both sides of all peripheral drainages. Where roads could not be used, surveys were conducted on foot. All potential nesting trees were searched with binoculars and/or a spotting scope for nests and adult Swainson's hawks.

Surveys were conducted in three phases. Phase 1 surveys were conducted early in the breeding season (late March to mid-April) to (1) detect Swainson's hawk activity at previously known nest sites as well as in all other suitable nesting habitats, and (2) to detect early nest failures that might otherwise be missed. All suitable nesting habitats were checked for the presence of adult Swainson's hawks and to note nesting activity and behavior (e.g., nest construction, courtship flights, defensive behavior). Activity was noted and mapped, and nest locations were documented using a global positioning system receiver.

Phase 2 surveys were conducted from mid-May through June to (1) determine whether potentially breeding pairs detected during Phase 1 surveys were nesting, and (2) resurvey all previously unoccupied potential nesting habitat for late-nesting pairs and for active nests that may have gone undetected during Phase 1 surveys.

Phase 3 surveys were conducted during July to determine nest success and record the number of young fledged per nest. Incidental observations, such as foraging, roosting, and other sightings of adult Swainson's hawks, were also noted.

An *occupied territory* is defined as a nest site that was occupied by a pair of Swainson's hawks, regardless of the reproductive outcome. An *active nest* is defined as a nest in which eggs are laid. A *successful nest* is defined as a nest from which young fledged. A *failed nest* is defined as a nest in which eggs were laid but from which no young were fledged.

4.2.2 Habitat Assessment

The distribution and abundance of land cover/crop types throughout the Basin, both on and off reserve lands, are documented annually (see Chapter 2, *Land Cover Tracking)*. These data are used to document any changes in the distribution and abundance of suitable Swainson's hawk foraging habitat throughout the Basin.

4.3 Results

4.3.1 Population Assessment

Swainson's hawks continued to nest primarily in the southern portion and along the far western and northern edges of the Basin in 2023. The nest sites are predominantly located along the Sacramento River and within approximately 1 mile of the river (Appendix D). These areas support suitable habitat for both nesting and foraging. Potential nest trees are distributed along roadsides, in remnant riparian and oak woodlands, and as isolated trees; foraging habitat is present in the upland row crops that dominate this part of the Basin. Conversely, most of the Basin north of Elkhorn Boulevard and east of Powerline Road is less suitable for nesting or foraging by Swainson's hawks because it is dominated by rice production, which provides limited foraging value, and there are relatively few potential nest trees in this area.

A total of 151 current and historical Swainson's hawk nesting territories were monitored during 2023 (Table 4-1). However, many of these territories are assumed to represent alternative nesting locations for the same breeding pairs. In instances where individual birds are marked (i.e., color banded) and can be identified, or where a new nest site occurs in proximity to a known and unoccupied nest with no other known territories in the immediate vicinity, the site is considered an alternate nest of a known territory. In the absence of either of these conditions, the site is considered a new territory. Therefore, although the number of territories may increase each year, this increase does not necessarily reflect new breeding pairs within the study area.

Changes in the number of occupied Swainson's hawk nesting territories, the number of successful nests, and the total number of young fledged from 2001 through 2023 are listed in Table 4-2 and depicted in Figure 4-6. Although the number of occupied territories decreased by 7 from 69 in 2022 to 62 in 2023, the number of occupied territories in 2023 remained well above the average of 57 over the study period and the statistically significant upward trend in the number of occupied territories over the study period is still evident ($R^2 = 0.614$, $P < 0.001$, Figure 4-7).

The high annual variation in reproductive success that has characterized the breeding population since 2011 continued in 2023. There have been five precipitous drops in most measures of reproductive success, including the total number of successful nests, total number of young fledged, the number of young per occupied territory, and the number of young per active nest. In all cases, reproductive metrics have rebounded the following year, often dramatically (Figures 4-6 and 4-8). Since the first precipitous drop in 2011, reproductive metrics have exhibited a high degree of annual variation, suggesting instability in the population. The number of young produced per occupied territory, per active nest, and per successful nest all now exhibit a significant downward trend over the monitoring period ($R^2 = 0.217$, $P = 0.025$; $R^2 = 0.197$, $P = 0.034$; and $R^2 = 0.548$, $P < 0.001$, respectively).

Following a modest rebound in 2022, most measures of reproductive success dropped substantially in 2023 to the lowest values since monitoring began. A similar reproductive crash occurred in 2019 when only five pairs nested successfully. Two pairs fledging a total of two young in 2023 indicates a near total loss of the 2023 reproductive cohort for the Basin breeding population. The reproductive rate (young produced per occupied territory) is significantly negatively correlated with the number of pairs (i.e., occupied territories) that fail to nest at all ($R^2 = 0.683$, $P < 0.001$). Both the 2019 and 2023 crashes in the reproductive rate are consistent with results from other areas of the Central

Valley, particularly the Sacramento Valley (Estep 2020, Estep pers obs.) and not unique to—or based on conditions within—the Basin.

Although a failure to nest is the most significant factor contributing to low reproductive rates, particularly in 2019 and 2023, there is also a significant decline in the number of young produced per successful nest (a measure of brood size) over the monitoring period (R^2 = 0.548, P < 0.001, Figure 4-9). While the cause(s) of this decline are unknown, the number of young fledged per successful nest is also negatively correlated with the number of occupied territories each year (R^2 = 0.352, P = 0.003), which is consistent with the hypothesis of a density-dependent response in this metric.

In 2023, there were 26 active nesting territories along the Sacramento River, a decrease of 9 from 2022, and slightly less than the average of 28 since 2001 (Table 4-3, Figure 4-10). Although the total number of nesting pairs along the Sacramento River fluctuates substantially from year to year ($\bar{x}$ = 28.8; SD = 3.9), there is no discernible trend over time. This relative constancy in the mean number of pairs has persisted despite continuing home construction, ongoing tree removal, and increasing human disturbances, including disturbance associated with implementation of the SAFCA NLIP along the east side of the river. Many pairs have alternate nest sites on both sides of the river, allowing for changes in nest site location in response to local disturbances.

Swainson's hawks often use alternate nest sites within the breeding territory. Of the 62 active territories in 2023, 47 (76%) have one or more alternate nest sites. Of the 23 pairs that nested in 2023, all used alternative nest trees that had been previously documented. No new nest trees were documented in 2023. All the alternate nest trees were in the immediate vicinity of previously used nest trees.

Historical activity within the 62 active territories is variable but indicates the extent of territory fidelity and the tendency toward long-term occupancy. Twenty-four (39%) of the territories were first reported active during or before the first year of monitoring under the current protocols in 2001 and, although some have been inactive in some of the intervening years, most have been mostly consistently active throughout the entire 23-year monitoring period. Forty-three (70%) of the 62 active territories were first reported active prior to 2010.

No Swainson's hawk nest trees were removed in 2023; however, several were damaged during spring storm events and one (NB-74) was trimmed to reduce interference with overhead distribution lines, severely reducing its suitability as a nest tree. Although many potential nest trees were removed during levee construction activities associated with the SAFCA NLIP, restoration actions have established new potential replacement trees near the toe of the new levee. These trees are expected to provide new potential nesting habitat when they reach maturity. Although no Swainson's hawk nest trees were removed within the NLIP in 2023, a total of nine have been removed since implementation of the NBHCP, seven of which resulted in the apparent abandonment of the nesting territory (Table 4-1). Levee construction activities on the next phase of the NLIP began in 2019 and continued through the 2023 breeding season. Numerous mature valley oak and other native trees were removed from the land side of the existing levee south of Powerline Road. Additional tree removal is planned as the project moves southward. There are no reported nests within the project right-of-way; however, substantial suitable nesting habitat is present and will be removed to expand the levee. Construction disturbance from levee construction activities is also likely to affect nesting activity and reproductive output of active nests that occur on the water side of the levee.

Competition with other nesting raptors also influences the distribution and abundance of nesting Swainson's hawks. For example, in 2022, 19 previously documented Swainson's hawk territories were occupied by nesting red-tailed hawks and great-horned owls.

Sources of adult or nestling mortality are usually difficult to confirm but presumably include predation by great-horned owls and direct disturbances to nests from construction or recreational activities that result in nest abandonment. Collisions with airplanes have also been documented but are difficult to quantify. In 2014, Sacramento County Airport System (SCAS) reported four adult Swainson's hawk fatalities resulting from collisions with aircraft, including the banded (i.e., identifiable) adult female from territory NB-107, immediately west of the airport perimeter fence. SCAS staff reported two Swainson's hawk fatalities from collision with aircraft in 2017, two in 2018, one in 2020, and one in 2021. Data were not available for 2023.

4.3.2 Habitat Assessment

The distribution of suitable Swainson's hawk foraging habitat in 2023 is shown on Figure 4-11, while changes in the total acres of three general categories of Swainson's hawk foraging habitat (upland agriculture, fallow lands, and grasslands) are listed in Table 4-4 and depicted on Figure 4-12. The biggest driver of the total number of acres of suitable Swainson's hawk foraging habitat is the number of acres of fallow lands, which itself is driven primarily by the total acres of fallow rice lands. Although fallow upland agricultural fields can provide valuable Swainson's hawk foraging habitat, fallow rice fields likely provide the lowest value habitat of any other land cover type considered suitable for foraging by Swainson's hawks.

Basin-wide foraging habitat increased 42% from 2021 to 2022 due primarily to the increase in fallow rice fields caused by the extensive drought in California. In 2023, the was a concomitant decrease in total foraging habitat resulting from the resumption of rice agriculture following one of the wettest winters ever recorded in California.

Suitable habitat on reserve lands increased substantially due primarily to the acquisition of new reserve tracts with an upland agriculture component. Most of the new land acquisitions with an upland agricultural component were in alfalfa or grass hay when acquired, and these two habitats have the highest value for Swainson's hawk foraging.

The total amount of alfalfa and the total amount of grasslands Basin-wide has decreased significantly over time (R^2 = 0.342, P = 0.008 and R^2 = 0.337, P = 0.007, respectively), despite the creation of new grasslands by the SAFCA NLIP project. Conversely, there has been no significant increase or decrease over the monitoring period in total acres of upland agriculture, fallow lands, or total Swainson's hawk foraging habitat.

There is no correlation between the number of occupied territories each year and the total acreage of suitable forging habitat in the Basin (R^2 = 0.098, P = 0.178), the acreage of upland row and field crops (R^2 = 0.075, P = 0.242), or the total acreage of alfalfa each year (R^2 = 0.085, P = 0.226). However, the total number of occupied territories is negatively correlated with the total acres of grassland habitat in the Basin (R^2 = 0.273, P = 0.018). This counterintuitive result is likely due to the fact that the majority of grasslands converted to other land cover types were probably of lower habitat value in areas seldom used by Swainson's hawks (e.g., ruderal habitats within or adjacent to developed areas).

No measures of reproductive success were significantly correlated with the total acreage of any of the categories of Swainson's hawk suitable foraging habitat in the Basin, with one exception. The number of young produced per successful nest is positively correlated with the Basin-wide total acres of alfalfa (R^2 = 0.214, P = 0.046).

The reserve system currently accounts for approximately 9% of the suitable Swainson's hawk foraging habitat in the Basin. Consequently, the extent to which TNBC-managed land will be able to influence the trajectory of the Swainson's hawk population in the Basin is currently limited.

4.4 Discussion

Trends over time in the number of occupied territories indicate a stable but slightly increasing breeding population of Swainson's hawks in the Basin. However, the pattern of relatively high territory occupancy and low reproductive metrics, which began in 2011, continued through 2023. The dramatic declines in reproductive metrics that began in 2011 have always been followed by a significant rebound the following year. However, declines have been more substantial than the subsequent rebounds and most reproductive metrics now exhibit a statistically significant decline over the monitoring period. The declines in 2019 and 2023 were part of a broader condition throughout the Central Valley.

Although it remains speculative, in any given year the likely causes for this widespread lack of production among Swainson's hawk and other raptor species nesting in the Central Valley include drought, late-spring storms, changes in agricultural patterns or practices, or more subtle climate-change phenomena — which may affect prey (i.e., rodent) populations — or possibly a natural cyclical decline in microtine rodents, or a combination of these factors. The arrival dates of Swainson's hawks on the breeding grounds and the pattern of territory establishment were typical from 2019 to 2022, and territory occupancy was relatively high, suggesting that the decline in reproductive performance is related to food resources. However, data from the Basin and elsewhere in the Central Valley showed later arrival dates on the breeding grounds in 2023, with most areas reporting arrival at least 2 weeks later than is typical, suggesting the possible contribution of weather or climate effects on nest establishment and reproductive output. The significant decline over the monitoring period in the number of young per successful nest, which is a reproductive metric influenced by clutch size and brood size, is unusual because of the intrinsic invariability in the metric (i.e., it is derived from a series of mostly 1s and 2s), but not unprecedented. The breeding population of Swainson's hawk in Saskatchewan Province, Canada, experienced a similar long-term decline in the number of young fledged per successful nest that coincided with a decline in Richardson's ground squirrel (*Urocitellus richardsonii*), the principal prey species (Houston and Schmutz 1995). Annual variation in clutch or brood size is common among some raptor species (including Swainson's hawk) that rely to a large extent on a single prey species, particularly if that species is subject to its own reproductive cycles, such as the California vole (*Microtus californicus*). However, a gradual and long-term decrease in average clutch or brood size may suggest a change in habitat conditions, such as the continuing conversion of row and field crop habitats to orchards or other crop types that could influence the availability of Swainson's hawk food resources (Bechard 1983). The increase in the number of occupied territories in conjunction with a decrease in the number of young per successful nest is also consistent with a density-dependent response in the reproductive rate to an increase in the size of the breeding population. Other potential (but less likely) contributing factors include pesticide contamination that reduces eggshell thickness or

disease. Given the correlation between the Basin-wide acres of alfalfa and the number of young produced per successful nest, it is possible that alfalfa provides food resources at a critical time (egg laying or incubation period) for brood development.

The lack of any positive correlation between the number of occupied territories and any metric of Swainson's hawk foraging habitat may indicate that the Basin provides only a portion of the foraging habitat required for this population, which is consistent with recent radio telemetry studies that demonstrated substantial use of out-of-Basin foraging habitats by Swainson's hawks nesting in the Basin (Fleishman et al. 2016).

The 2023 distribution of nest sites remained similar to past years, with the bulk of the nests occurring in trees along the perimeter drainages, primarily the Sacramento River and the Natomas Cross Canal. Most of the remaining nest sites are in the south Basin (i.e., south of Elkhorn Boulevard) and along the western edge of the Basin.

Nest tree removal and conversion of agricultural foraging habitat, mostly because of urbanization, have historically resulted in the removal of some nesting territories in the south Basin. The 2008 moratorium on planned and proposed urbanization because of levee-related restrictions was lifted in 2017, and development has resumed, primarily in the south Basin. As a result, suitable nesting and foraging habitat is expected to decline more rapidly within the Basin in the near future, which could result in nesting pairs being displaced. Recent urbanization in the Basin south of Elkhorn Boulevard and east of Powerline Road has - and continues to - remove suitable foraging habitats. Nesting territories in this area, such as NB-27 and NB-140, that are becoming increasingly surrounded by urbanization, are expected to eventually be abandoned. Others, such as NB-98 and NB-63, are subject to increasing risk due to recent urbanization within the territory. However, despite this loss, which was anticipated in the NBHCP, the management of reserve lands and other suitable nesting and foraging habitats in the Basin have contributed to maintaining a stable and even increasing Swainson's hawk nesting population.

The ongoing loss of trees could limit future nesting opportunities and the ability of the Swainson's hawk population to respond to habitat changes throughout the Basin. The County of Sacramento continues to allow residential development on the water side of the Sacramento River levee, which accelerates tree loss as riparian vegetation is cleared for home sites. These projects, along with tree and brush clearing for vegetation management and a fire on the east side of the river just north of Powerline Road in 2010, have cumulatively contributed to additional riparian tree loss. This loss of potential nesting trees and the increase in human disturbance along the river could potentially result in territory abandonment and limit opportunities for relocation of displaced nesting pairs and the establishment of new nesting sites.

In addition, SCAS, citing Federal Aviation Administration regulations, has removed trees on airport lands that are considered potential hazard trees due to bird use (County of Sacramento 2006). Although these actions may have been warranted to meet federal safety regulations, they have resulted in the removal of a substantial number of mature trees, including sites known to be used by Swainson's hawks as nest sites. No active nest trees were removed by SCAS in 2023.

SCAS also implements a wildlife hazard management plan to minimize the potential for bird strikes with planes on airport lands (Sacramento County Airport System 2007). This program involves the removal of a variety of bird species, including raptors. The loss of individual Swainson's hawks through this program is inconsistent with the goals of the NBHCP with respect to the maintenance of existing Swainson's hawk population levels in the Basin. Despite implementation of the wildlife

hazard management plan, airplane collision with birds at Sacramento International Airport (SMF) is a cause of mortality that could adversely affect the Natomas Basin Swainson's hawk population. Much of the land within the SMF perimeter fence is managed as a short grassland, which is attractive to foraging Swainson's hawks and other raptors, putting them at risk of collision with planes landing or taking off. Collision mortality during the breeding season can result in the abandonment of active nests and loss of productivity and increase adult turnover in the breeding population.

Implementation of the SAFCA NLIP has resulted in impacts on the Swainson's hawk population, but effects have generally been short term and appear to be mitigated. Despite the changes in habitat value resulting from levee and canal construction activities, tree removal, restoration activities, and related disturbances that may have been responsible for some nest failures in the last several years, the distribution of nesting pairs in the area affected by levee construction remains relatively stable. In addition, the restored grassland habitats in the area of the SAFCA NLIP provide moderate- to high-value foraging habitat and may also provide refugia for voles and other prey populations on adjacent agricultural lands, while the restored woodland habitats are expected to provide future nesting opportunities.

The majority of major levee construction activities from the Natomas Cross Canal to Powerline Road—coordinated by SAFCA—have been completed; however, the next phase of the project, from Powerline Road southward, which began in 2019 and continued through 2023, is largely completed south to San Juan Road and is nearing completion south to Interstate 80. Levee work will continue south of San Juan Road through at least 2024. The landside levee construction is coordinated by USACE, including the removal of trees along the remaining portion of the Sacramento River and along Steelhead Creek, and could adversely affect nesting activity in those areas.

4.5 Effectiveness

Biological effectiveness as it pertains to Swainson's hawk is measured on the basis of acquisition of reserve lands and management activities that meet the goals for Swainson's hawk habitat, as well as the population's response to these actions. Effectiveness is also measured through successful implementation of management recommendations designed to further benefit Swainson's hawk through targeted land acquisition or specific land management activities.

As discussed above, the status of the Swainson's hawk population in the Basin remains stable to slightly increasing, as measured by the number of occupied territories (Table 4-2). Evidence to date thus indicates that implementation of the NBHCP and Metro Airpark HCP has been effective in conserving the nesting population of Swainson's hawks in the Basin. However, additional population effects could become evident as urbanization of the Basin continues post-release of the building moratorium and actions unforeseen by the NBHCP continue, such as the continuation of the SAFCA NLIP south of Powerline Road, bird control actions by SCAS, bird-aircraft collision mortality, continued disturbance and habitat removal along the east side of the Sacramento River, or possibly factors affecting hawks outside the breeding season (i.e., on wintering habitats).

Swainson's hawk habitat goals continue to be met through establishment and management of suitable upland habitat, including the planting of potential future nesting trees, on reserve lands. The first documented active nest on an NBHCP Reserve tract was a nest on the BKS tract in 2005. 2019 marked the second year that Swainson's hawks occupied a nest on an NBHCP Reserve tract. A nesting pair established a new nest in a small group of trees planted in 2007 between the Huffman

East and Huffman West tracts in the North Basin Reserve. In 2020, a third Swainson's hawk nest site was found on the Atkinson tract of the North Basin Reserve. The nest was near the southern end of the cottonwood grove, where the nesting pair successfully fledged two young.

Swainson's hawk habitat has been a key consideration in reserve land acquisition. Acquisitions have generally been consistent with recommendations in the *Biological Effectiveness Monitoring Report* for the last several years.

4.6 Recommendations

The following management recommendations are provided to ensure that the biological goals and objectives identified in the NBHCP and MAPHCP are met or exceeded for this species. These recommendations are based on the data presented in this chapter, observations in the field, and the expertise of the chapter authors.

- Maximize acreage planted in alfalfa or similar grass hay or lightly grazed irrigated pasture habitats that minimize the annual removal of cover for small mammal prey species.
- Leave agricultural lands unplowed for as long as possible post-harvest so that vegetative cover supporting small mammal populations continues to provide foraging habitat for Swainson's hawk.
- Provide uncultivated field borders next to upland agricultural fields composed of native grasses, forbs, pollinator species, or other forms of permanent herbaceous cover to provide refugia for populations of small mammal prey species in areas where such refugia do not already exist.
- Work with the County of Sacramento to raise awareness of the importance of native trees along the Sacramento River to provide current and future nesting habitat for Swainson's hawk.
- Manage fallow lands with cover crops or other techniques to increase prey production for Swainson's hawk.

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Table 4-1. Results of 2023 Swainson's Hawk Surveys, NBHCP Area.

Territory Number	Status[a]	Number of Young	Nesting Habitat	Nest Tree Species[b]
NB-1	A-X	0	Urban	Valley oak
NB-2	I		Urban	Cottonwood
NB-3	NLE		Isolated tree—removed in 2003	Valley oak
NB-4	I		Riparian	Cottonwood
NB-5	I		Riparian	Willow
NB-6	I		Ornamental grove	Eucalyptus
NB-7	NLE		Isolated trees—removed in 2002	Willow
NB-8	A-X	0	Roadside tree row—ornamental	Cottonwood
NB-9	I		Channelized riparian	Cottonwood
NB-10	I		Isolated tree – removed in 2021	Cottonwood
NB-11	I		Riparian	Valley oak
NB-12	A-X	0	Riparian	Cottonwood
NB-13	A-F	0	Riparian	Oregon ash
NB-14	A-U		Tree row—ornamental	Eucalyptus
NB-15	NLE		Isolated tree—removed in 2002	Valley oak
NB-16	A-F	0	Oak grove	Cottonwood
NB-17	NLE		Isolated tree—removed in 1998	Valley oak
NB-18	I		Isolated tree	Cottonwood
NB-19	A-F	0	Tree along irrigation canal	Cottonwood
NB-20	NLE		Isolated tree—removed in 2002	Cottonwood
NB-21	A-X	0	Riparian	Cottonwood
NB-22	A-X	0	Isolated tree	Willow
NB-23	I		Riparian	Willow
NB-24	A-U		Riparian	Valley oak
NB-25	I		Riparian	Walnut
NB-26	NLE		Roadside tree—removed in 2002	Valley oak
NB-27	I		Riparian	Cottonwood
NB-28	I		Riparian	Cottonwood
NB-29	A-X	0	Riparian	Willow
NB-30	I		Riparian	Cottonwood
NB-31	I		Riparian	Willow
NB-32	A-F	0	Riparian	Cottonwood
NB-33	I		Riparian	Cottonwood
NB-34	I		Riparian	Cottonwood
NB-35	I		Riparian	Cottonwood
NB-36	I		Riparian	Cottonwood
NB-37	A-X	0	Riparian	Cottonwood
NB-38	A-X	0	Riparian	Cottonwood
NB-39	A-X	0	Riparian	Willow
NB-40	I		Riparian	Cottonwood
NB-41	I		Riparian	Willow
NB-42	I		Riparian	Cottonwood
NB-43	A-X	0	Riparian	Cottonwood
NB-44	A-F	0	Riparian	Cottonwood

Table 4-1 Continued

Territory Number	Status[a]	Number of Young	Nesting Habitat	Nest Tree Species[b]
NB-45	I		Riparian	Cottonwood
NB-46	I		Riparian	Cottonwood
NB-47	A-F	0	Riparian	Cottonwood
NB-48	I		Riparian	Cottonwood
NB-49	I		Riparian	Cottonwood
NB-50	I		Riparian	Sycamore
NB-51	I		Riparian	Cottonwood
NB-52	A-X	0	Riparian	Cottonwood
NB-53	A-X	0	Riparian	Cottonwood
NB-54	I		Riparian	Cottonwood
NB-55	A-X	0	Riparian	Cottonwood
NB-56	I		Riparian	Cottonwood
NB-57	A-X	0	Riparian	Cottonwood
NB-58	I		Riparian	Cottonwood
NB-59	A-F	0	Riparian	Cottonwood
NB-60	A-F	0	Riparian	Cottonwood
NB-61	I		Riparian	Cottonwood
NB-62	I		Riparian	Cottonwood
NB-63	I		Isolated tree	Willow
NB-64	A-F	0	Riparian	Valley oak
NB-65	A-F	0	Cottonwood grove	Cottonwood
NB-66	I		Riparian	Cottonwood
NB-67	I		Riparian	Cottonwood
NB-68	A-X	0	Riparian	Sycamore
NB-69	I		Urban ornamental	Willow
NB-70	I		Riparian	Valley oak
NB-71	A-X	0	Riparian	Willow
NB-72	I		Riparian	Cottonwood
NB-73	NLE		Tree row – removed in 2019	Ornamental conifer
NB-74	A-F	0	Roadside tree	Willow
NB-75	A-U		Riparian	Cottonwood
NB-76	NLE		Tree row—removed in 2004	Cottonwood
NB-77	A-X	0	Riparian	Cottonwood
NB-78	I		Riparian	Cottonwood
NB-79	I		Riparian	Sycamore
NB-80	I		Riparian	Cottonwood
NB-81	I		Isolated tree	Cottonwood
NB-82	I		Riparian	Willow
NB-83	A-X	0	Riparian	Willow
NB-84	I		Riparian	Cottonwood
NB-85	I		Riparian	Cottonwood
NB-86	A-U		Riparian	Cottonwood
NB-87	A-X	0	Riparian	Cottonwood
NB-88	I		Riparian	Cottonwood

Table 4-1 Continued

Territory Number	Status[a]	Number of Young	Nesting Habitat	Nest Tree Species[b]
NB-89	I		Riparian	Valley oak
NB-90	I		Riparian	Willow
NB-91	A-F	0	Riparian	Cottonwood
NB-92	I		Riparian	Cottonwood
NB-93	I		Riparian	Cottonwood
NB-94	A-X	0	Riparian	Cottonwood
NB-95	A-U		Riparian	Valley oak
NB-96	A-F	0	Riparian	Cottonwood
NB-97	I		Tree row	Eucalyptus
NB-98	I		Tree row	Eucalyptus
NB-99	I		Urban	Ornamental pine
NB-100	I		Riparian	Walnut
NB-101	A-F	0	Riparian	Cottonwood
NB-102	I		Riparian	Cottonwood
NB-103	I		Riparian	Cottonwood
NB-104	I		Riparian	Black locust
NB-105	A-F	0	Riparian	Cottonwood
NB-106	I		Roadside	Cottonwood
NB-107	A-X	0	Riparian	Cottonwood
NB-108	I		Ornamental (freeway rest stop)	Cottonwood
NB-109	I		Tree row	Valley oak
NB-110	A-X	0	Riparian	Cottonwood
NB-111	I		Tree Row	Cottonwood
NB-112	I		Riparian	Valley oak
NB-113	I		Riparian	Cottonwood
NB-114	A-X	0	Channelized riparian/tree row	Valley oak
NB-115	I		Riparian	Willow
NB-116	A-X	0	Cottonwood grove	Cottonwood
NB-117	I		Riparian	Cottonwood
NB-118	A-X	0	Tree row	Valley oak
NB-119	A-F	0	Channelized riparian/tree row	Cottonwood
NB-120	A-X	0	Channelized riparian/tree row	Valley oak
NB-121	A-X	0	Rural residential	Walnut
NB-122	A-X	0	Tree row	Valley oak
NB-123	I		Isolated tree	Cottonwood
NB-124	A-X	0	Riparian	Valley oak
NB-125	I		Riparian	Cottonwood
NB-126	A-X	0	Riparian	Cottonwood
NB-127	A-X	0	Riparian	Oregon ash
NB-128	I		Riparian	Alder
NB-129	A-F	0	Roadside tree row	Willow
NB-130	I		Isolated tree	Locust
NB-131	I		Riparian	Cottonwood
NB-132	A-F	0	Cottonwood grove	Cottonwood

Table 4-1 Continued

Territory Number	Status[a]	Number of Young	Nesting Habitat	Nest Tree Species[b]
NB-133	I		Isolated roadside tree	Valley oak
NB-134	I		Channelized riparian/tree row	Valley oak
NB-135	I		Isolated roadside tree	Sycamore
NB-136	A-X	0	Cottonwood grove	Cottonwood
NB-137	I		Riparian	Valley oak
NB-138	A-S	1	Tree row	Valley oak
NB-139	I		Isolated roadside tree	Eucalyptus
NB-140	I		Roadside tree row	Redwood
NB-141	A-F	0	Riparian	Cottonwood
NB-142	I		Riparian	Valley oak
NB-143	I		Tree row	Willow
NB-144	I		Tree row	Ornamental conifer
NB-145	A-F	0	Grove	Cottonwood
NB-146	I		Rural residential	Eucalyptus
NB-147	I		Riparian	Willow
NB-148	A-X	0	Isolated roadside tree	Willow
NB-149	A-X	0	Riparian	Oregon ash
NB-150	A-F	0	Grove	Valley oak
NB-151	A-S	1	Rural residential	Walnut

[a] A = active; I = inactive; NLE = no longer extant; S = successful; F = failed; X = did not nest; U = undetermined.

[b] For territories designated as I or X, tree species shown reflects last active nest tree.

Table 4-2. Reproductive Data for Active Swainson's Hawk Territories in the NBHCP Area, 1999–2023

Year	Occupied Territories[b]	Successful Nests	Unsuccessful Nests	Occupied but Not Nesting	Un-confirmed Nesting Status	Number Young Reared to Fledging	Number Young per Occupied Territory[c]	Number Young per Active Nest[c, d]	Number Young per Successful Nest[c]
1999[a]	15	14	1	0	0	25	1.67	1.67	1.79
2000[a]	18	10	4	4	0	20	1.11	1.43	2.00
2001	46	24	15	7	0	40	0.87	1.03	1.67
2002	43	24	11	7	1	38	0.90	1.09	1.58
2003	54	34	15	4	1	53	1.00	1.08	1.56
2004	59	39	12	4	4	54	0.98	1.06	1.38
2005	45	31	11	1	2	48	1.12	1.14	1.55
2006	45	32	9	4	0	48	1.07	1.17	1.50
2007	44	34	9	1	0	48	1.09	1.12	1.41
2008	51	42	8	1	0	64	1.25	1.28	1.52
2009	59	51	2	1	5	83	1.54	1.57	1.63
2010	52	42	4	3	3	70	1.43	1.52	1.67
2011	62	23	27	6	6	30	0.54	0.60	1.30
2012	65	42	14	3	6	59	1.00	1.05	1.40
2013	56	11	26	16	3	12	0.23	0.32	1.09
2014	59	34	11	7	7	39	0.75	0.87	1.15
2015	61	44	6	4	7	69	1.28	1.38	1.57
2016	56	43	3	6	4	63	1.21	1.37	1.47
2017	58	49	4	3	2	68	1.21	1.28	1.39
2018	69	48	9	5	7	70	1.13	1.23	1.46
2019	71	5	33	26	7	5	0.08	0.13	1.00
2020	70	50	8	3	9	54	0.89	0.93	1.08
2021	59	24	25	7	3	24	0.43	0.49	1.00
2022	69	35	14	8	12	40	0.70	0.81	1.14
2023	62	2	21	34	5	2	0.03	0.09	1.00

[a] Years 1999 and 2000 do not include the Sacramento River territories.

[b] An occupied territory is a nesting area that was occupied by a breeding pair of raptors throughout all or a significant portion of the breeding season. Includes successful nests, unsuccessful nests, pairs with unconfirmed nesting status, and pairs not nesting.

[c] Does not include pairs with unconfirmed nesting status.

[d] Active nest = number of successful nests + number of unsuccessful nests.

Table 4-3. Number of Active Territories on the Sacramento River, 2001–2023.

	River Side		
Year	West	East	**Total**
2001	14	13	**27**
2002	12	12	**24**
2003	12	20	**32**
2004	20	18	**38**
2005	11	13	**24**
2006	14	15	**29**
2007	8	12	**20**
2008	8	21	**29**
2009	8	23	**31**
2010	12	15	**27**
2011	11	17	**28**
2012	11	20	**31**
2013	11	14	**25**
2014	10	19	**29**
2015	12	17	**29**
2016	13	13	**26**
2017	15	14	**29**
2018	20	13	**33**
2019	19	13	**32**
2020	18	13	**31**
2021	11	16	**27**
2022	16	19	**35**
2023	11	15	**26**

Table 4-4. Swainson's Hawk Foraging Habitat in the NBHCP Area (acres), 2004–2023.

	Habitat Type			
Year	Upland Agriculture	Fallow Lands	Grasslands[a]	**Total**
2004	8,251	823	7,847	**16,921**
2005	7,566	1,625	7,766	**16,957**
2006	6,462	10,101	7,263	**23,826**
2007	7,919	10,033	5,669	**23,621**
2008	8,293	10,076	5,461	**23,830**
2009	11,692	5,869	5,794	**23,355**
2010	13,863	2,912	4,853	**21,628**
2011	15,100	2,323	4,608	**22,031**
2012	14,019	2,282	4,491	**20,792**
2013	12,096	2,160	4,832	**19,088**
2014	11,601	1,604	4,961	**18,166**
2015	11,771	1,893	4,344	**18,007**
2016	11,890	1,712	4,157	**17,759**
2017	11,089	6,442	4,359	**21,890**
2018	11,782	3,307	4,252	**19,341**
2019	10,488	4,667	4,193	**19,348**
2020	8,837	3,234	4,043	**16,114**
2021	8,784	3,414	4,041	**16,239**
2022	7,752	9,813	5,418	**22,039**
2023	6,835	1,404	6,836	**15,075**

[a] Grasslands include the grasslands (created), nonnative annual grassland, and ruderal land cover types.

FIGURE 4-1
Swainson's Hawk

NBC 104332 (2-27-2023)

FIGURE 4-2
Swainson's Hawk Range

Typical Swainson's hawk nesting and foraging habitat
in the Central Valley

Typical Swainson's hawk nest

FIGURE 4-3
Swainson's Hawk Nesting and Foraging Habitat

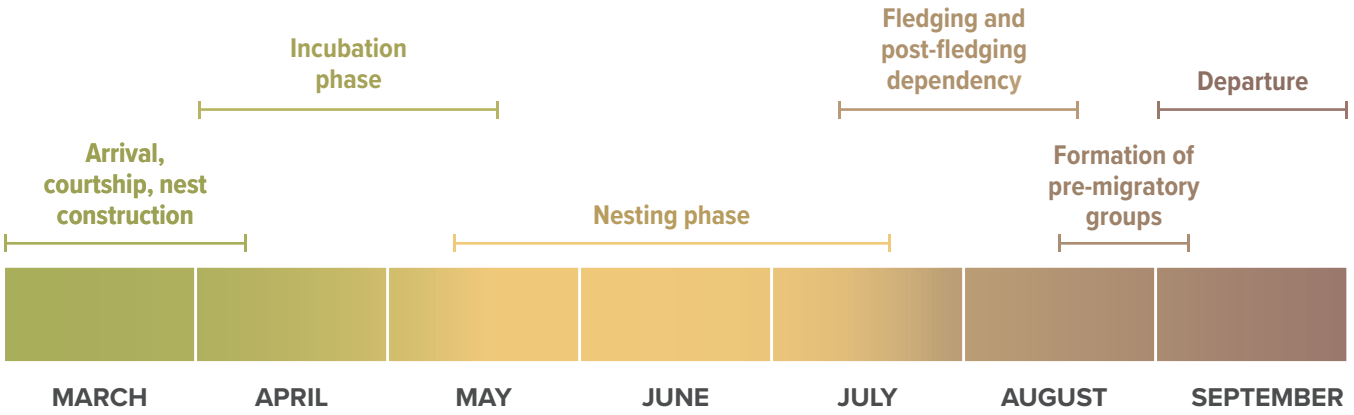


FIGURE 4-4
General Representation of Swainson's Hawk Breeding Cycle in the Central Valley

Swainson's hawk nest with eggs

Nestling Swainson's hawks

Nearly fledged Swainson's hawks

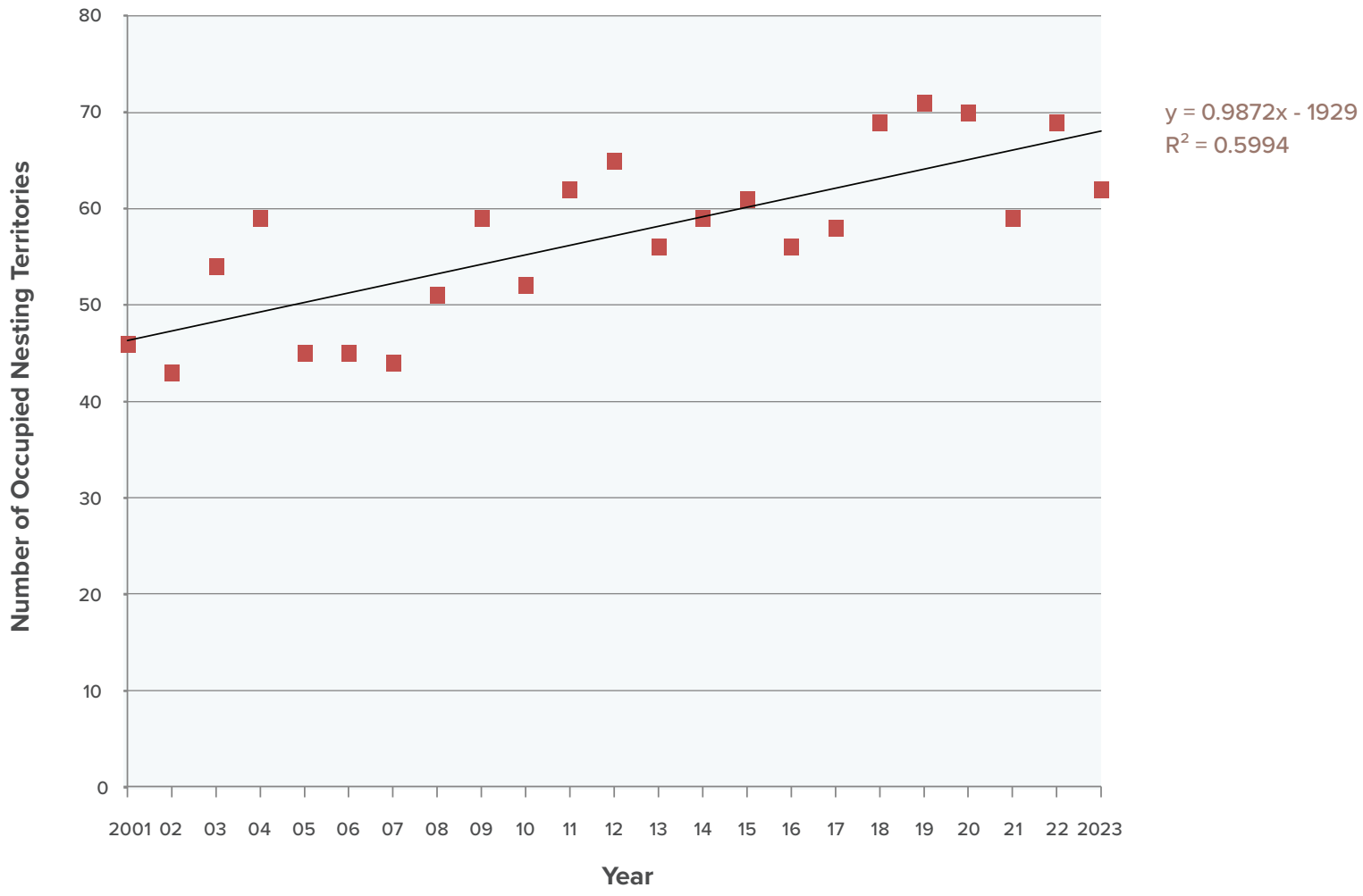
NBC 104332 (2-27-2023)

FIGURE 4-5
Swainson's Hawk in the Nest

NBC 104332 2023 AR (3-5-2024)

FIGURE 4-6

Number of Occupied Swainson's Hawk Nesting Territories, Successful Nests, and Total Young Fledged in the Natomas Basin, 2001–2023

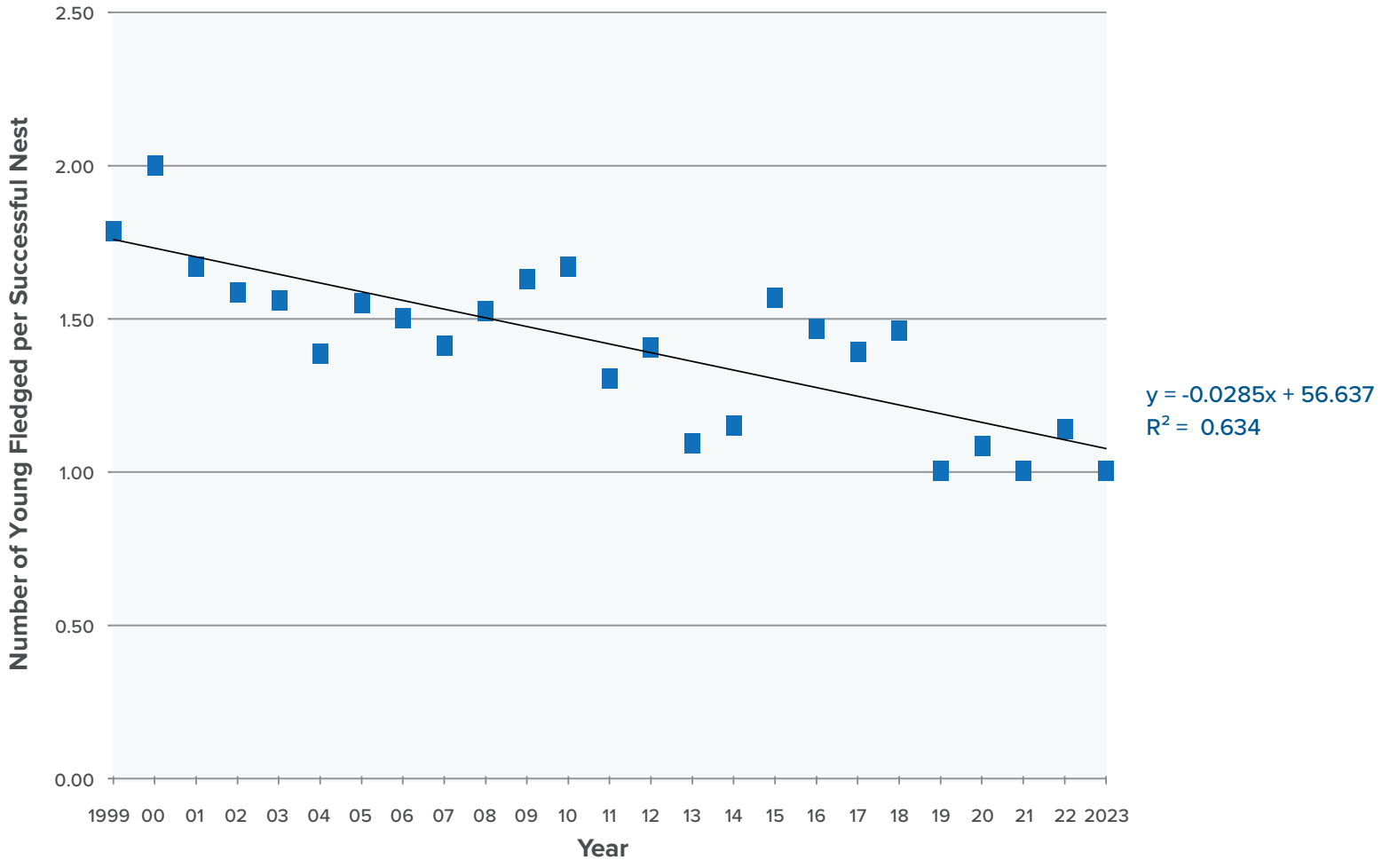


NBC 104332 2023 AR (3-5-2024)

FIGURE 4-7
Trends in the Number of Occupied Territories in the Natomas Basin Nesting Population, 2001–2023

NBC 104332 2023 AR (3-5-2024)

FIGURE 4-8
Various Measures of Swainson's Hawk Reproductive Success in the Natomas Basin, 1999–2023



NBC 104332 2023 AR (3-5-2024)

FIGURE 4-9

Trends in the Number of Young Fledged per Successful Nest in the Breeding Population of Swainson's Hawk in the Natomas Basin, 1999–2023

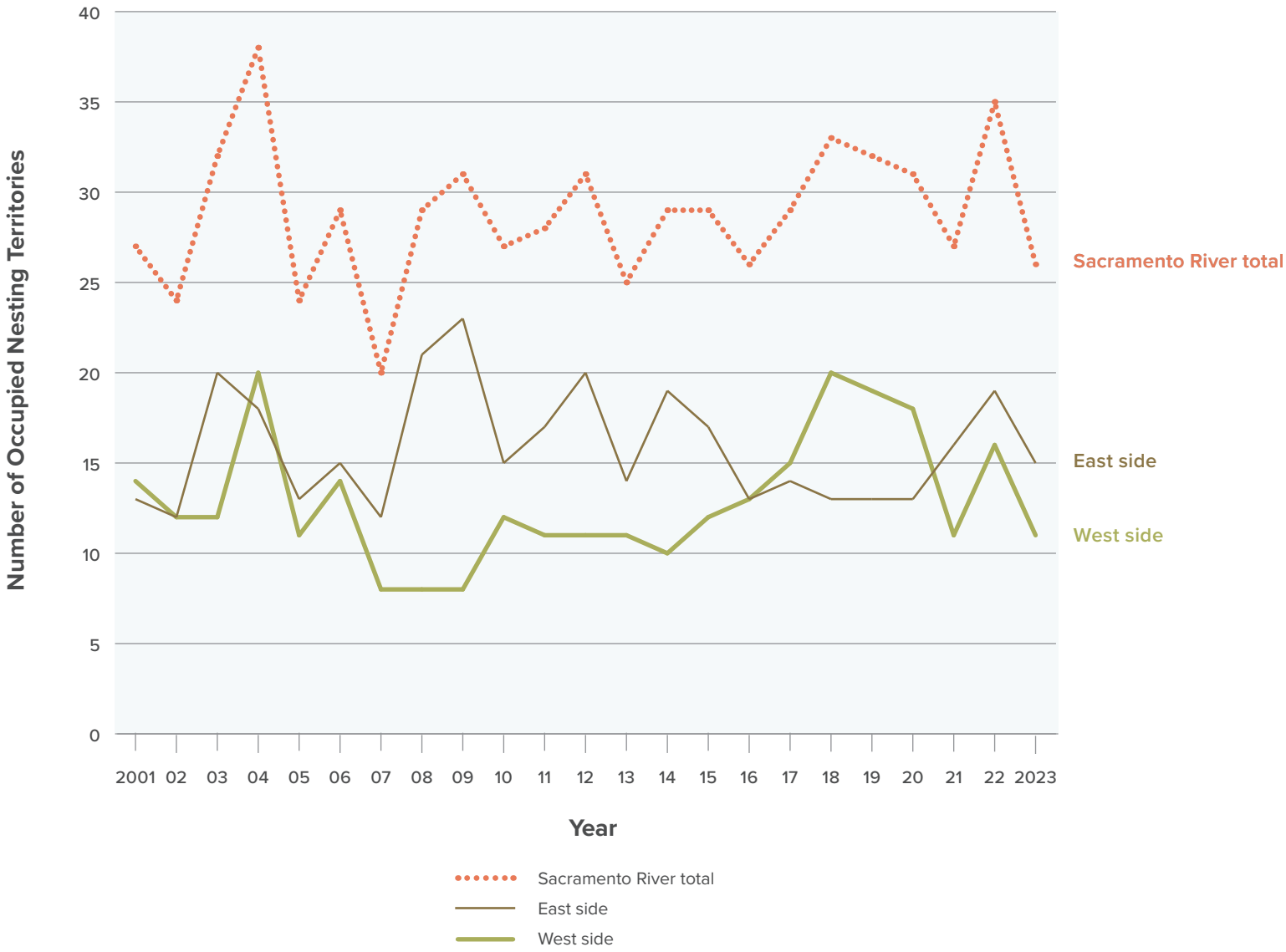
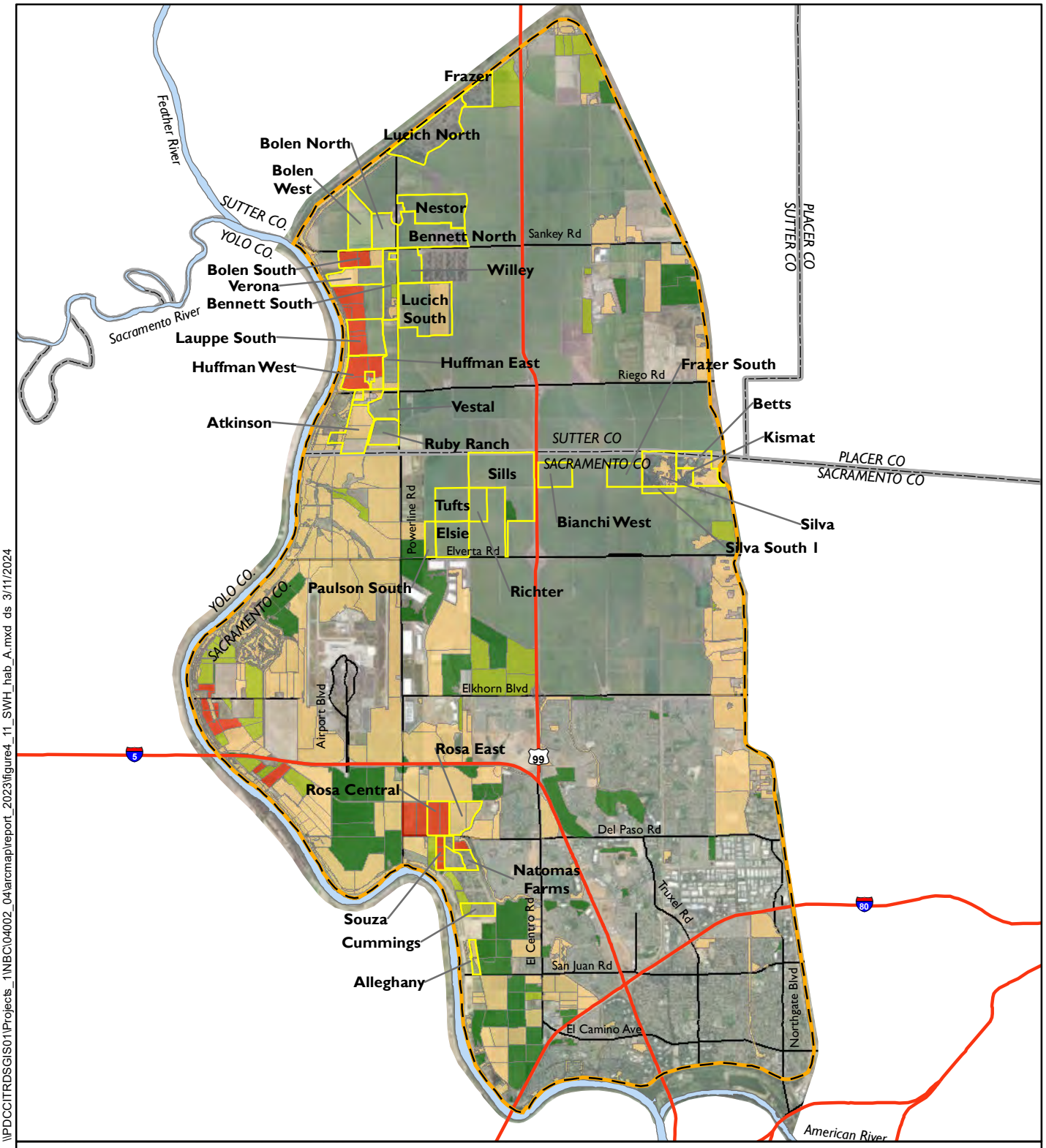


FIGURE 4-10
Number of Occupied Swainson's Hawk Nesting Territories along the Sacramento River in the Natomas Basin, 2001–2023



\\PDCCITRDSGIS01\Projects_1\NBC\04002_04\arcmap\report_2023\figure4_11_SWH_hab_A.mxd ds 3/11/2024

Legend

Swainson's Hawk Foraging Habitat

- High Value
- Moderate Value
- Moderate/Low Value
- Low Value

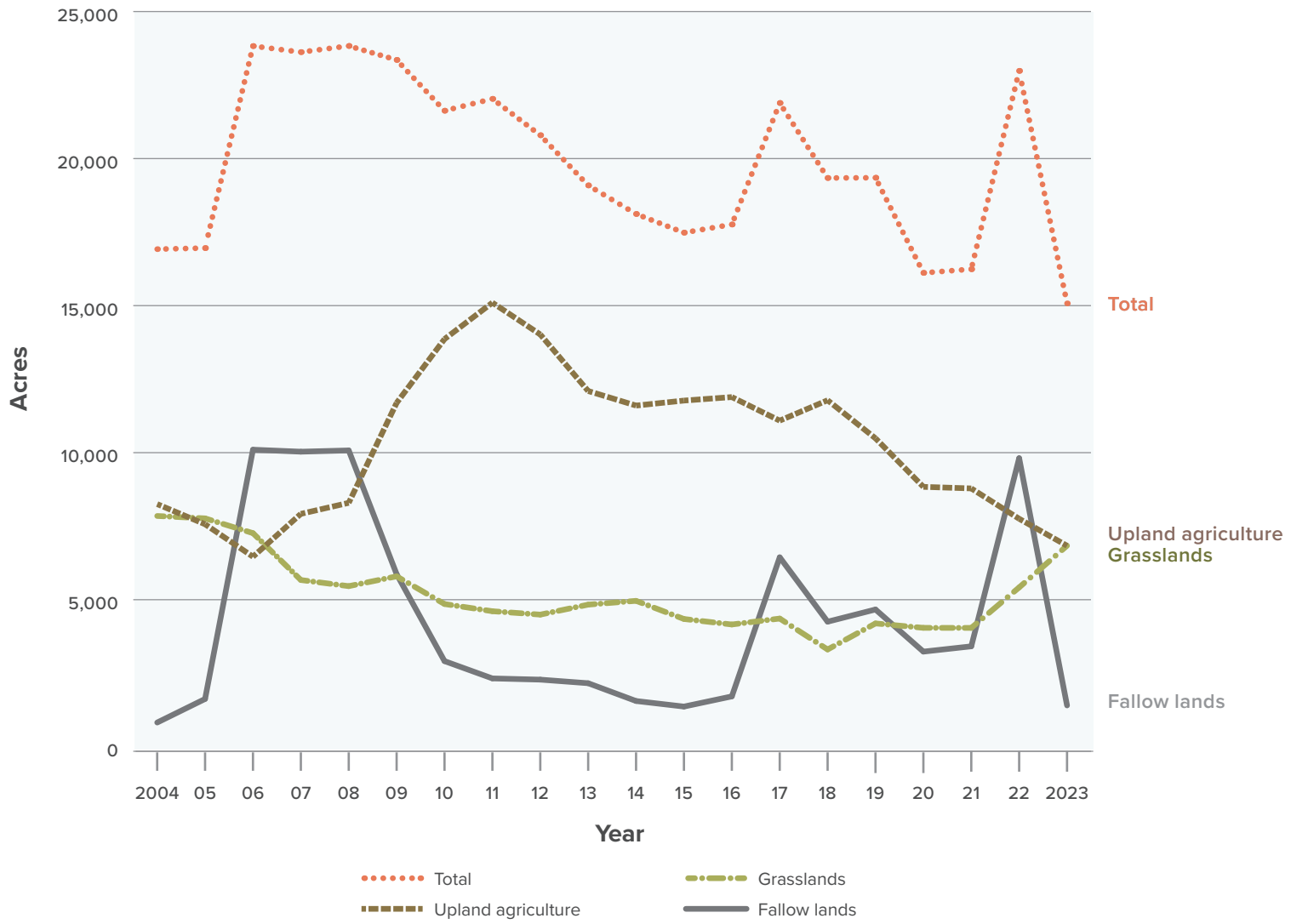
- Reserve Lands
- NBHCP Area Boundary
- Major Roads

- Roads
- County Boundaries
- Rivers

N

0 1 2 Miles

Figure 4-11
Distribution of Suitable Swainson's Hawk Foraging Habitat, 2023



NBC 104332 2023 AR (3-12-2024)

FIGURE 4-12

Changes in the Abundance of Three Categories of Swainson's Hawk Foraging Habitat in the Natomas Basin, 2004–2023

Chapter 5
Other Covered Wildlife Species

CHAPTER HIGHLIGHTS

- Reserve lands continue to provide important habitats for a wide variety of species, including shorebirds, neotropical migrants, raptors, and waterfowl.
- Northwestern pond turtle now occurs on most if not all reserve lands that host a wetland component.
- White-faced ibis and tricolored blackbird have not nested on reserve lands since 2010. These two species nest intermittently on the nearby SCAS Willey Wetlands Preserve and a patch of Armenian blackberry (*Rubus armeniacus*) in an irrigated pasture on private lands. Wetland habitats on reserve lands would need to be enhanced to support nesting by these two species on reserve lands again.
- Burrowing owl and loggerhead shrike detections have significantly declined on both reserve and non-reserve lands. Adaptive management action is required if these species are to be conserved in the Basin.

5.1 Introduction

5.1.1 Background

Other Covered Species include 20 plant and animal species other than giant garter snake and Swainson's hawk that are addressed in the NBHCP and covered by its associated permits (Table 1-2). Monitoring efforts for Other Covered Species, like those for Swainson's hawk and giant garter snake, are designed to evaluate progress in meeting the Plan's biological goals and objectives for Covered Species and their habitats.

Five Other Covered Species have been detected in the Basin: white-faced ibis, loggerhead shrike, tricolored blackbird, burrowing owl, and northwestern pond turtle. Although suitable foraging habitat for Aleutian cackling goose (formerly Aleutian Canada goose) is present, this species has not been detected in the Basin since comprehensive monitoring began in 2004. Suitable nesting habitat for bank swallow (*Riparia riparia*), another Covered Species, is not present in the Basin. Suitable habitat for vernal pool species—vernal pool fairy shrimp (*Branchinecta lynchi*), mid-valley fairy shrimp (*B. mesovallensis*), vernal pool tadpole shrimp (*Lepidurus packardi*), California tiger salamander (*Ambystoma californiense*), and western spadefoot (*Spea hammondii*) — has not been reported in the Basin except for the 11 vernal pools (1 acre) created on the BKS tract and a few potentially suitable wetlands on private property along the extreme eastern edge of the Basin. Created vernal pools on the BKS tract were not inoculated with soil occupied by vernal pool species and to date, there has been no evidence of occupancy of the 11 pools at BKS by any Covered Species. Several blue elderberry (*Sambucus cerulea*) shrubs, the host plant for valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), have been documented in the Basin, but the beetle has

not been found there although no surveys have been conducted. None of the five covered plant species have been detected in the Basin despite intensive monitoring efforts for many years. Several Sanford's arrowhead (*Sagittaria sanfordii*) plants were transplanted to the BKS tract in 2022 but did not survive.

Monitoring populations of Other Covered Species known to occur in the Basin is accomplished using a variety of techniques, including a generalized avian survey on reserves. Two general types of monitoring were conducted to meet the Plan's goals and objectives: monitoring on reserve lands and Basin-wide monitoring on non-reserve lands.

5.1.2 Goals and Objectives

The objectives of monitoring efforts on reserve lands for Other Covered Species are listed below.

- Document the presence/absence and use of reserves by all wildlife species in general and Other Covered Species in particular.
- Compare the relative success of Other Covered Species on and off reserves.
- Evaluate the extent to which the Plan is meeting its objectives to provide open space to benefit all native wildlife species.

Secondary objectives of monitoring on reserve lands include providing information on the effects of management actions and monitoring populations of indicator species that may be useful in assessing the health of managed habitats.

Monitoring on non-reserve lands is limited to surveys for Other Covered Species. The objectives of this monitoring effort are listed below.

- Document the presence/absence of Other Covered Species within the Basin.
- Compare the relative success of Other Covered Species on and off TNBC reserve lands.

5.2 Methods

5.2.1 Surveys on Reserves

Surveys for Other Covered Species include surveys for covered avian species and northwestern pond turtle. These surveys are conducted using a generalized avian monitoring protocol that is a modified area search (Ralph et al. 1993). The survey technique consists of slowly driving roads or walking trails and recording the numbers of each species (both Covered and non-Covered Species) seen or heard on each reserve tract. Areas of dense vegetation, linear tree rows, and areas inaccessible by vehicle are surveyed on foot using the area search technique to ensure complete coverage. The exact route and the time allotted for the survey is specific to each tract and is constrained to ensure consistency in effort and technique through time. The numbers of each avian species seen or heard during the search are recorded. Species observed outside each tract are not counted unless they are clearly associated with the tract in some way (e.g., swallows flying overhead hawking insects, or a raptor perched outside the tract and scanning the ground inside the tract, would be counted). The specific routes taken, and time allotted for each tract, are described in the

Natomas Basin Habitat Conservation Plan Area Biological Effectiveness Monitoring Program (ICF Jones & Stokes 2009).

From 2005 through 2017, each tract was surveyed monthly. Beginning in 2018, the frequency of surveys was modified to incorporate two surveys per month from April through June with one monthly survey in July and August. Surveys were discontinued for September through November whereas surveys December through February were limited to reserves composed of rice fields and emergent wetland habitats (ICF 2017).

Tracts acquired in 2021 included the Willey, Verona, and Lauppe South tracts in the North Basin Reserve, and the Paulsen South, Elverta, and Richter tracts in the Central Basin Reserve. Surveys on the Willey, Paulsen South, and Richter tracts began in January 2021. Surveys on the Verona and Lauppe South tracts began in May 2021. Surveys on the Elverta tract began in January 2022. Surveys on the Lauppe North tract - acquired in January 2022 - also began in January 2022. Surveys on the Paulsen Central tract - acquired in January 2023 - began January 2023. Surveys on the Ann Rudin tract - acquired in February 2023 - began in April 2023.

Observations of Covered Species on non-reserve lands or outside of formal survey periods were recorded separately as incidental observations. Northwestern pond turtle detections were recorded during avian surveys, particularly along marsh shorelines with suitable basking habitat and other areas where turtles congregate to bask.

5.2.2 Surveys on Non-Reserve Land

Surveys for Other Covered Species throughout the Basin on non-reserve lands are specifically designed to obtain maximum geographic coverage of the Basin and to ensure repeatability and consistency. These surveys were conducted monthly from 2005–2017. Since 2018, the survey effort has consisted of one monthly survey from April to July. Surveys in the South Basin region were discontinued at the end of 2017.

The Basin is divided into three regions for the surveys (Figure 5-1) as follows. The North Basin is the area between the Natomas Cross Canal and Elverta Road, the Central Basin is the area between Elverta Road and Del Paso Road, and the South Basin is the area between Del Paso Road and Garden Highway. A road transect has been established in each region. Each road transect covers 48–51 kilometers (30–32 miles) and is surveyed in approximately 1.5 hours. Survey times were assigned to road segments in each transect to minimize variation in effort. A single observer drives slowly (when possible) and scans the area for Other Covered Species, occasionally stopping at pullouts or backtracking where appropriate. Stops occur frequently to scan large fields for Other Covered Species, but the duration and number of stops are constrained by the time allotted for each segment and transect. Each survey route is depicted in Figure 5-1.

5.2.3 Analytical Methods

The average number of detections per survey (i.e., total number of individuals counted divided by the number of surveys) and the proportion of surveys in which at least one individual was counted are the two metrics or indices used to assess relative use of reserve and non-reserve lands between years, seasons, tracts, and reserves. Trends over time in these metrics were evaluated using simple linear regression.

5.3 Results

A complete list of all wildlife species detected on reserves since comprehensive monitoring began is provided in Appendix E-1. The numbers of each bird species detected by tract and reserve during surveys for Other Covered Species in 2023 are provided in Appendix E-2.

5.3.1 Generalized Avian Surveys

In 2023, 117 avian species were detected on reserves, compared to 116 in 2022, and 122 in 2021. The number of species observed each monitoring year has ranged from a low of 114 in 2019 to a high of 139 in 2009. No new species were detected on reserves in 2023. Table 5-1 summarizes the total number of individuals and number of avian species recorded from 2021 through 2023 on each tract (by reserve) for selected taxonomic groups (raptors, waterfowl, neotropical migrants, and shorebirds) and all birds.

5.3.1.1 Raptors

The raptor group consists of hawks and owls, a category of predatory birds that predominantly occupy the top of the food web and are generally less abundant than other groups, making them good indicators of ecosystem health. Although Swainson's hawk and burrowing owl are the only two Covered Species that are raptors, 17 other raptor species have been recorded during avian surveys in the Basin since 2004.

Many raptors are migratory, changing the composition of the raptor community across seasons. For example, Swainson's hawk only occurs in the Basin during the breeding season, spending the winter in Central and South America, while large numbers of red-tailed hawks and other species move into the Basin from other areas during winter.

Across all years and all seasons, red-tailed hawk (*Buteo jamaicensis*) continues to be the most abundant raptor on reserve lands, followed by northern harrier (*Circus hudsonius*), American kestrel (*Falco tinnunculus*), red-shouldered hawk (*Buteo lineatus*), and white-tailed kite (*Elanus leucurus*). The annual average number of raptors detected per survey on reserve lands was 0.094 in 2023, the lowest value ever recorded over the monitoring period (Figure 5-2). There has been a significant decline in raptor detections over the monitoring period (R^2=0.531, P<0.001), driven primarily by declines in the number of detections of northern harrier (R^2=0.652, P<0.001) and American kestrel (R^2=0.655, P<0.001).

Raptors are most abundant on the BKS tracts in the Central Basin Reserve (0.320 raptor detections per survey) and Atkinson tract in the North Basin Reserve (0.223 raptor detections per survey), followed by Lucich South (0.133 raptor per survey) and Lucich North (0.127 raptor per survey). Raptors are most abundant on reserves from September through March when large numbers of migratory raptors come into the Central Valley to spend the winter.

5.3.1.2 Waterfowl

The waterfowl group—comprising geese, swans, and ducks—is an important aesthetic and sporting resource in the Basin. Approximately 60% of the ducks and geese that migrate along the Pacific Flyway use the wetlands, flooded agricultural fields, and wildlife refuges in the Central Valley during winter. The waterfowl population wintering in the Central Valley comprises 20% of all waterfowl in

North America (Heitmeyer et al. 1989). Because less than 10% of the wetlands that historically covered the Central Valley still exist today, this group is of high management concern in the region.

Greater white-fronted goose (*Anser albifrons*) is the most abundant species of waterfowl on reserve lands, followed by snow goose (*Anser caerulescens*), mallard (*Anas platyrhynchos*), northern shoveler (*Spatula clypeata*), and pintail (*Anas acuta*). The average number of waterfowl detected per survey on reserve lands exhibits a great deal of variation over the monitoring period, as would be expected for migratory species that occur in very large flocks (Figure 5-3). However, there is no evidence of a significant increase or decrease in waterfowl numbers as a group over the monitoring period (R^2=0.165, P=0.085). Of the four most abundant species, only mallard has exhibited a significant decline over the monitoring period (R^2=0.734, P<0.001) (Figure 5-3).

The BKS tracts support the largest number of waterfowl followed by the Lucich South, Lucich North, and Bennett North tracts. BKS and Lucich North are composed almost entirely of wetlands; the other tracts with high numbers of waterfowl are composed of rice fields. Waterfowl numbers are highest from December through February when large numbers of geese and other waterfowl begin to arrive in the Central Valley to spend the winter.

5.3.1.3 Neotropical Migrants

Neotropical migrants are defined here as passerine (perching) birds (e.g., flycatchers, swallows, warblers) that breed in North America in the summer and migrate in fall to the Neotropics (southern United States, Mexico, Central America, and South America) to spend the winter. Populations of neotropical migrants are generally declining, due in part to loss of habitats such as riparian woodlands in both their breeding and wintering ranges, as well as habitat loss along migration routes. The riparian woodlands on the western and northern edges of the Natomas Basin are an important resource for breeding and migrating neotropical migrants. This habitat type has recently increased substantially in the Basin because of mitigation associated with the NLIP. Many species such as kingbirds (*Tyrannus* spp.) and swallows also make extensive use of the wetlands, grasslands, and agricultural habitats on reserve lands for foraging.

Cliff swallow (*Petrochelidon pyrrhonota*) is the most abundant neotropical migrant on reserve lands, followed by barn swallow (*Hirundo rustica*), tree swallow (*Tachycineta bicolor*), and western kingbird (*Tyrannus verticalis*) (Figure 5-4). There has been no significant increase or decrease in the numbers of neotropical migrant detections over the monitoring period (R^2=0.046, P=0.377), although there have been significant declines in the numbers of detections of barn swallows and tree swallows over the monitoring period (R^2=0.424, P<0.003 and R^2=0.289, P=0.018, respectively) (Figure 5-4).

Detections of neotropical migrants have been driven primarily by cliff swallow, which began nesting in large numbers under the carport on the BKS tracts in the Central Basin Reserve in 2012. In 2015, cliff swallows arrived on the BKS tract in April and May, but the colony collapsed, and no young were fledged. The cliff swallow nesting colony did not return in 2016 or 2017, although large numbers of birds continue to congregate on the BKS tracts, possibly nesting in smaller groups throughout the tracts. In 2018, cliff swallows nested on both the BKS tracts and under the drainage canal between the AKT and Sharma SAFCA tracts. A similar pattern was repeated in 2019. In 2020, cliff swallows again nested in the culvert draining the SAFCA marshes into Fisherman's Lake, but in small numbers, and were not detected nesting anywhere else on reserve lands. No cliff swallow nesting colonies have been detected since 2019.

5.3.1.4 Shorebirds

Shorebirds are a diverse taxonomic group that includes sandpipers, plovers, stilts, avocets, snipes, and phalaropes. The majority of species migrate long distances between breeding and wintering areas. The shallow wetlands and flooded agricultural fields of the Central Valley constitute one of the most important foraging areas in western North America for migrating and wintering shorebirds (Shuford et al. 1998). The post-harvest rice fields and marsh complexes of TNBC's reserve system provide important habitats for shorebirds during spring and fall migration. Management of these habitats can have a strong influence on the number of shorebirds stopping over in the Basin. Like waterfowl, shorebirds are a group of high management concern in the region.

Some shorebird species have been documented breeding on reserve lands, including American avocet (*Recurvirostra americana*), black-necked stilt (*Himantopus mexicanus*), and killdeer (*Charadrius vociferus*). These species tend to be most abundant during June through August, the period after young have fledged. Conversely, the non-resident shorebirds tend to be most abundant from November through January. The largest numbers of shorebirds by far are found on the BKS tract, followed by the Lucich South, Lucich North, and Nestor tracts. Long-billed dowitcher (*Limnodromus scolopaceus*), killdeer, dunlin (*Calidris alpina*), and least sandpiper (*Calidris minutilla*) are the most abundant shorebirds on reserve lands.

Shorebird detections have decreased significantly over the monitoring period (R^2=0.465, P=0.001). Long-billed dowitcher, killdeer, and dunlin all exhibit significant declines in the number of detections over the monitoring period (R^2=0.301, P=0.015, R^2=0.784, P<0.001, and R^2=0.266, P=0.024, respectively), while least and western sandpiper (*Calidris mauri*) numbers show no evidence of an increase or decrease over the monitoring period (Figure 5-5).

5.3.1.5 Other Species and Observations of Interest

Yellow-billed magpie (*Pica nuttalli*) is endemic to California, and its range is restricted to the Central Valley, southern Coast Ranges, and Sierra Nevada foothills. Numbers of this species have declined rapidly in the Central Valley in association with the introduction and spread of West Nile virus, first detected in this species in 2004 (Ernest et al. 2010). Yellow-billed magpie appears to be more susceptible to West Nile virus than most species (Wheeler et al. 2009), and the impacts of West Nile virus on avian populations is of increasing concern because populations of many species have not recovered after initial contact with the disease (George et al. 2015).

The mean number of detections per survey has declined drastically and significantly over the monitoring period (R^2=0.796, P<0.001) (Figure 5-6). Although yellow-billed magpie has been detected on most reserve tracts over the monitoring period, the species began to disappear from tracts that did not contain nesting habitat after 2008. This species is most common on tracts with significant woodlands such as Alleghany 50, Atkinson, BKS, and Huffman West; however, even on these tracts, there has been a significant decline in the number of detections per survey over the monitoring period (R^2=0.581, P<0.001).

The distribution and abundance of Canada goose (*Branta canadensis*) has been increasing in the United States for several decades. Populations in some areas have grown substantially, so much so that they are considered pests for their droppings, bacteria in their droppings, noise, and damage they do to some grasslands.

Although California is outside the historical breeding range of Canada goose, numerous resident populations have become established. Because they are herbivorous, they can present management problems in natural landscapes where the management goal is establishment of native grasses. Numbers of Canada goose detected on reserves have significantly increased during the monitoring period (R^2=0.740, P<0.001), although the numbers appear to have stabilized since 2019 (Figure 5-6). Canada goose now regularly nests on several reserve tracts, including the BKS, Lucich North, Lucich South, Frazer, Bennett North, and Bennet South tracts.

5.3.2 Other Covered Species

All five Other Covered Species known to occur in the Basin have been documented using reserve lands, and all have been documented or are suspected of breeding on reserves at some point since comprehensive monitoring began (Tables 5-2 and 5-3). Northwestern pond turtles of varying size are now routinely documented on reserves, and thus breeding on reserves is almost certain.

The average number of individuals detected per survey of avian Other Covered Species recorded during surveys on reserves is summarized in Table 5-3. The average numbers of avian Other Covered Species detected per survey during non-reserve land surveys are summarized in Table 5-4.

5.3.2.1 Loggerhead Shrike

Loggerhead shrike has been a year-round resident in the Basin and has been detected throughout the year (Figure 5-7). The mean number of detections per survey on reserve lands has been cyclic over the course of the monitoring period, peaking in 2009 and 2012, followed by a significant decline after 2013 (Table 5-3, Figure 5-7). Shrike detections have remained low since 2014 and declined to zero in 2022. In 2023 there were two detections on the southern edge of the Bennett North tract. In both cases the flushed bird flew south to the SCAS Willey Wetlands Preserve. The decline in shrike detections on reserve lands over the monitoring period is statistically significant (R^2=0.347, P=0.008).

The decline in the shrike population on non-reserve lands has also been statistically significant (R^2=0.816, P<0.001), with no detections since 2017 (Table 5-4; Figure 5-7).

The few shrikes detected on non-reserve lands over the last 4 years have all been associated with large contiguous patches of habitat with minimal human disturbance (e.g., the ruderal area of SCAS buffer lands north of the Atkinson tract, the SCAS buffer lands north of the Rosa tracts, and the SCAS Willey Wetland Preserve south of the Bennett North tract).

5.3.2.2 White-Faced Ibis

White-faced ibis typically occurs in very low numbers outside the breeding season and moves into the Basin in large numbers from May through September (Figure 5-8). The species was regularly detected foraging in small numbers on reserve lands when comprehensive monitoring began in 2005. From 2007 through 2010 white-faced ibis nested in large numbers on the BKS tracts in the Central Basin Reserve (Table 5-2). No nesting was detected in the Basin in 2011. In 2012, the nesting colony moved to the SCAS Willey Wetlands Preserve. The SCAS Willey Wetlands Preserve nesting colony was active again in 2013 and 2021, with 400 to 600 nesting pairs. White-faced ibis has not nested in the Basin since 2010.

On reserve lands, neither the mean number of white-faced ibis detected per survey nor the proportion of surveys in which the species was detected exhibits a significant increase or decrease over the monitoring period (Table 5-3, Figure 5-8).

On non-reserve lands, the proportion of surveys in which white-faced ibis was detected shows a statistically significant increase over the monitoring period (R^2=0.222, P=0.042) through 2022. White-faced ibis was not detected on non-reserve lands in 2023 (Figure 5-8).

5.3.2.3 Tricolored Blackbird

Tricolored blackbird is detected in the Basin year-round (Figure 5-9), although numbers are impossible to estimate outside the breeding season when the species primarily occurs in large, mixed-species flocks. During the breeding season, tricolored blackbird occurs in single-species flocks that are more detectable, even when they are not breeding.

Tricolored blackbird nested on the BKS tract in a small patch of Armenian blackberry in 2005 and 2007. A second colony was established in a patch of Armenian blackberry in 2007 in an irrigated pasture on private land. At the end of the 2007 breeding season, TNBC trimmed the patch of Armenian blackberry where tricolored blackbirds had nested on the BKS tract. In 2008, the BKS colony nested in the created emergent tule marsh on the tract, and TNBC removed the entire patch of Armenian blackberry that tricolored blackbird had previously nested in, and the colony on private lands moved to the marsh on the Frazier tract. Tricolored blackbird nested in the marshes on the BKS tracts in 2009 and 2010.

In 2011, a new colony was established on the SCAS Willey Wetlands Preserve. In 2012, no tricolored blackbirds nested in the Basin for the first time since 2006. In 2013, tricolored blackbird again nested on the SCAS Willey Wetlands Preserve although the nesting attempt was eventually abandoned. In 2020, tricolored blackbird again nested on the SCAS Willey Wetlands Preserve. In 2023 tricolored blackbirds nested in the large patch of Armenian blackberry on the northern edge of the Basin on private property.

Tricolored blackbird detections on reserve lands exhibit a significant decrease over the monitoring period, primarily due to the presence of nesting colonies on the BKS and Frazer tracts from 2005 through 2010 (R^2=0.313, P=0.013) and subsequent lack of nesting on reserve lands, while the proportion of surveys in which tricolored blackbird was detected on reserve lands does not exhibit any significant increase or decrease over time (R^2=0.017, P=0.593) (Figure 5-9).

Conversely, the proportion of surveys in which tricolored blackbird was detected on non-reserve lands has increased significantly over the monitoring period (R^2=0.430, P=0.002) (Figure 5-9), primarily due to the movement of the nesting colonies in the Basin to non-reserve lands, while the mean number of tricolored blackbirds detected per survey on non-reserve lands exhibits no significant increase or decrease over time (Figure 5-9).

5.3.2.4 Western Burrowing Owl

Burrowing owl is known to breed and winter in low densities in the Basin and can be regularly detected throughout the year (Figure 5-10).

On reserve lands a single pair resided at the BKS tract in 2004 and 2005 but disappeared after one member of the pair was apparently killed by a great horned owl in 2006. Burrowing owl

subsequently bred on the Elsie and Tufts tracts for several years, but the species has not bred on reserve lands since 2012 (Table 5-2). Burrowing owl continues to winter on the Elsie and Tufts tracts, with a scattering of winter sitings on other reserve tracts.

Neither the mean number of burrowing owls detected per survey nor the proportion of surveys in which owls were detected on reserve lands exhibit a statistically significant increase or decrease over the monitoring period (R^2=0.184, P=0.067 and R^2=0.194, P=0.059, respectively) (Table 5-3, Figure 5-10).

Breeding burrowing owls have likewise disappeared from most of the Basin, although Basin-wide surveys could easily miss owls on private lands and other areas not covered by survey routes.

Three burrowing owl nesting colonies were documented in the Basin on non-reserve lands over the monitoring period. One occurred in the Sleep Train Arena Parking lot, but the colony was abandoned when the parking lot was used as a temporary parking space for large commercial trucks.

The second colony occurred near the eastern edge of the Basin just north of Del Paso Boulevard near Aimwell Road along a dirt road bordering an agricultural field. The field road was eventually disked, removing the high ground and ground squirrel burrows required by the owls and the site was abandoned.

The third colony occurs just north of Elkhorn Boulevard near the eastern edge of the Basin in an elevated area between two agricultural fields that historically contained several buildings that have since been removed. Breeding owls at this site also occurred across the street to the south in a dry pasture field. Maintenance in the form of mowing and controlling vegetation decreased over time until the site became unsuitable and was abandoned by the owls. One to two pairs of owls continue to inhabit the dry pasture on the south side of the road. Breeding was last documented at this site in 2021.

Burrowing owl has been documented inhabiting several scattered locations within the Basin over the monitoring period, but never for more than a single year.

Neither the mean number of burrowing owls detected per survey nor the proportion of surveys on which owls were detected on non-reserve lands exhibit a statistically significant increase or decrease over the monitoring period (R^2=0.077, P=0.251 and R^2=0.010, P=0.679, respectively) (Table 5-4, Figure 5-10).

Burrowing owl is occupying fewer places in the Basin and is no longer resident in some areas where the species historically occurred, both on and off reserve lands.

5.3.2.5 Northwestern Pond Turtle

Northwestern pond turtle is known to have occured in several areas of the Basin prior to the onset of comprehensive monitoring in 2005, including Fisherman's Lake and near the Prichard Lake and Elkhorn pumping stations. Red-eared slider (*Trachemys scripta elegans*), a naturalized but nonnative species that superficially resembles northwestern pond turtle, can be difficult to distinguish from northwestern pond turtle before a turtle slips into the water and disappears from sight. Since 2013, large, adult northwestern pond turtles have been observed regularly in Fisherman's Lake adjacent to the Rosa and Natomas Farms tracts during the summer months. Northwestern pond turtle has also been documented on the Cummings, Natomas Farms, and Rosa Central tracts of the Fisherman's

Lake Reserve, the BKS and Sills tracts of the Central Basin Reserve, and the Lucich North, Lucich South, Bennet North, Bennet South, and Frazer tracts of the North Basin Reserve (Table 5-3, Figure 5-11).

Due to the difficulty in determining species when turtles of all species dive at the first sign of disturbance, it is impossible to tell if the increase in turtle sightings is due to an increasing number of northwestern pond turtles or if the increase is due to increased numbers of nonnative turtles. Monitoring data indicate that the creation of marsh and wetland habitats has benefitted the population of northwestern pond turtles in the Basin.

5.4 Discussion

Monitoring results over the last 19 years indicate that TNBC reserves meet the NBHCP objective of providing open space to benefit wildlife species (i.e., covered and non-covered species). On average, 125 species of birds are documented annually on reserves — most of which are typical of the Central Valley and associated with agricultural habitats, but also includes some rarely seen species and species that depend on specialized habitats such as wetlands, riparian forest, and grasslands.

The data collected indicate that the creation of emergent tule marsh and other aquatic wetlands on reserve lands have benefitted some Covered Species. Northwestern pond turtle detections on reserve lands demonstrate that the species has successfully colonized most, if not all, of the TNBC tracts with created emergent tule marsh habitats. However, tricolored blackbird and white-faced ibis have not nested in created emergent tule marsh habitats on TNBC reserves since 2010 and data show that other species' (e.g., loggerhead shrike) detections and nesting have declined significantly. Tricolored blackbird populations have experienced significant declines throughout their range and were listed as threatened under the California ESA. Tricolored blackbird is an itinerant breeder (Beedy et al. 2023) that still intermittently nest in relatively small colonies in the Basin and use reserve lands to roost and forage. However, the species has not nested on reserve lands since 2010, nesting instead in the created emergent tule marsh non-reserve habitat on the SCAS Willey Wetlands Preserve and in a large patch of Armenian blackberry in an irrigated pasture on private lands.

Larger contiguous patch size of tules and Armenian blackberry, more extensive emergent tule benches, stable water levels that are maintained throughout the nesting season, and less human disturbance appear to be the characteristics that distinguish the SCAS Willey Wetland Preserve from the TNBC created and managed wetlands. TNBC lands do not contain either irrigated pasture nor patches of Armenian blackberry which are known and often preferred nesting and foraging habitats for tricolored blackbird (Beedy et al. 2023). Water levels must be maintained at levels to support the preferred nesting vegetation which would provide the basic habitat requirements to support nesting of tricolored blackbird or white-faced ibis.

The pattern of nesting by white-faced ibis (i.e., nesting on the BKS tract prior to 2010 and subsequent move to the SCAS Willey Wetlands Preserve) is very similar to that of tricolored blackbird indicating that larger patch size, more extensive emergent tule benches, stable water levels maintained throughout the nesting season, and less human disturbance are important for this species as well. There are adaptive management opportunities to enhance and improve reserve lands to ensure that habitat requirements for tricolored blackbird are met.

Loggerhead shrike and burrowing owl have all but disappeared from the Basin on both reserve and non-reserve lands. The factors influencing these declines are unknown. That these declines occur on both reserve and non-reserve lands suggest that factors beyond TNBC's control, such as climate change or widespread use of biocides, may be contributing to these declines. The decline in some raptors, shorebirds, and other species adds support to this hypothesis.

The creation of extensive grasslands adjacent to the stands of oak woodland along the western side of the Basin along with the establishment of additional riparian and wetland habitats in this area as mitigation for the NLIP has resulted in a substantial expansion of loggerhead shrike habitat. However, to date no increase in the shrike population has been documented.

Recent studies in Europe show dramatic declines in insect abundance even in wilderness areas (Hallmann et al. 2017), indicating that biocide use may be having dramatic effects well beyond the area of application. Use of biocides has been implicated in the decline of loggerhead shrikes across the species range (Yosef 2020) and in some burrowing owl populations (Poulin et al. 2020).

Habitats for Other Covered Species associated with vernal pools (e.g., vernal pool invertebrates, western spadefoot, and California tiger salamander) are generally lacking in the Basin, except for the created vernal pool habitats on the BKS tracts. No evidence of occupancy by any covered species has been observed in these pools.

5.5 Effectiveness

Biological effectiveness as it pertains to Other Covered Species is measured primarily based on land management activities that promote the development and enhancement of habitats for these species and the response of populations to these management actions.

Data obtained for tricolored blackbird, white-faced ibis, and northwestern pond turtle to the NBHCP and MAPHCP operating conservation program indicate mixed responses, with some positive results (northwestern pond turtle) while also indicating that reserve design and management need to be improved for tricolored blackbird and white-faced ibis. The data regarding burrowing owl and loggerhead shrike indicate that additional management actions are required if these species are to be conserved in the Basin.

5.6 Recommendations

The following list of recommendations to improve habitat design and management were developed based on data obtained from published and unpublished sources on natural history and management of select Covered Species, as well as data obtained from this monitoring program. Implementation of many of these recommendations will likely benefit the entire suite of Covered Species known to occur in the Basin.

5.6.1 Western Burrowing Owl

Burrowing owl nests in burrows in open grasslands away from trees and power poles. Burrows for escape from predators and for nesting are required. Nest boxes have been used successfully across the northern and western U.S. Protection of burrowing mammals, installation of nest boxes,

installation of perches to provide sites for hunting and predator observation, restriction of biocides, and vegetation management through fire or grazing have all been used to improve burrowing owl habitat (Poulin et al. 2020). We provide the following recommendations for this Covered Species:

- Limit the use of biocides to the maximum extent practicable on all reserve lands to allow insect prey populations to recover and to prevent direct adverse effects of biocides on this species.
- Promote the expansion of existing California ground squirrel populations on the BKS tract and the ruderal field on the Sills tract and/or consider translocation of ground squirrels to these or other suitable sites. California ground squirrels have persisted in the Central Basin Reserve rice fields west of SR 99 and appear to be compatible with rice production and water conveyance infrastructure.
- Create burrowing owl nesting habitat using recently designed above ground artificial burrows in grassland habitats that can be maintained in shorter grass through grazing where possible.
- Provide elevated perch sites in areas where burrowing owl habitat is to be improved or created and managed.
- Restore irrigated pasture near areas where burrowing owl habitat is to be managed or created to provide foraging habitat for burrowing owls and other covered species.
- Consider relocating owls being displaced by development or other projects onto TNBC reserves, using artificial burrows in appropriate places and techniques developed in other relocation efforts.
- Consider active translocation from healthy populations elsewhere and supplemental prey to encourage establishment following translocation, similar to what is being done for the Santa Clara Valley HCP and Natural Community Conservation Plan in Santa Clara County, CA.

5.6.2 Tricolored Blackbird

Tricolored blackbird is a colonial nester that nests in dense emergent marsh and in patches of Armenian blackberry in the northern central valley. Colony sites frequently change from year to year, indicating a need for several distinct patches of suitable nesting habitat. Patch sizes used typically exceed 15 meters wide and thus must be large. Tricolored blackbird will travel substantial distances to find suitable foraging habitat in rice fields, grasslands, wetlands, alfalfa fields and irrigated pastures. The species requires large amounts of insect prey to nest successfully. Recommendations for this covered species are as follows:

- Expand existing created emergent tule marsh habitats rather than creating new ones in separate locations to increase the patch size of marsh habitats.
- Expand tule benches in existing marsh habitats.
- Maintain water levels according to design specifications in approved land management plans to ensure that tule benches are continually submerged throughout the nesting season (May through August).
- Design native habitats to minimize disturbance by minimizing roads, maximizing emergent marsh patch size, and maximizing the distance between water control structures.
- Create new, lightly grazed irrigated pasture.

- Graze grasslands such as the Bennett South grassland and the ruderal field on the Sills tract to maximize the availability of insect prey and maintain appropriately low grass heights.
- Minimize or eliminate the use of biocides or—when absolutely necessary—use biocides that are the least toxic and most specific to the species being targeted.
- Conduct necessary management activities (i.e., mowing, weed spraying, etc.) outside the breeding season (May through August) to minimize disturbance and human presence and the potential for nest disturbance, destruction, or abandonment.
- If Armenian blackberry becomes reestablished in a suitable location (a location with little to no disturbance and proximity to foraging habitat), allow it to persist and expand.

5.6.3 Loggerhead Shrike

Loggerhead shrike inhabits ecotones, grasslands, and other open habitats and feeds on a variety of insects and vertebrates such as lizards and small birds and mammals. The species forages primarily in open habitats and often impales prey on thorny vegetation or barbed wire fences. Across its range, loggerhead shrike is often associated with active pasture lands with many perches and typically breeds in isolated trees or large shrubs (Yosef 2020). We provide the following recommendations for this covered species:

- Create new lightly grazed irrigated pasture.
- Maintain and lightly graze other grasslands such as the ruderal field on the Sills tract, the relatively large grassland on the Bennett South tract, or the grasslands on the eastern edge of the BKS tract.
- Minimize or eliminate the use of biocides or when absolutely necessary, use biocides that are the least toxic and most specific to the species being targeted.
- Design native habitats to minimize disturbance by minimizing roads, maximizing emergent marsh patch size, and maximizing the distance between water control structures.

5.7 References

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Table 5-1. Summary of Results of Monthly Avian Surveys by Reserve and Tract,[a] 2021–2023.

	Waterfowl			Raptors			Neotropical Migrants			Shorebirds			All Bird Species		
Reserve	**2021**	**2022**	**2023**	**2021**	**2022**	**2023**	**2021**	**2022**	**2023**	**2021**	**2022**	**2023**	**2021**	**2022**	**2023**
North Basin Reserve															
Atkinson	179 (4)	73 (3)	14 (`1)	41 (8)	42 (6)	21 (5)	116 (9)	136 (9)	81 (6)	6 (2)	8 (2)	4 (1)	2,405 (65)	1,609 (59)	1,153 (49)
Bennett North	3,414 (12)	748 (11)	1,131 (10)	29 (6)	8 (4)	3 (3)	15 (3)	47 (3)	44 (3)	8 (2)	20 (1)	29 (2)	5,087 (41)	1,550 (38)	2.060 (38)
Bennett South	627 (4)	33 (8)	48)2)	28 (7)	14 (6)	12 (4)	16 (5)	20 (4)	4 (2)	34 (4)	4 (1)	27 (2)	3,702 (42)	4,846 (35)	786 (24)
Bolen North	2,483 (3)	12 (1)	453 (2)	5 (2)	8 (3)	- (-)	2 (1)	1 (1)	- (-)	48 (3)	9 (2)	73 (2)	3,793 (24)	744 (23)	1,279 (17)
Bolen South[b]	- (-)	- (-)	- (-)	5 (2)	6 (2)	2 (1)	55 (4)	45 (5)	59 (3)	- (-)	- (-)	- (-)	1,911 (26)	408 (29)	243 (23)
Bolen West	676 (5)	- (-)	20 (3)	7 (4)	8 (4)	3 (2)	11 (3)	16 (2)	17 (2)	413 (4)	- (-)	112 (2)	5,092 (37)	348 (15)	546 (22)
Frazer North	1,078 (9)	548 (11)	477 (12)	9 (4)	9 (3)	4 (3)	8 (1)	22 (3)	53 (4)	15 (1)	20 (2)	44 (3)	2,669 (38)	1,865 (40)	2.050 (43)
Huffman East	173 (3)	16 (1)	141 (3)	13 (4)	5 (4)	5 (3)	4 (2)	3 (2)	5 (2)	8 (2)	14 (1)	4 (2)	2,341 (24)	1,737 (28)	607 (25)
Huffman West[b]	- (-)	- (-)	- (-)	25 (5)	12 (4)	7 (4)	32 (4)	25 (5)	38 (2)	13 (2)	8 (1)	- (-)	1,163 (28)	590 (24)	256 (17)
Lauppe North	n/a	- (-)	34 (3)	n/a	15 (5)	7 (3)	n/a	15 (2)	23 (2)	n/a	44 (3)	250 (4)	n/a	1,842 (29)	704 (31)
Lauppe South	2 (1)	128 (3)	95 (2)	1 (1)	3 (3)	3 (2)	12 (4)	17 (4)	9 (1)	61 (2)	156 (4)	25 (3)	399 (25)	1,195 (28)	391 (25)
Lucich North	2,608 (17)	1,338 (19)	1,545 915)	26 (5)	15 (5)	17 (4)	32 (3)	46 (4)	23 (2)	429 (4)	180 (5)	158 (4)	6,010 (55)	2,542 (52)	4,134 (51)
Lucich South	5,630 (13)	265 (6)	2,029 (7)	32 (7)	22 (4)	14 (6)	2 (1)	12 (2)	33 (4)	99 (7)	158 (4)	263 (5)	8,055 (49)	11,463 (41)	3,258 (45)
Nestor	30 (3)	2 (1)	80 (3)	9 (2)	13 (4)	5 (5)	3 (2)	- (-)	2 (2)	43 (5)	4 (1)	10 (1)	1,452 (28)	440 (19)	600 (23)
Ruby Ranch	28 (2)	60 (1)	3 (1)	7 (3)	10 (2)	2 (2)	18 (4)	14 (2)	36 (5)	20 (3)	9 (2)	26 (3)	3,525 (34)	413 (18)	626 (26)
Verona	2,507 (3)	- (-)	2 (1)	1 (1)	4 (4)	3 (3)	19 (4)	6 (2)	11 (3)	5 (1)	3 (1)	- (-)	2,780 (26)	276 (19)	596 (25)
Vestal	20 (2)	270 (1)	8 (2)	6 (5)	12 (3)	6 (2)	19 (4)	15 (3)	14 (4)	15 (1)	4 (1)	6 (1)	887 (32)	1,106 (28)	616 (37)
Willey	756 (5)	3 (1)	9 (1)	5 (3)	4 (2)	- (-)	3 (2)	2 (2)	2 (1)	- (-)	81 (2)	6 (1)	1,088 (21)	1,411(19)	422 (13)
Central Basin Reserve															
BKS	8,342 (19)	2,386 (21)	3,153 (17)	58 (8)	70 (8)	33 (9)	143 (5)	283 (5)	78 (4)	105 (5)	78 (4)	25 (2)	15,771 (72)	7,632 (74)	5,822 (67)
Bianchi West	676 (5)	363 (5)	876 (8)	4 (2)	6 (1)	- (-)	3 (1)	2 (1)	- (-)	57 (4)	65 (6)	121 (4)	1,167 (26)	1,084 (25)	1,216 (23)
Elsie	108 (3)	90 (1)	2 (1)	25 (4)	9 (4)	6 (2)	2 (1)	7 (1)	5 (1)	18 (2)	9 (1)	8 (1)	1,932 (26)	1,813 (19)	176 (20)
Elverta/ Silva S.	n/a	979 (2)	239 (3)	n/a	20 (4)	8 (3)	n/a	20 (2)	3 (1)	n/a	5 (1)	35 (2)	n/a	1,693 (27)	1,443 (30)
Frazer South	603 (10)	122 (3)	224 (3)	8 (3)	14 (3)	6 (4)	6 (3)	13 (2)	- (-)	102 (4)	48 (4)	28 (4)	1,308 (37)	666 (26)	888 (29)
Paulsen South	196 (6)	196 (5)	404 (6)	1 (1)	1 (1)	- (-)	6 (1)	- (-)	1 (1)	9 (2)	26 (4)	76 (5)	374 (20)	454 (21)	548 (21)
Richter	2 (1)	15 (1)	4 (1)	7 (3)	4 (2)	2 (2)	1 (1)	2 (2)	1 (1)	10 (2)	- (-)	1 (1)	236 (15)	85 (12)	118 (12)
Sills	54 (5)	356 (4)	194 (2)	29 (4)	18 (3)	5 (4)	8 (2)	29 (4)	24 (3)	76 (5)	10 (2)	55 (3)	2,048 (33)	1,615 (31)	982 (27)
Tufts	20 (3)	79 (2)	5 (1)	18 (3)	8 (2)	8 (4)	2 (1)	4 (1)	- (-)	14 (2)	2 (1)	3 (1)	759 (22)	667 (20)	155 (16)
Fisherman's Lake Reserve															
Allegheny[b]	- (-)	- (-)	- (-)	- (-)	3 (1)	3 (1)	9 (2)	5 (2)	17 (3)	- (-)	1 (1)	- (-)	107 (11)	101 (15)	191 (21)

Reserve	Waterfowl			Raptors			Neotropical Migrants			Shorebirds			All Bird Species		
	2021	2022	2023	2021	2022	2023	2021	2022	2023	2021	2022	2023	2021	2022	2023
Ann Rudin	- (-)	- (-)	153 (6)			7 (4)			36 (4)			- (-)	626 (34)	593 (35)	392 (34)
Cummings	162 (5)	56 (7)	110 (6)	11 (4)	4 (3)	6 (4)	33 (4)	26 (3)	46 (4)	5 (1)	3 (1)	3 (2)	1,038 (43)	636 (45)	640 (45)
Natomas Farms	323 (5)	201 (11)	168 (8)	17 (8)	6 (2)	11 (5)	8 (3)	54 (3)	28 (7)	7 (1)	5 (1)	4 (1)	405 (31)	280 (29)	247 (24)
Rosas[b]	24 (4)	6 (1)	6 (2)	11 (2)	8 (3)	3 (3)	32 (4)	41 (5)	23 (2)	2 (1)	9 (1)	- (-)	164 (20)	185 (19)	163 (18)
Souza[b]	5 (1)	79 (2)	- (-)	6 (3)	1 (1)	2 (1)	29 (2)	3 (1)	24 (3)	1 (1)	1 (1)	- (-)	107 (11)	101 (15)	191 (21)

[a] Numbers in this table reflect the total number of individuals of each group observed followed by the number of species observed (in parentheses).
[b] These reserves were surveyed only from May through August and therefore would be expected to have a lower number of observations and species.

Table 5-2. Number of Pairs of Other Covered Species on TNBC Mitigation Lands, 2004–2023.

Species	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Burrowing owl	1 (BKS)	1 (BKS)	1 (BKS, pair failed)	0	1 (Elsie)	3 (2 Tufts, 1 Elsie)	4 (1 Tufts, 1 Elsie, 1 Sills, 1 BKS)	3 (2 Elsie, 1 Tufts)	1 (Elsie)	2 (Elsie)	1 (Tufts)	0	0	0	0	0	0	0	0	0
Loggerhead shrike	4 (3 BKS, 1 Brennan)	3 (2 BKS, 1 Brennan)	3 (1 BKS, 1 Alleghany, 1 Brennan)	3 (1 BKS, 1 Alleghany, 1 Huffman West)	1 (Alleghany)	1 (Atkinson)	1 (Atkinson)	1 (Atkinson)	3[a]	3[a] (1 Lucich North, 1 Rosa, 1 Souza)	4[a] (Lucich North, Bennett North, Atkinson, Rosa)	1[a] (Rosa)	0	1 (Rosa)	1 (Rosa)	0	0	0	0	0
Tricolored blackbird	0	~900 (BKS)	0	~1,200 (BKS)	~4,900 (~900 BKS, ~4,000 Frazer)	~1,500 (BKS)	~700 (BKS)	0	0	0	0	0	0	0	0	0	0	0	0	0
White-faced ibis	0	0	0	~750 (BKS)	~1,500 (BKS)	~2,500 (BKS)	~2,500 (BKS)	0	0	0	0	0	0	0	0	0	0	0	0	0

[a] Presumed nesting on/or immediately adjacent to reserve lands.

Table 5-3. Average Number of Observations per Survey of Other Covered Species Recorded during Monthly Avian Surveys on Reserves, 2005–2023.

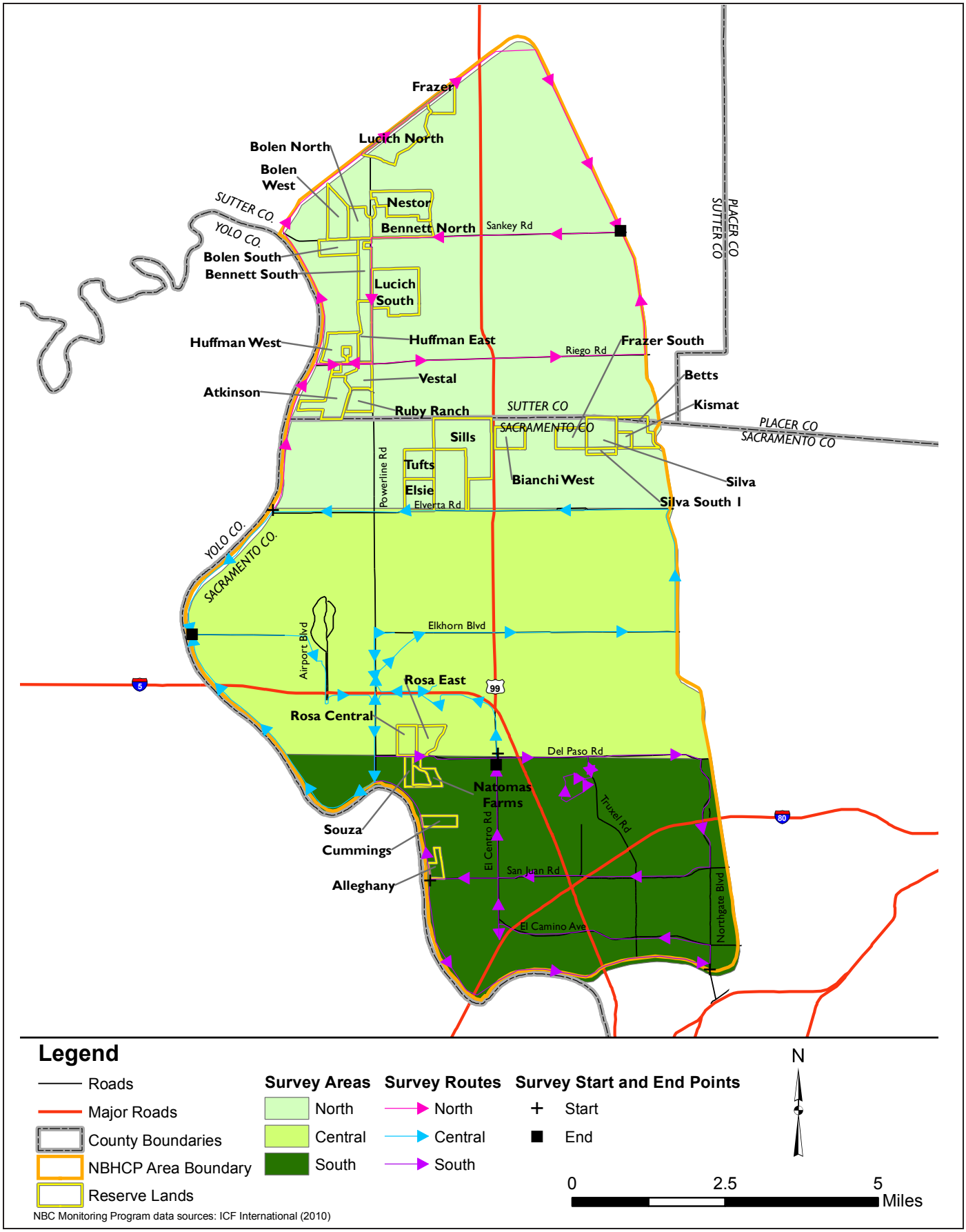
Species	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
White-faced ibis[a]	0.042	0.050	0.062	0.241	0.222	0.160	0.129	0.124	0.187	0.156	0.160	0.102	0.018	0.111	0.051	0.146	0.266	0.095	0.039
Burrowing owl	0.028	0.039	0.000	0.098	0.196	0.175	0.138	0.058	0.022	0.036	0.004	0.009	0.004	0.020	0.043	0.029	0.018	0.006	0.016
Loggerhead shrike	0.085	0.033	0.067	0.223	0.253	0.047	0.116	0.164	0.164	0.054	0.044	0.036	0.013	0.051	0.020	0.007	0.003	0.000	0.007
Tricolored blackbird	24.169	2.039	26.836	50.031	15.760	2.401	3.763	1.604	6.236	5.000	4.071	0.982	0.391	3.336	0.602	5.211	3.405	3.006	1.305
Pacific pond turtle and Unidentified Turtle	0.000	0.000	0.000	0.004	0.000	0.000	0.004	0.027	0.033	0.065	0.047	0.044	0.018	0.099	0.082	0.082	0.071	0.142	0.155

[a] To account for variation in effort in documenting total numbers during Basin-wide surveys and to account for numbers inflated by large counts at nesting colonies, this metric is the proportion of surveys on which the species was detected.

Table 5-4. Average Number of Observations per Survey of Other Covered Species Recorded during Monthly Basin-Wide Surveys, 2005–2023.

Species	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
White-faced ibis[a]	0.154	0.077	0.269	0.261	0.259	0.167	0.074	0.208	0.227	0.273	0.231	0.471	0.136	0.444	0.250	0.429	0.750	0.600	0.000
Burrowing owl	0.385	0.385	0.038	1.826	3.519	4.000	4.852	7.292	5.682	4.364	1.855	1.471	1.136	1.222	0.125	0.857	0.625	0.200	0.000
Loggerhead shrike	3.269	2.769	2.346	1.565	3.519	2.167	2.111	2.042	1.273	0.545	0.500	0.059	0.045	0.000	0.000	0.000	0.000	0.000	0.000
Tricolored blackbird	6.385	1.154	1.885	261.739	287.222	0.000	18.519	5.000	7.364	37.773	56.154	5.294	12.364	28.333	25.625	53.857	13.75	80.000	367.000

[a] To account for variation in effort in documenting total numbers during Basin-wide surveys and to account for numbers inflated by large counts at nesting colonies, this metric is the proportion of surveys on which the species was detected.



Graphics ... 662.17 NBC (3-9-2021) TG

FIGURE 5-1
Monthly Basin-Wide Survey Routes

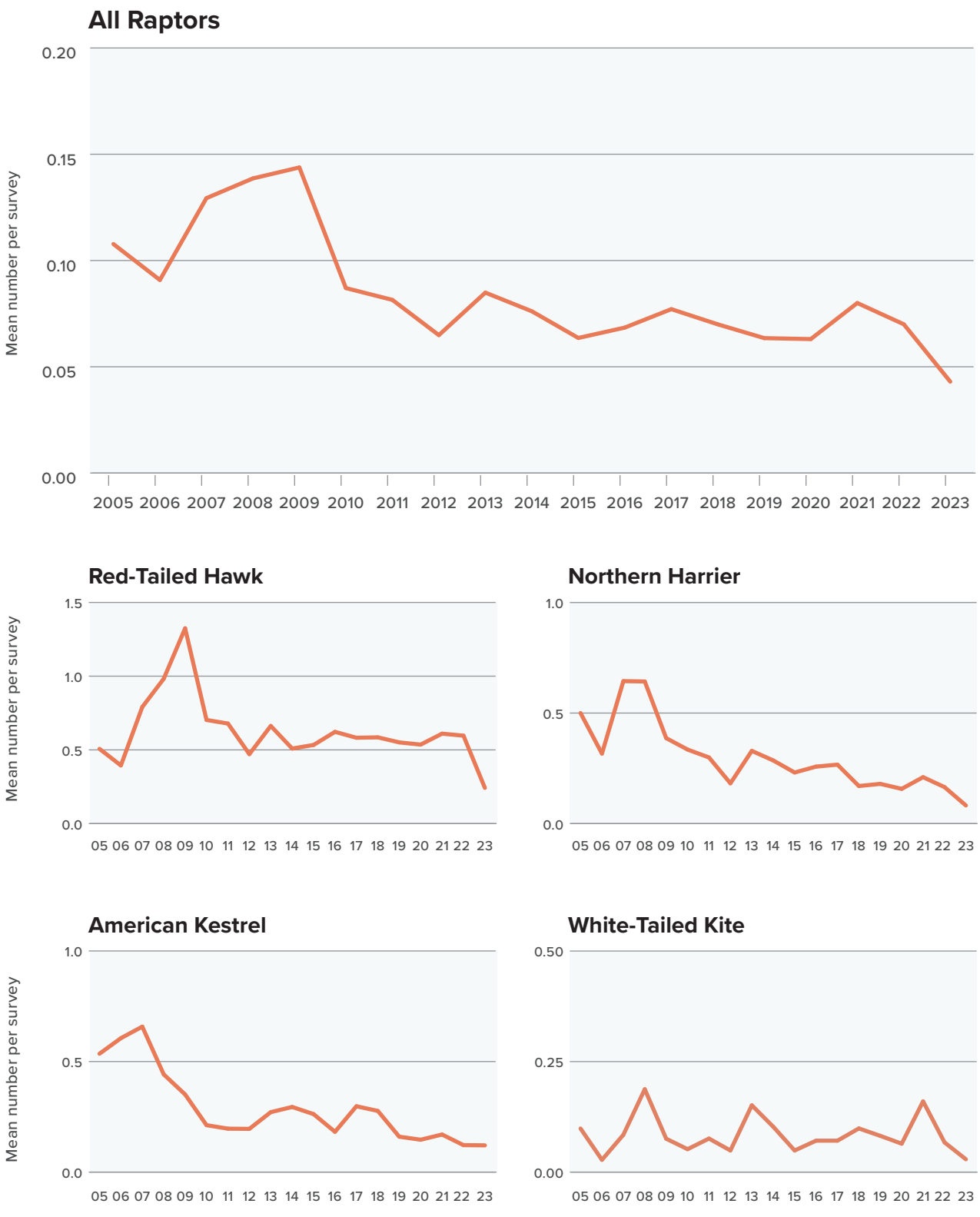


FIGURE 5-2
Mean Number of Raptors Detected per Survey on TNBC Reserves in the Natomas Basin, 2005–2023

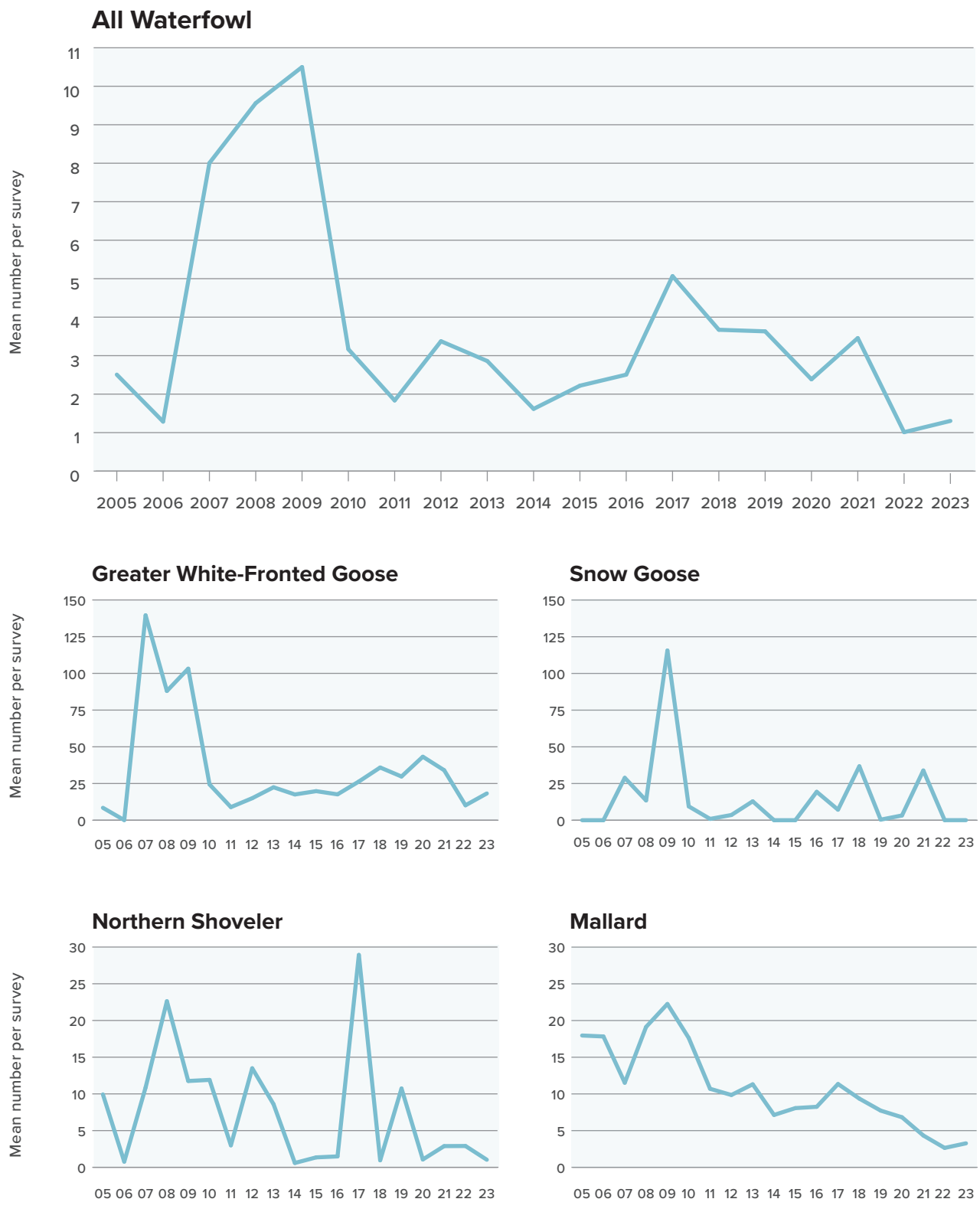
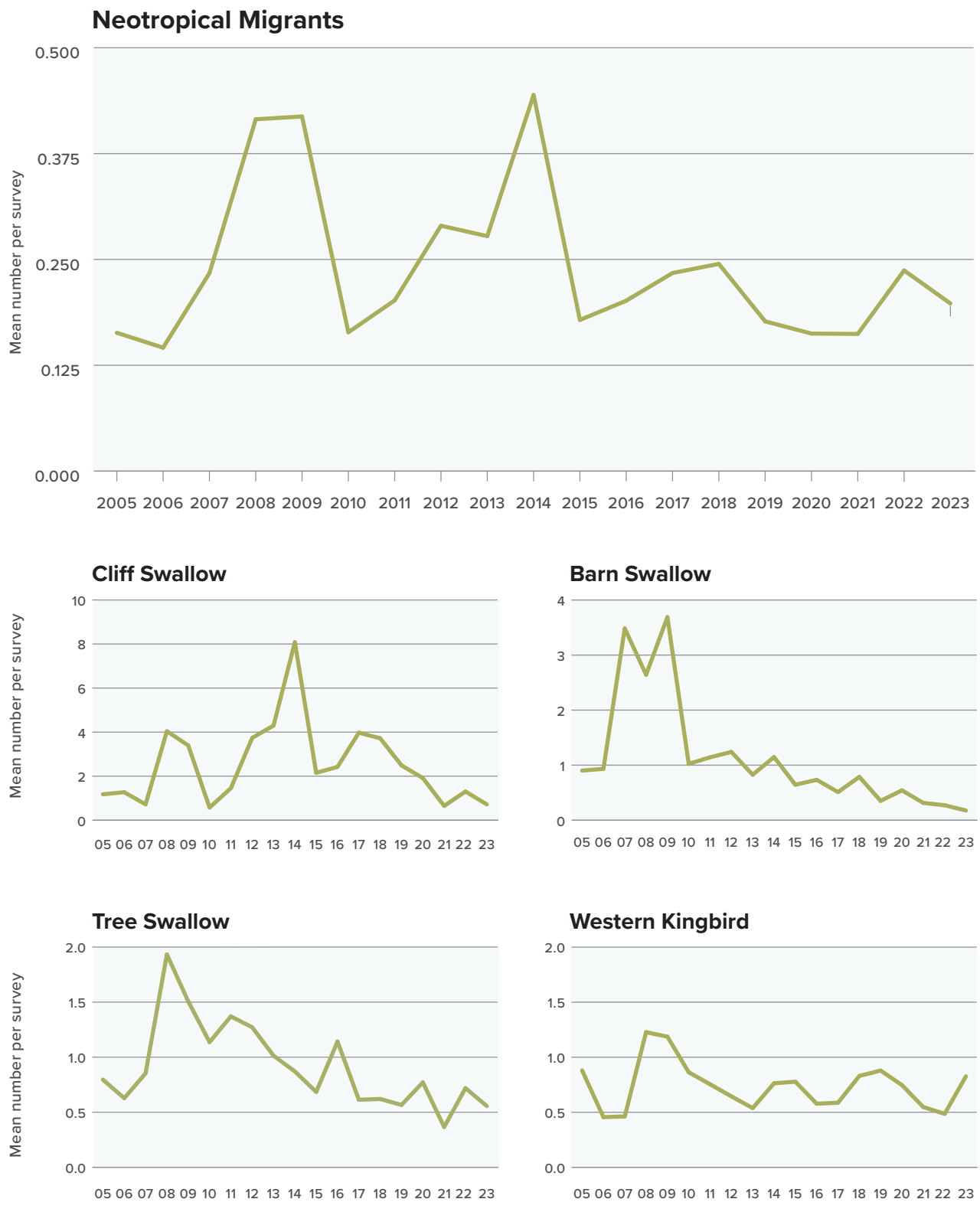


FIGURE 5-3
Mean Number of Waterfowl Detected per Survey on TNBC Reserves in the Natomas Basin, 2005–2023



NBC 104332 2023 (3-6-2024)

FIGURE 5-4

Mean Number of Neotropical Migrants Detected per Survey on TNBC Reserves in the Natomas Basin, 2005–2023

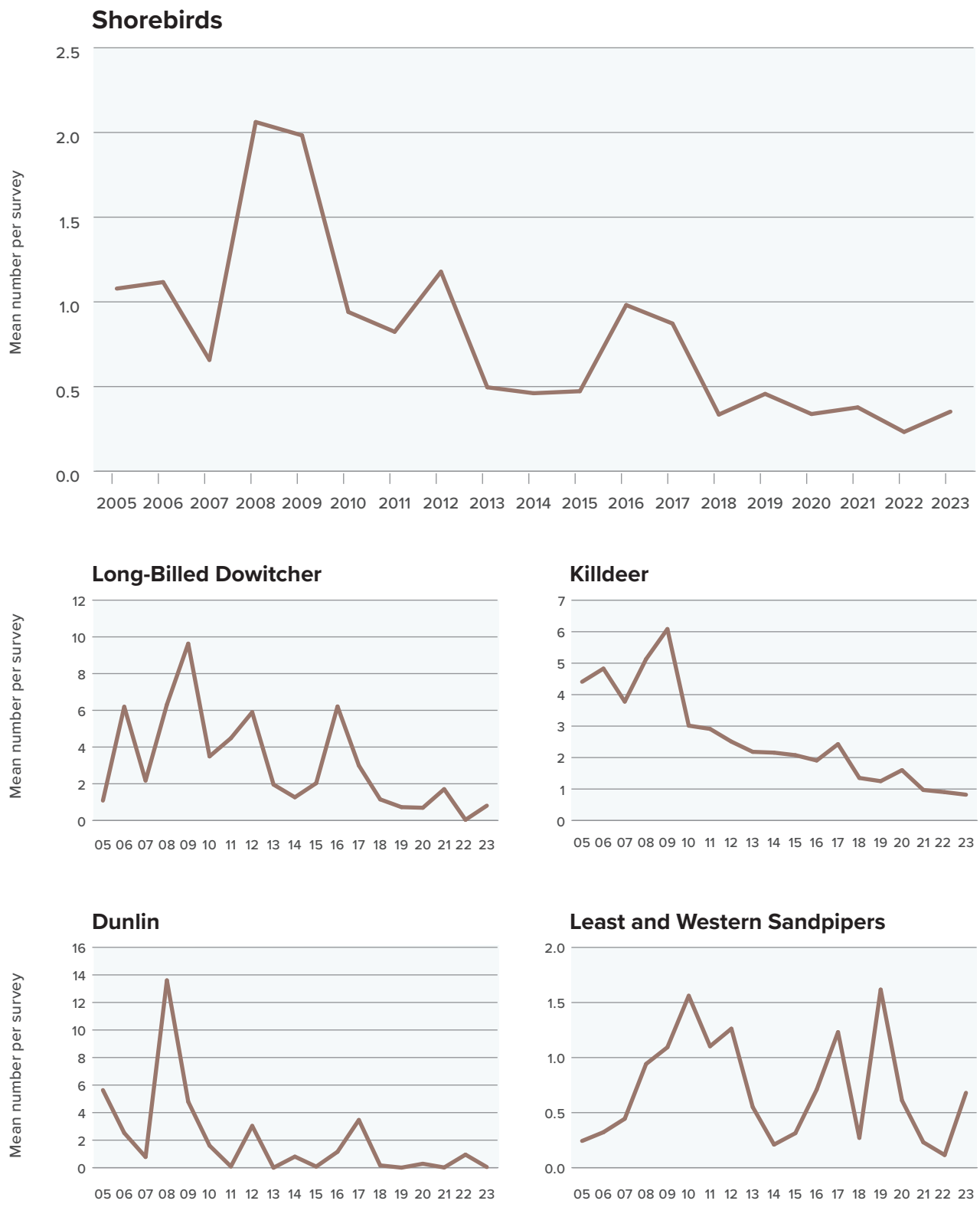
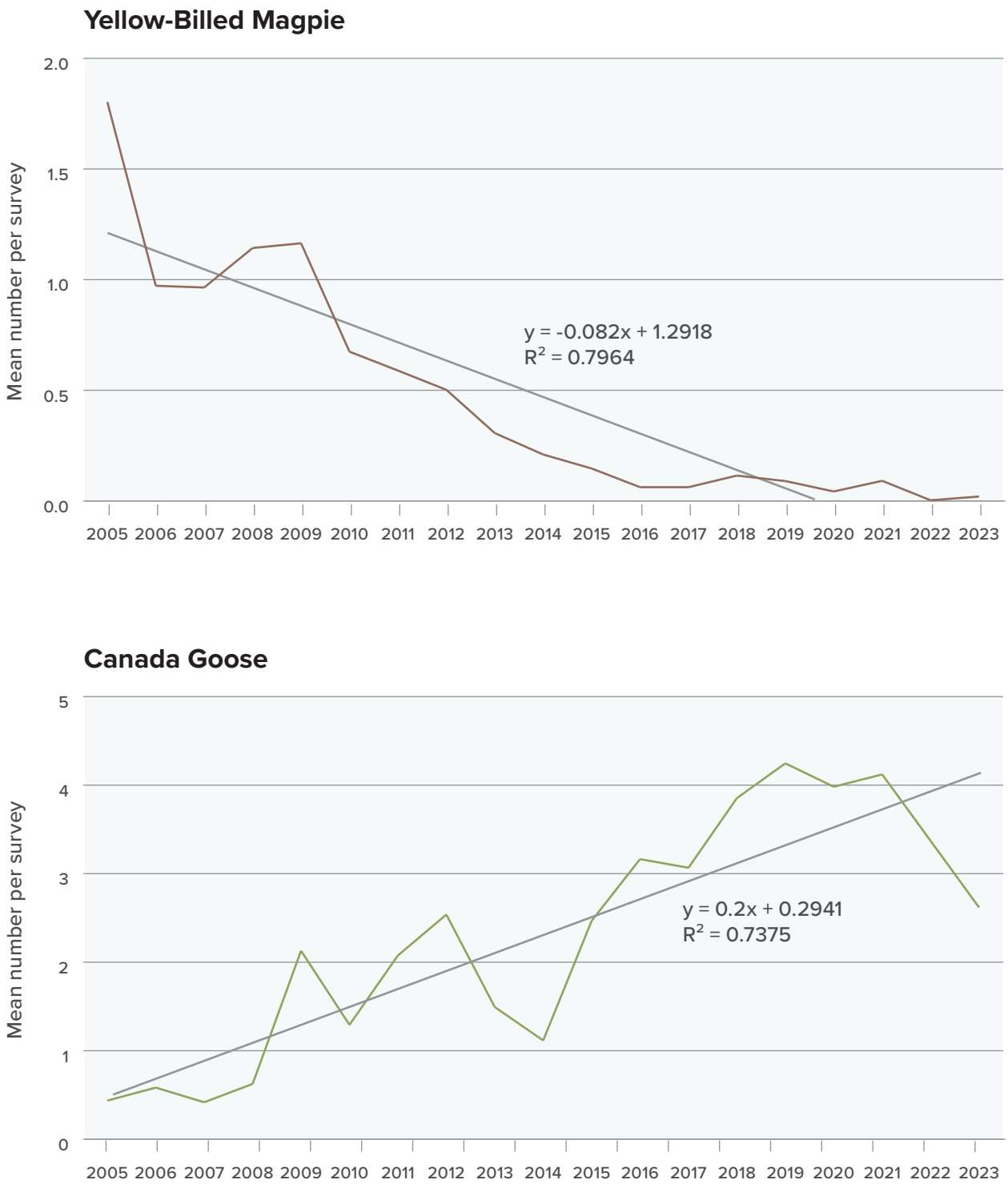


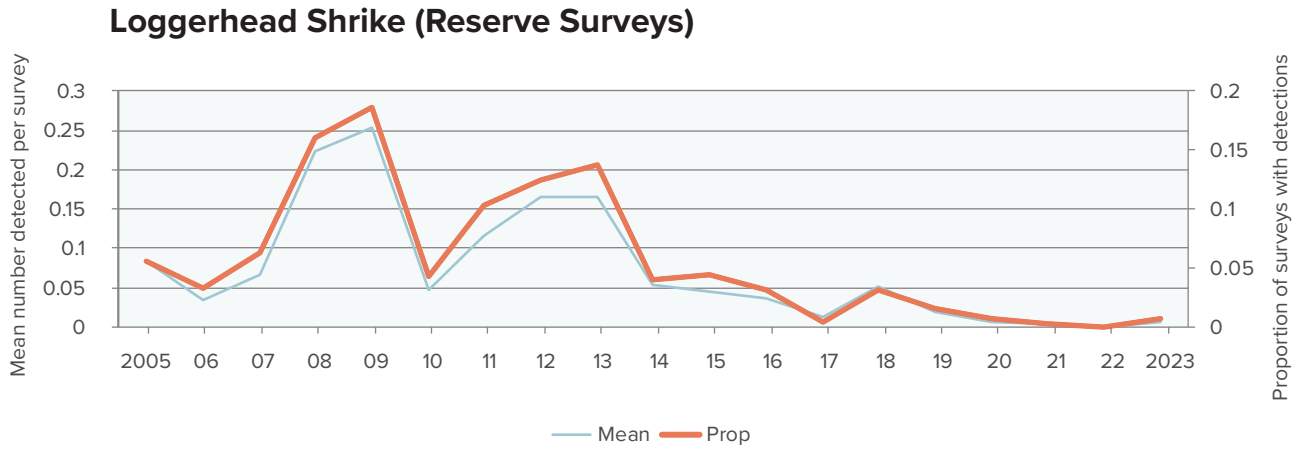
FIGURE 5-5
Mean Number of Shorebirds Detected per Survey on TNBC Reserves in the Natomas Basin, 2005–2023

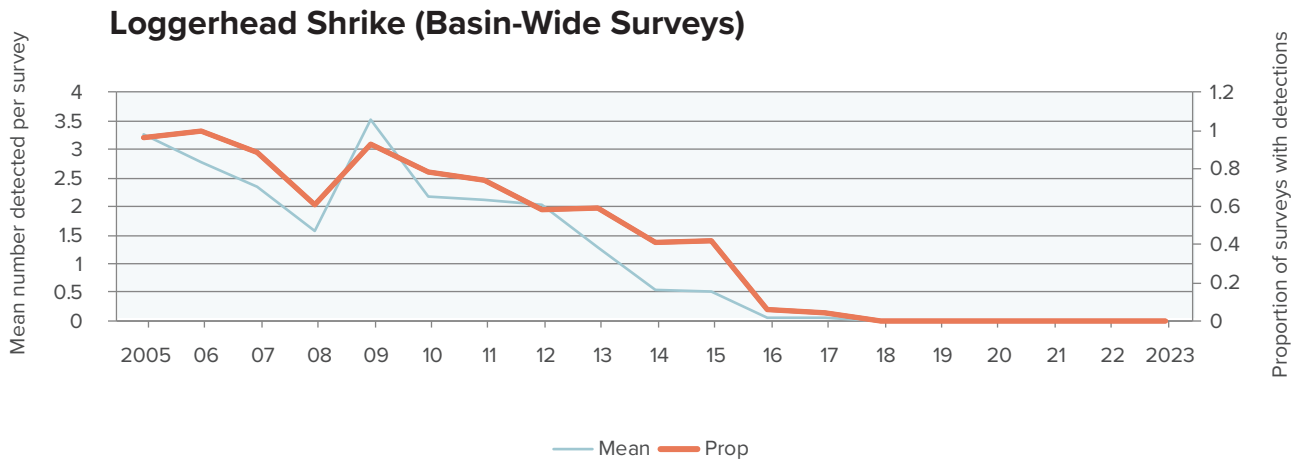


NBC 104332 2023 (3-6-2024)

FIGURE 5-6

Mean Number of Yellow-Billed Magpies and Canada Geese Detected per Survey on TNBC Reserves in the Natomas Basin, 2005–2023





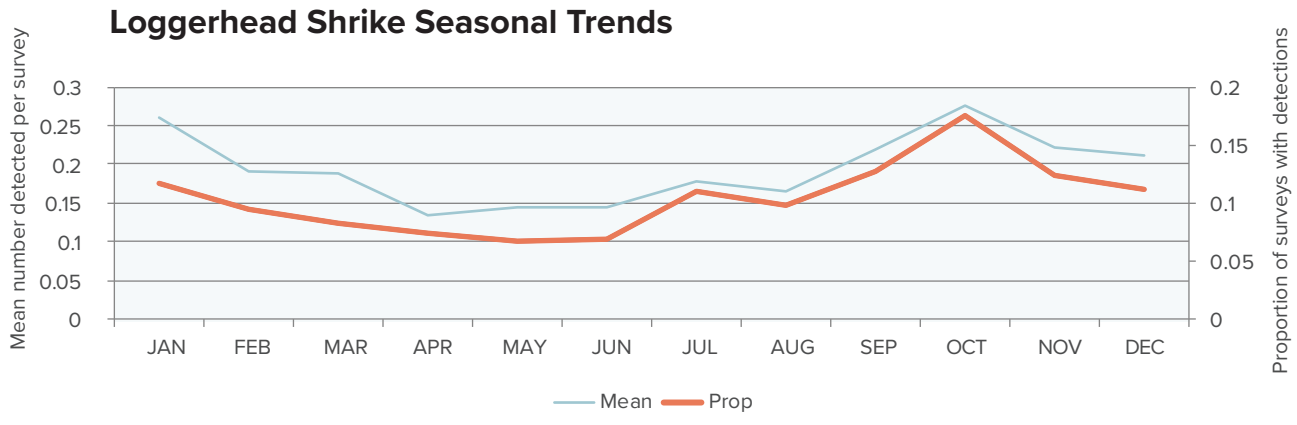
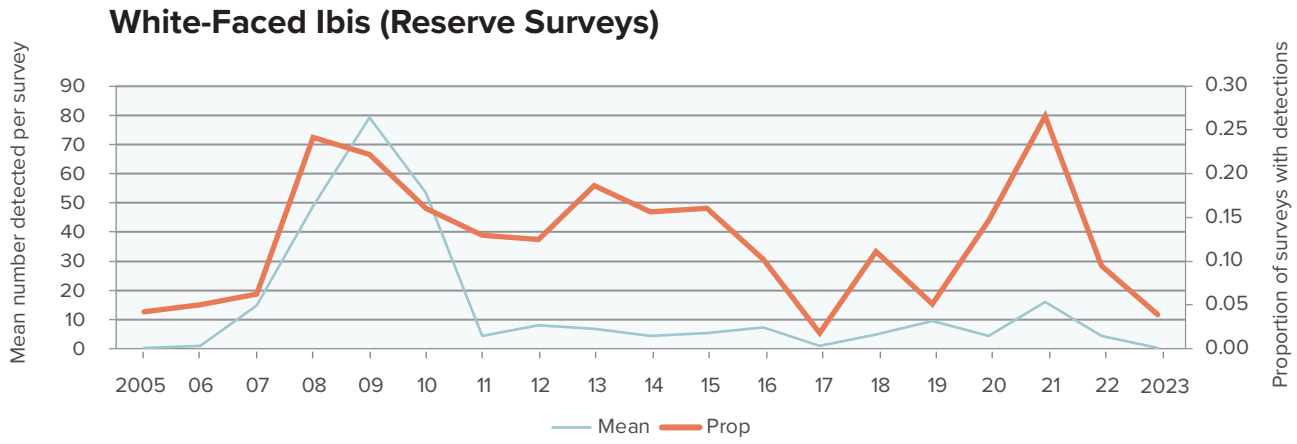
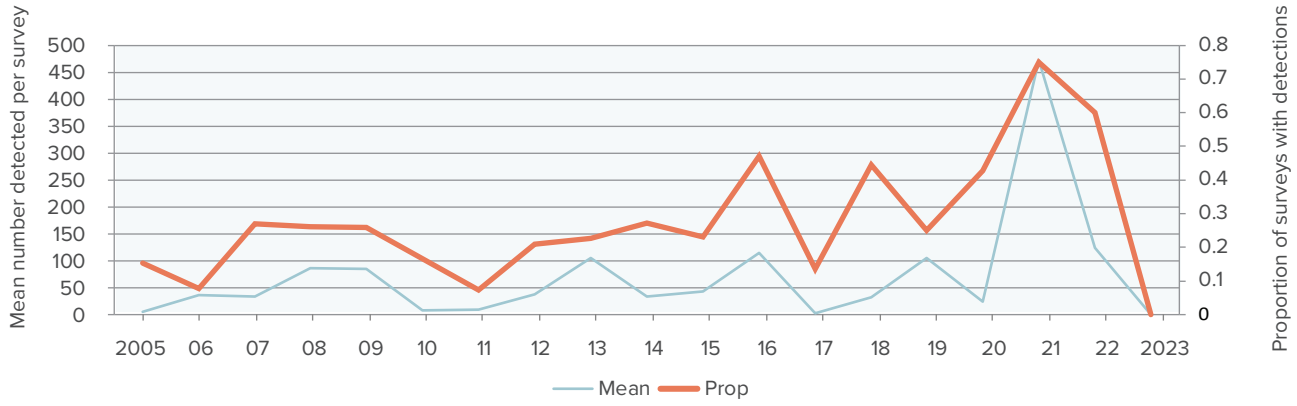


FIGURE 5-7

Mean Number of Loggerhead Shrikes Detected and the Proportion of Surveys on which Shrikes were Detected on TNBC Reserves in the Natomas Basin, 2005–2023





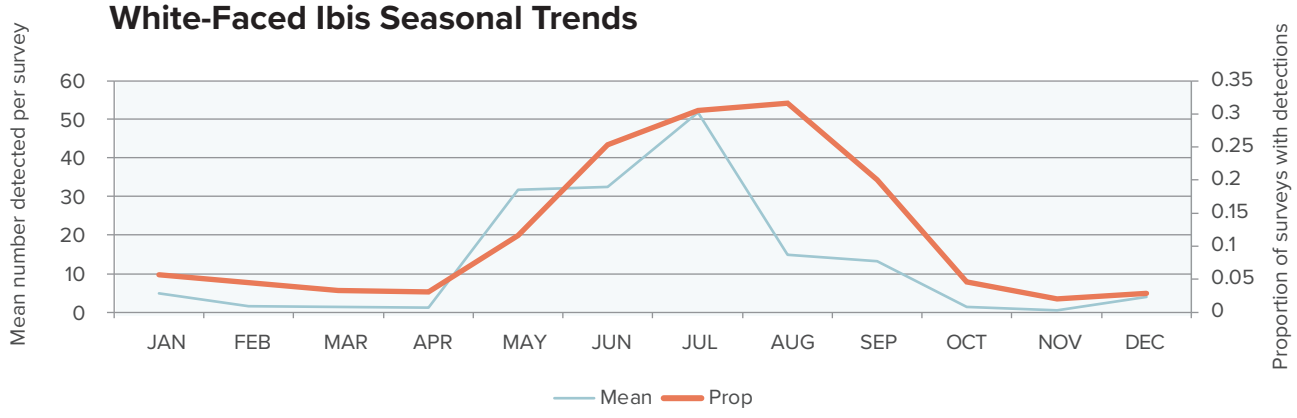
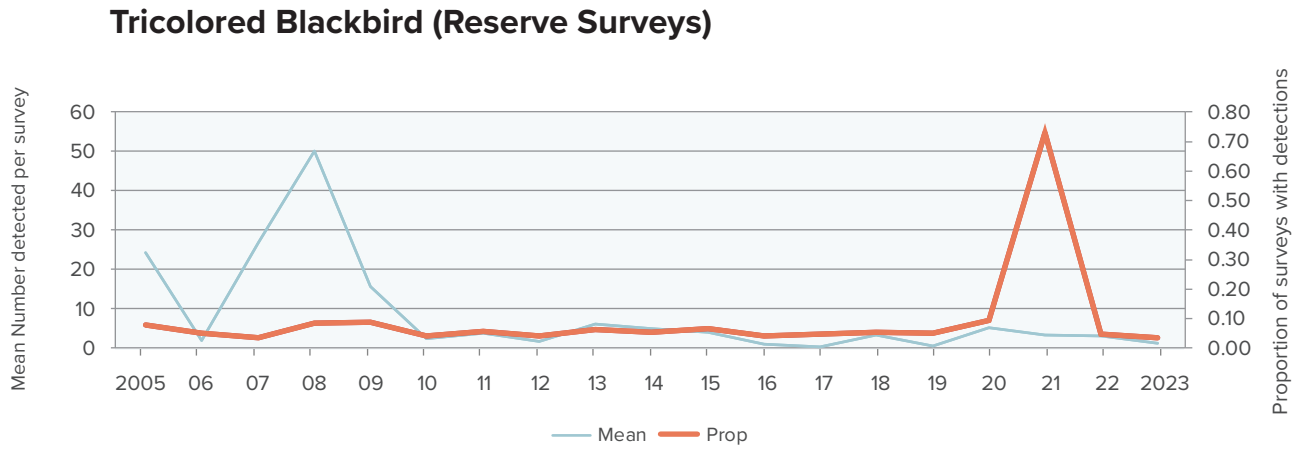
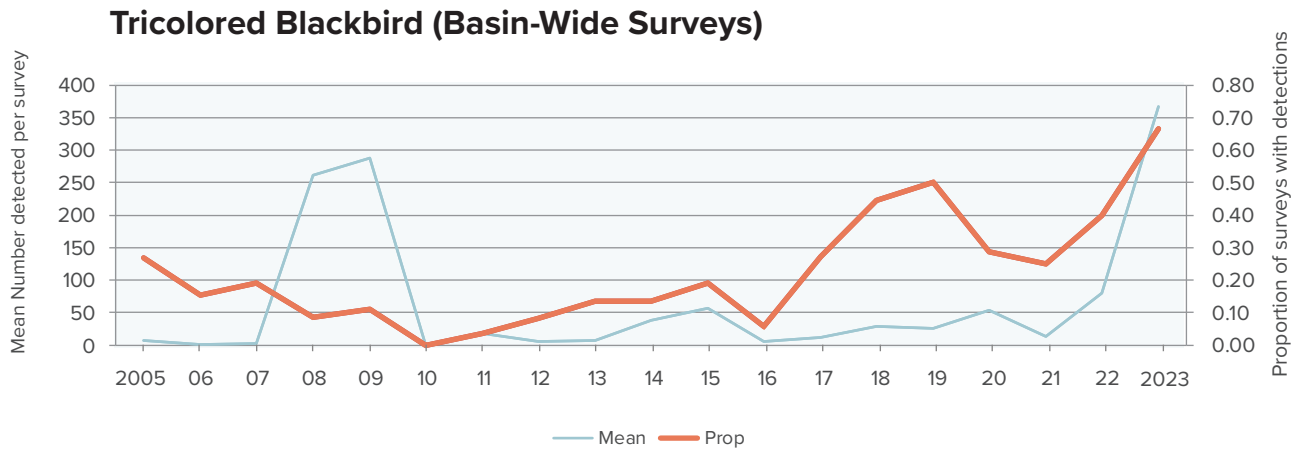
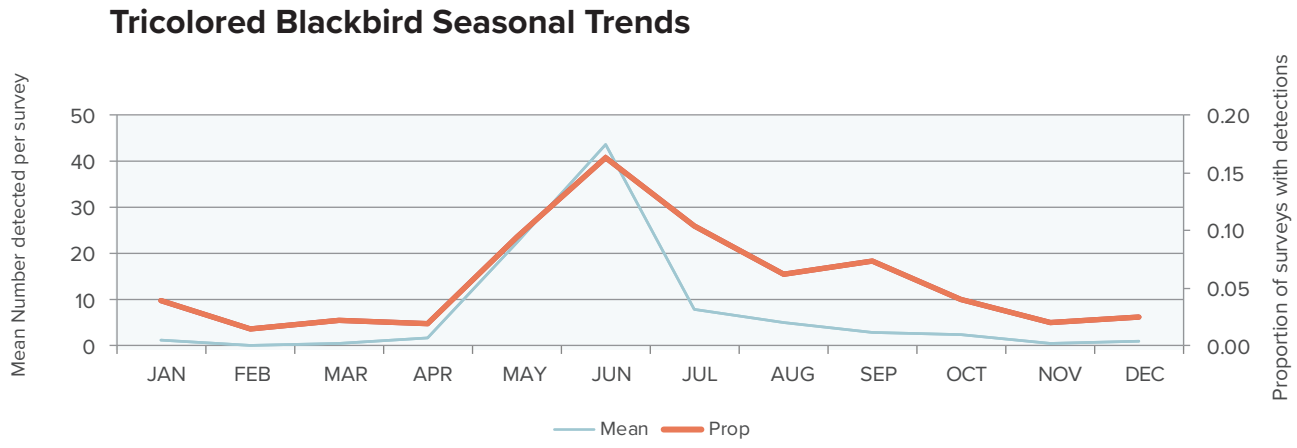


FIGURE 5-8

Mean Number of White-Faced Ibis Detected and the Proportion of Surveys on which Ibis Were Detected on TNBC Reserves in the Natomas Basin, 2005–2023



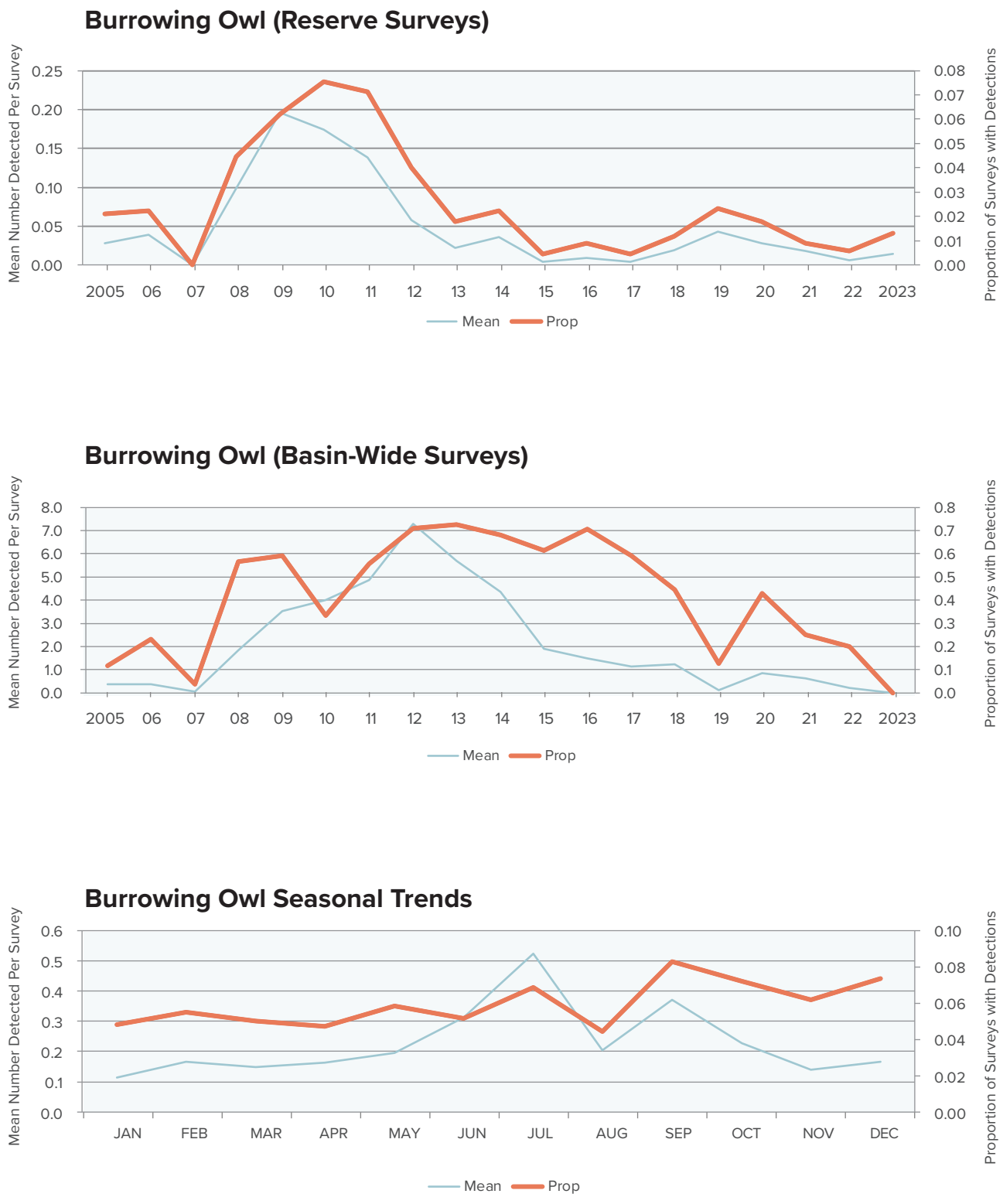




NBC 104332 2023 (3-6-2024)

FIGURE 5-9

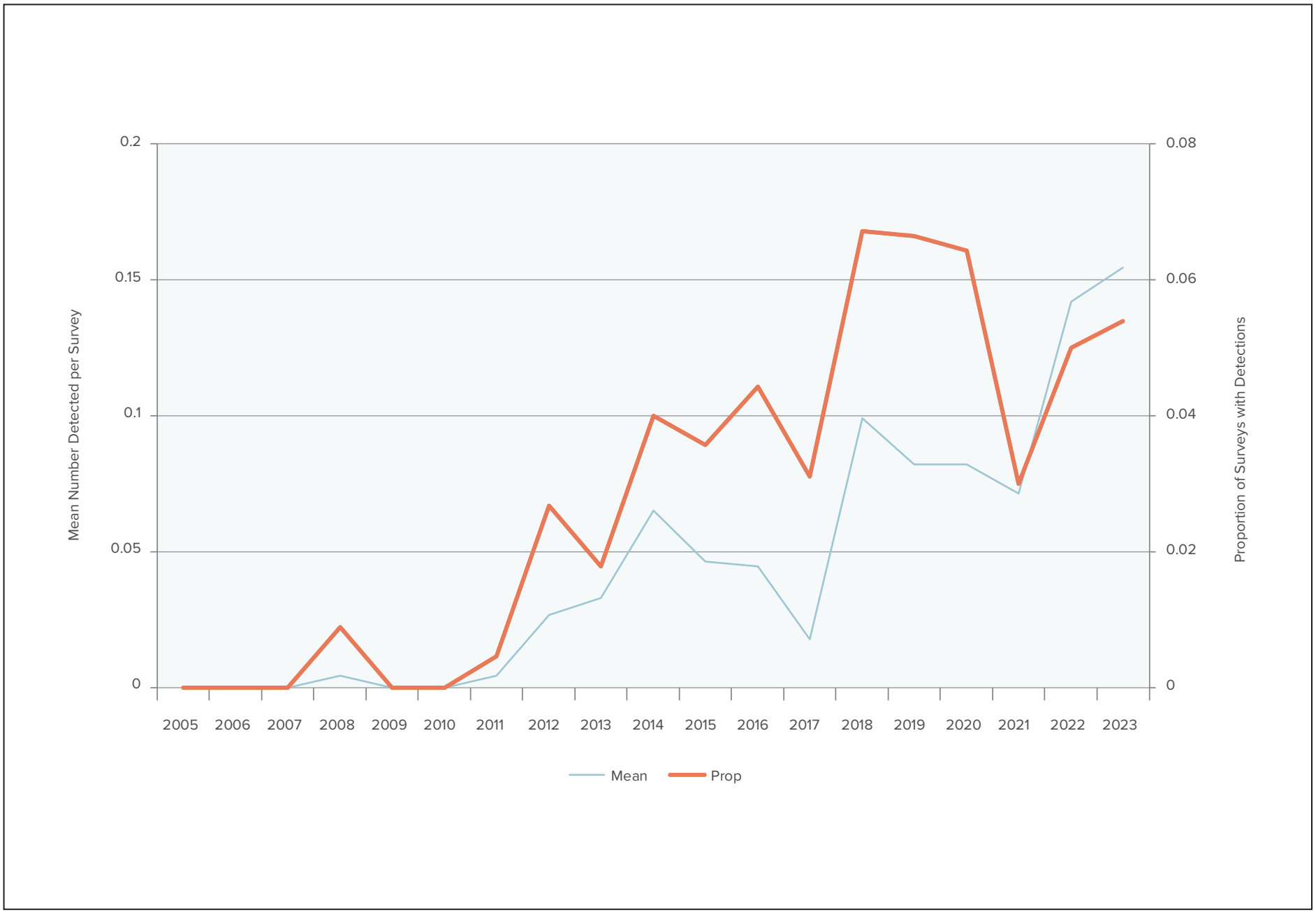
Mean Number of Tricolored Blackbird Detected and the Proportion of Surveys on which Blackbirds Were Detected on TNBC Reserves in the Natomas Basin, 2005–2023



NBC 104332 2023 (3-7-2024)

FIGURE 5-10

Mean Number of Burrowing Owl Detected and the Proportion of Surveys on which Owls were Detected on TNBC Reserves in the Natomas Basin, 2005–2023



NBC 104332 2023 (3-7-2024)

FIGURE 5-11

Mean Number of Northwestern Pond Turtles and Unidentified Turtles and the Proportion of Surveys on which Turtles were Detected on TNBC Reserves in the Natomas Basin, 2005–2023

Appendix A

NBHCP Reserve Land Cover Data

Figure A - 1
North Basin Reserve — Frazer North Tract

Path:\\PDCCITRDSGIS01\Projects_1\NBC\04002_04\arcmap\report_2023\AppendixA\AppendixA_A.aprx

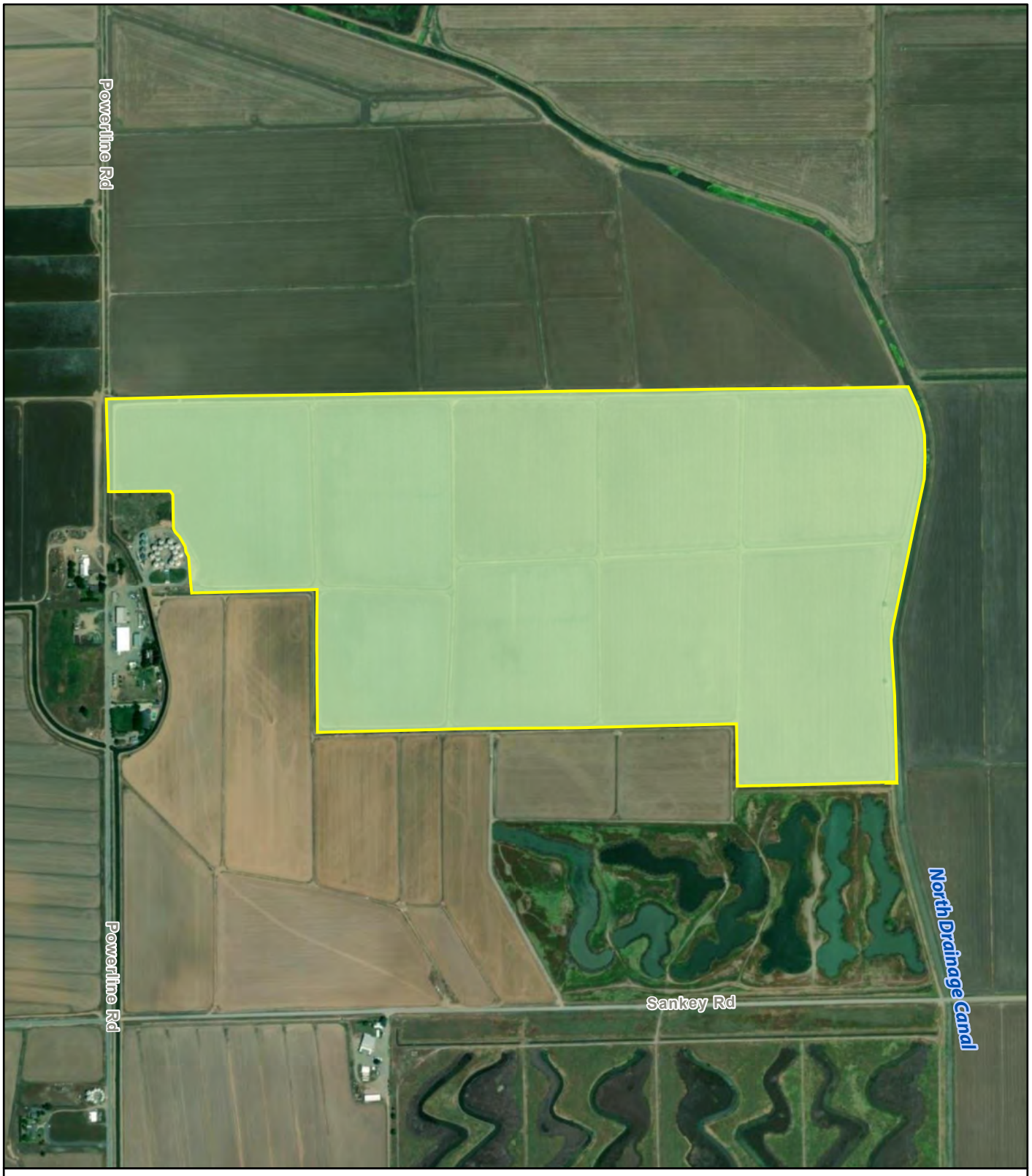
Figure A - 2
North Basin Reserve — Lucich North Tract

Path:\\PDCCITRDSGIS01\Projects_1\NBC\04002_04\arcmap\report_2023\AppendixA\AppendixA_A.aprx

Figure A - 3
North Basin Reserve — Bolen West Tract

Path:\\PDCCITRDSGIS01\Projects_1\NBC\04002_04\arcmap\report_2023\AppendixA\AppendixA_A.aprx

Figure A - 4
North Basin Reserve — Bolen North Tract



Path:\\PDCCITRDSGIS01\Projects_1\NBC\04002_04\arcmap\report_2023\AppendixA\Appendix_A.aprx

Figure A - 5
North Basin Reserve — Nestor Tract

Path:\\PDCCITRDSGIS01\Projects_1\NBC\04002_04\arcmap\report_2023\AppendixA\AppendixA_A.aprx

Figure A - 6
North Basin Reserve — Bennett North Tract

Figure A - 7
North Basin Reserve — Bolen South Tract

Figure A - 8
North Basin Reserve — Verona Tract

Figure A - 9
North Basin Reserve — Bennett South Tract

Reserve Lands
NBHCP Area Boundary

Land Cover
Developed
Open Water
Rice

N

200 0 200
Meters

Path:\\PDCCITRDSGIS01\Projects_1\NBC\04002_04\arcmap\report_2023\AppendixA\AppendixA_A.aprx

Figure A - 10
North Basin Reserve — Willey Tract

Path:\\PDCCITRDSGIS01\Projects_1\NBC\04002_04\arcmap\report_2023\AppendixA\AppendixA_A.aprx

Figure A - 11
North Basin Reserve — Lauppe North Tract

Path:\\PDCCITRDSG\50\Projects_1\NBC\04002_04\arcmap\report_2023\AppendixA\AppendixA_A.aprx

Figure A - 12
North Basin Reserve — Lucich South Tract

Path:\\PDCCITRDSGIS01\Projects_1\NBC\04002_04\arcmap\report_2023\AppendixA\AppendixA.aprx

Figure A - 13
North Basin Reserve — Lauppe South Tract

Path: \\PDCCITRDSGIS01\Projects_1\NBC\04002_04\arcmap\report_2023\AppendixA\AppendixA_A.aprx

Figure A - 14
North Basin Reserve — Huffman East Tract

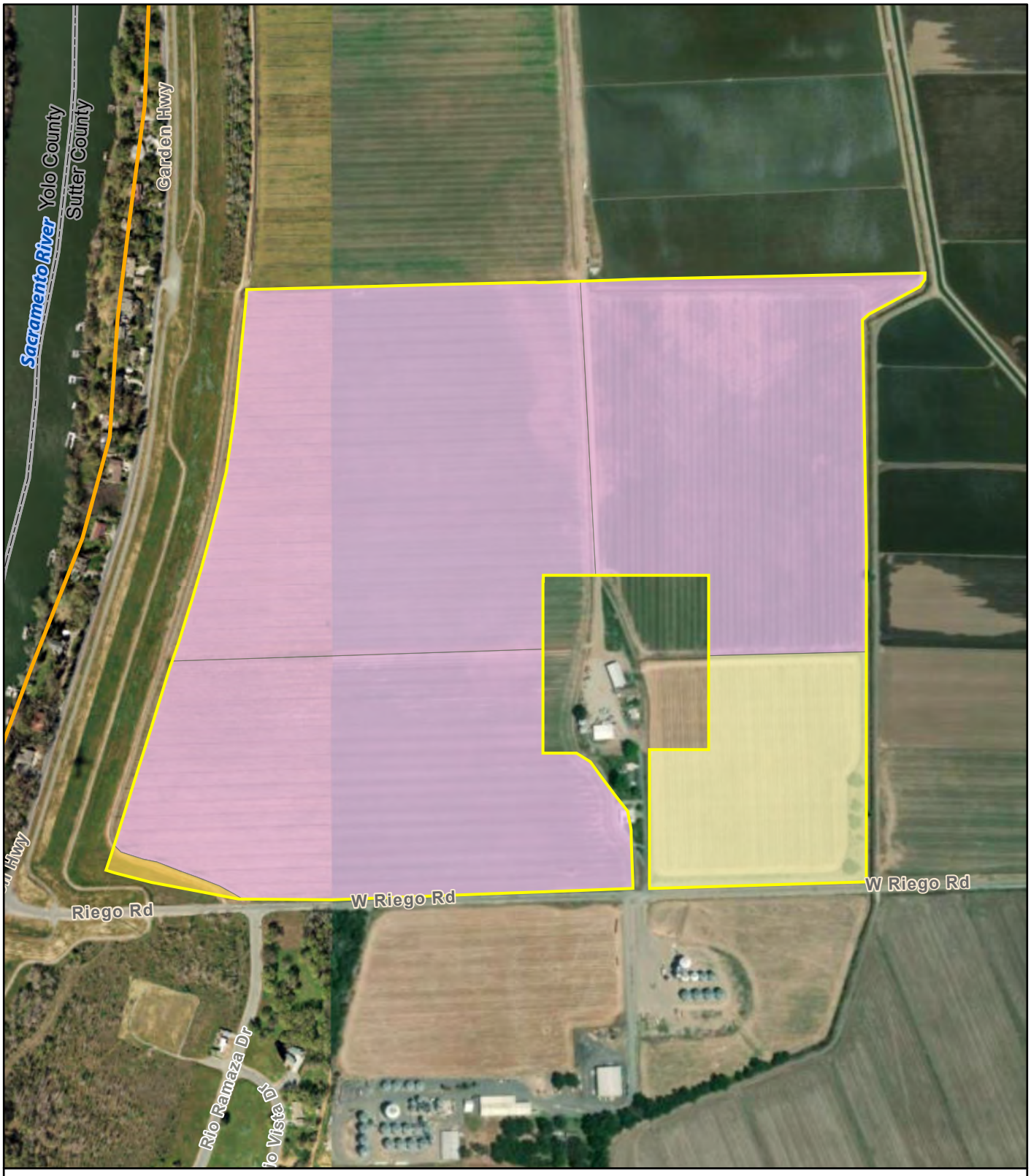


Figure A - 15
North Basin Reserve — Huffman West Tract

Figure A - 16
North Basin Reserve — Atkinson Tract

Path: \\PDCCITRDSGIS01\Projects_1\NBC\04002_04\arcmap\report_2023\AppendixA\AppendixA.aprx

Figure A - 17
North Basin Reserve — Vestal Tract

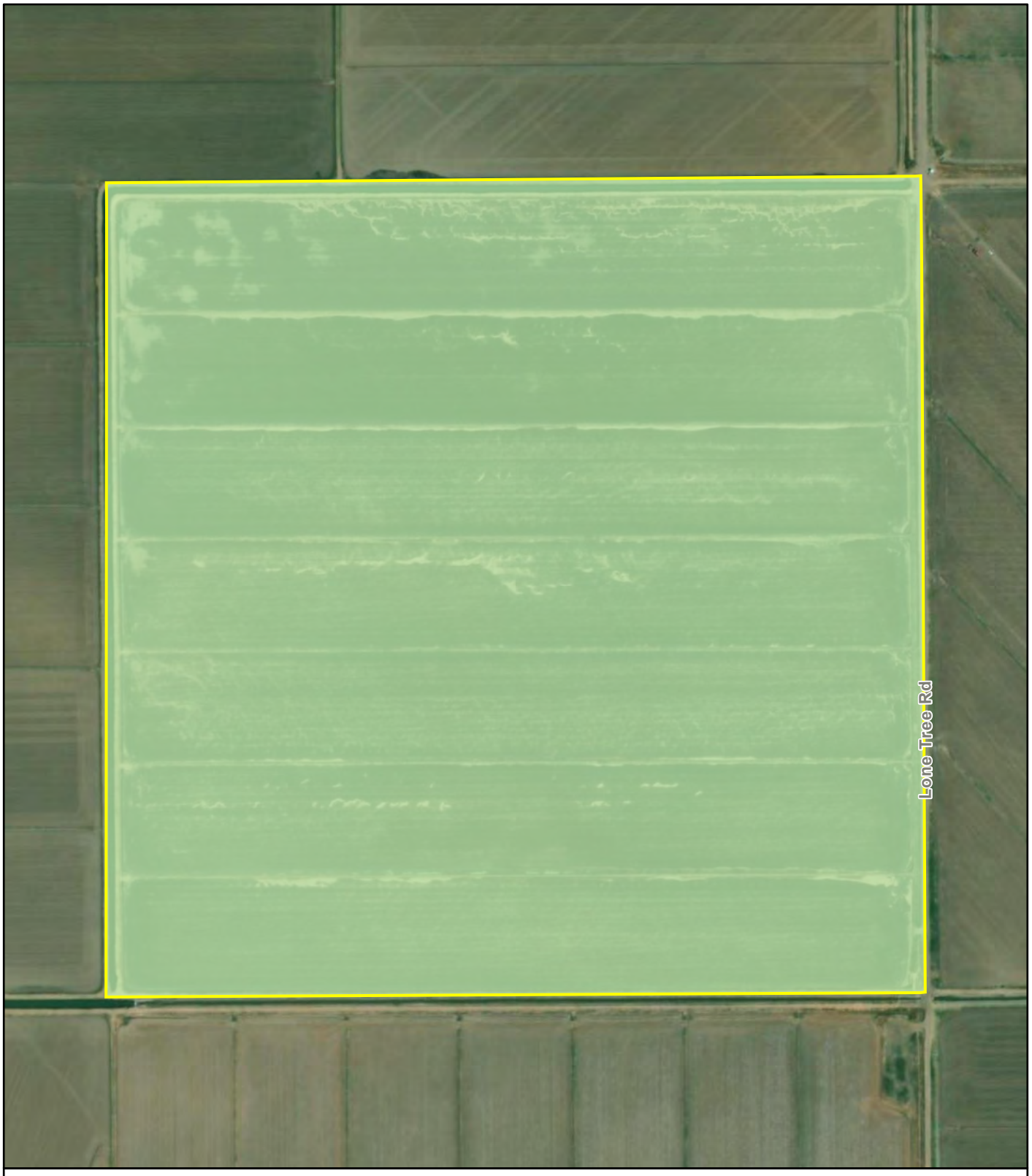
Path: \\PDCCITRDSGIS01\Projects_1\NBC\04002_04\arcmap\report_2023\AppendixA\Appendix_A.aprx

Figure A - 18
North Basin Reserve — Ruby Ranch Tract

Figure A - 19
Central Basin Reserve — Paulsen Central Tract

Path:\\PDCCITRDSGIS01\Projects_1\NBC\04002_04\arcmap\report_2023\AppendixA\AppendixA.aprx

Figure A - 20
Central Basin Reserve — Paulsen South Tract



Path:\\PDCCITRDSGIS01\Projects_1\NBC\04002_04\arcmap\report_2023\AppendixA\AppendixA.aprx

Figure A - 21
Central Basin Reserve — Tufts Tract

Path:\\PDCCITRDSGIS01\Projects_1\NBC\04002_04\arcmap\report_2023\AppendixA\AppendixA.aprx

Figure A - 22
Central Basin Reserve — Elsie Tract

Path: \\PDCCITRDSGIS01\Projects_1\NBC\04002_04\arcmap\report_2023\AppendixA\AppendixA.aprx

Figure A - 23
Central Basin Reserve — Richter Tract

Path:\\PDCCITRDSG\50\Projects_1\NBC\04002_04\arcmap\report_2023\AppendixA\AppendixA_A.aprx

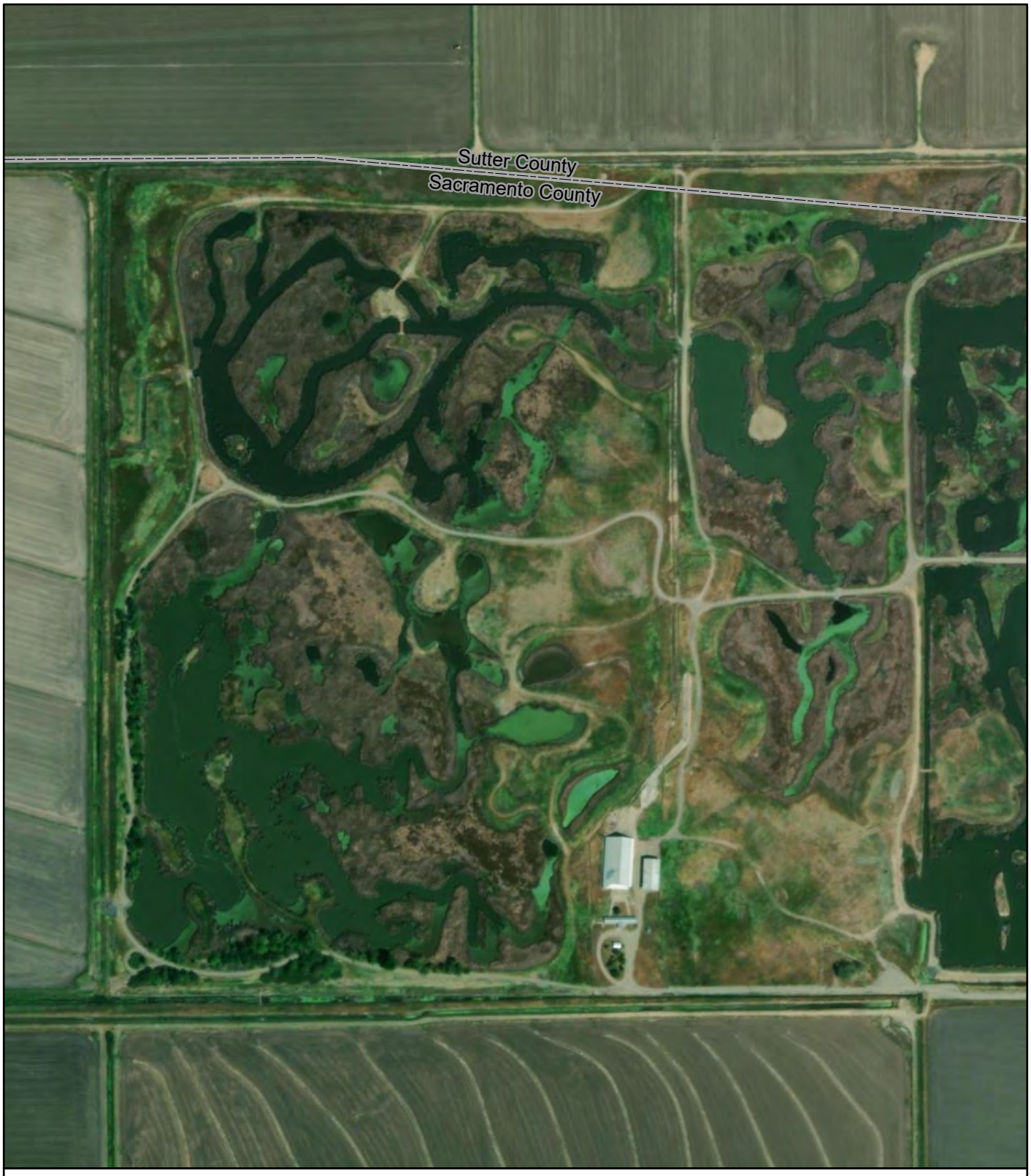
Figure A - 24
Central Basin Reserve — Sills Tract

Path:\\PDCCITRDSGIS01\Projects_1\NBC\04002_04\arcmap\report_2023\AppendixA\Appendix_A.aprx

Figure A - 25
Central Basin Reserve — Bianchi West Tract

Path:\\PDCCITRDSGIS01\Projects_1\NBC\04002_04\arcmap\report_2023\AppendixA\AppendixA.aprx

Figure A - 26
Central Basin Reserve — Frazer South Tract



Path:\\PDCCITRDSGIS01\Projects_1\NBC\04002_04\arcmap\report_2023\AppendixA\AppendixA_A.aprx

Figure A - 27
Central Basin Reserve — BKS Tract

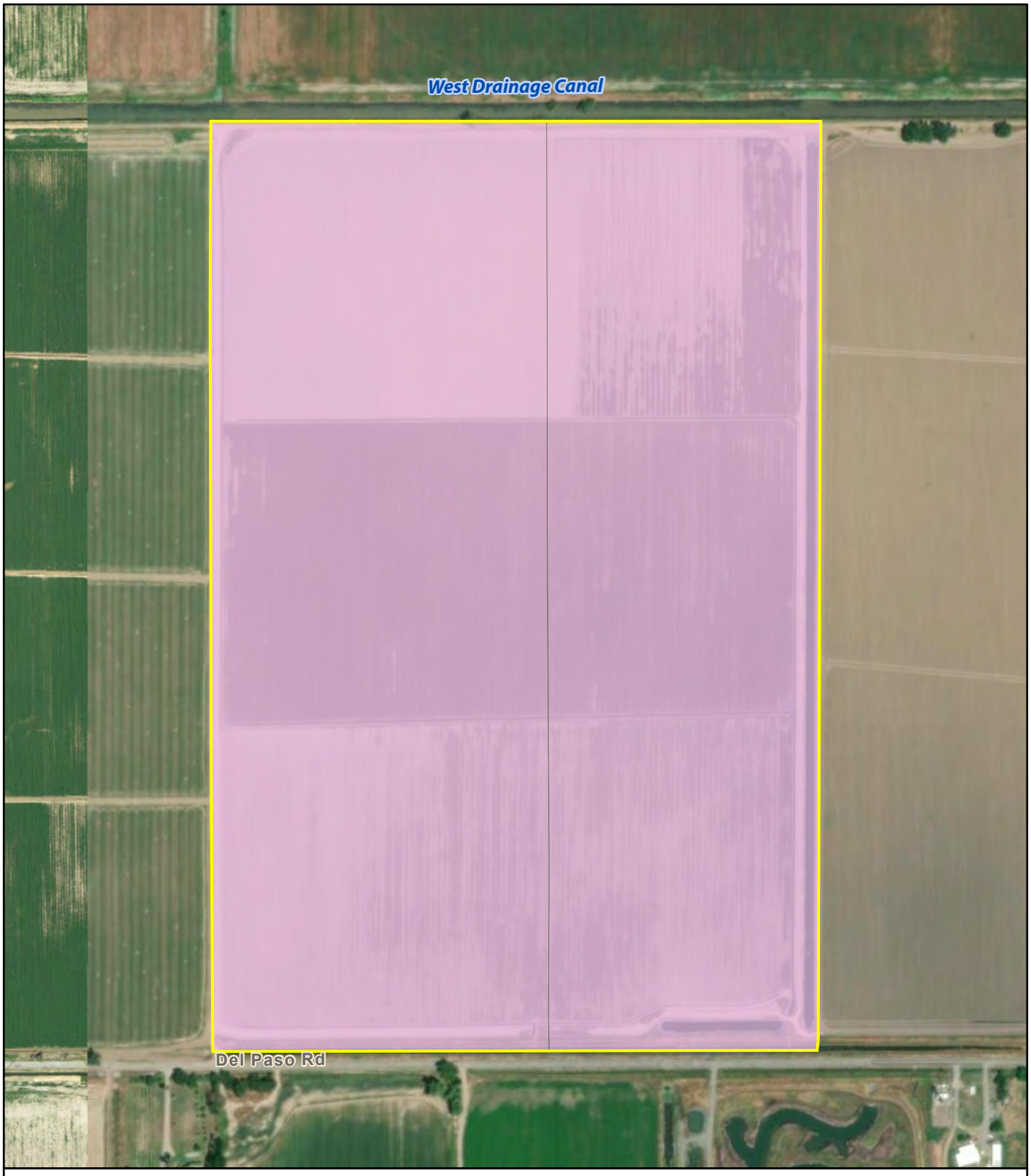
Figure A - 28
Central Basin Reserve — BKS Tract

Figure A - 29
Central Basin Reserve — BKS Tract

Figure A - 30
Central Basin Reserve — Silva South Tract

Path:\\PDCCITRDSGIS01\Projects_1\NBC\04002_04\arcmap\report_2023\AppendixA\AppendixA_A.aprx

Figure A - 31
Central Basin Reserve — Elverta Tract



Reserve Lands
NBHCP Area Boundary

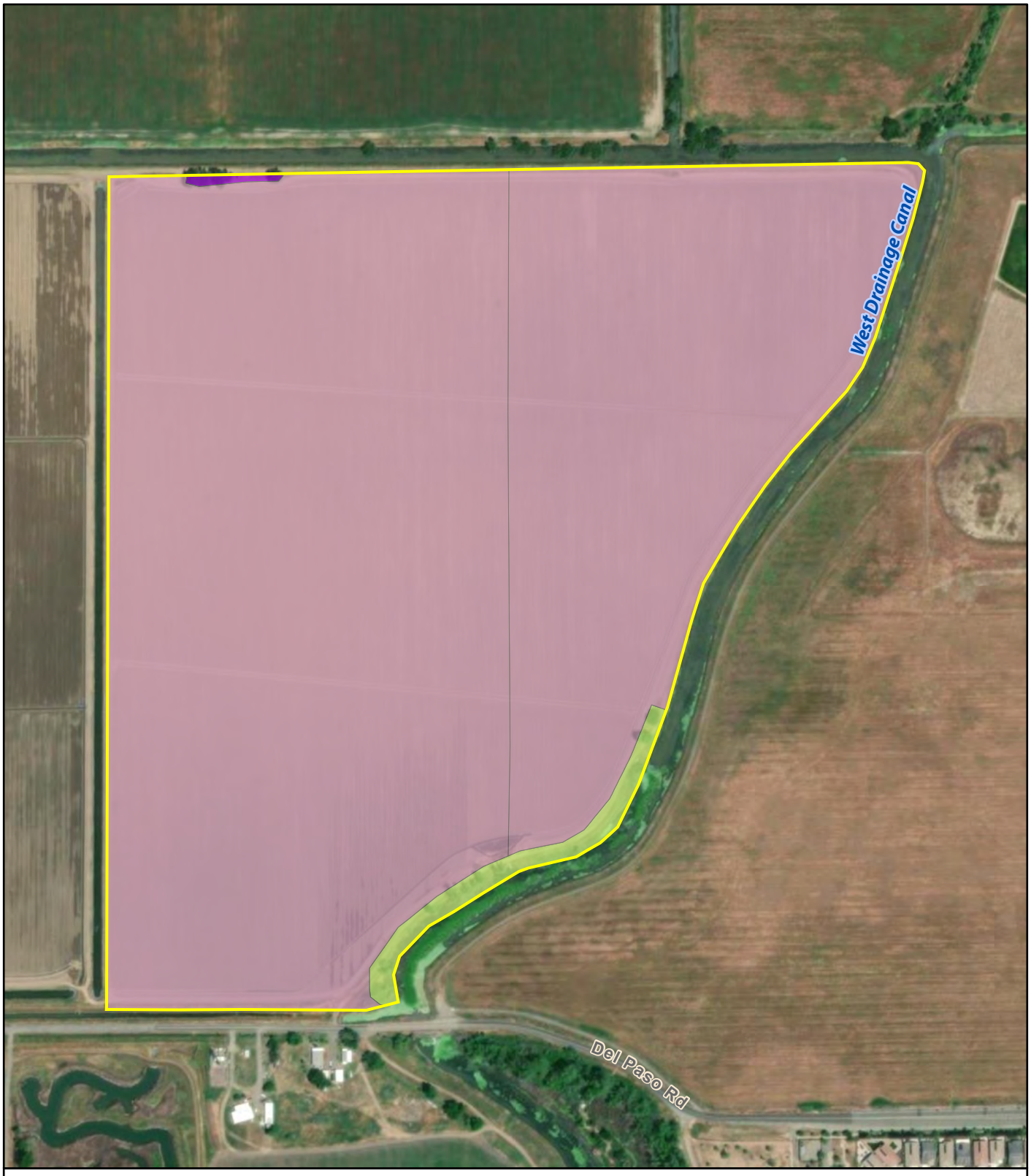
Land Cover
Alfalfa

N

200 0 200
Meters

Path:\\PDCCITRDSGIS01\Projects_1\NBC\04002_04\arcmap\report_2023\AppendixA\AppendixA_A.aprx

Figure A - 32
Fisherman's Lake Basin Reserve — Rosa Central Tract



Path:\\PDCCITRDSGIS01\Projects_1\NBC\04002_04\arcmap\report_2023\AppendixA\AppendixA.aprx

Figure A - 33
Fisherman's Lake Basin Reserve — Rosa East Tract

Path:\\PDCCITRDSGIS01\Projects_1\NBC\04002_04\arcmap\report_2023\AppendixA\AppendixA.aprx

Figure A - 34
Fisherman's Lake Basin Reserve — Souza Tract

Figure A - 35
Fisherman's Lake Basin Reserve — Natomas Farms Tract

Path: \\PDCCITRDSG150 \Projects_ I\NBC\04002_ 04\arcmap\report_2023\AppendixA\AppendixA.aprx

Figure A - 36
Fisherman's Lake Basin Reserve — AKT Tract

Path: \\PDCCITRDSG160 \Projects_ I\NBC\04002_ 04\arcmap\report_2023\AppendixA\Appendix_A.aprx

Figure A - 37
Fisherman's Lake Basin Reserve — Cummings Tract

Figure A - 38
Fisherman's Lake Basin Reserve — Alleghany Tract

Appendix B

Botanical Survey Results

Table B-1. Cumulative List of Plant Species Observed on the Natomas Basin Conservancy Reserves, 2005–2023.

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve							Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
Ferns and Fern Allies																										
Azollaceae	**Mosquito Fern Family**																									
Azolla filiculoides	Waterfern		X	X	X			X	X	X	X	X				X				X			X	X		
Equisetaceae	**Horsetail Family**																									
Equisetum telmateia ssp. *braunii*	Giant horsetail	X																				X				
Marsileaceae	**Marsilea Family**																									
Marsilea vestita ssp. *vestita*	Hairy waterclover			X							X													X		
Monocotyledons																										
Alismataceae	**Water-Plantain Family**																									
*Alisma lanceolatum**	Lance-leaved water-plantain	X	X	X	X		X	X	X	X	X	X	X		X		X	X	X	X	X		X	X		
Alisma trivial (Alisma plantago-aquatica)	Common water-plantain																							X		
Echinodorus berteroi	Burhead	X						X	X		X	X		X												
Sagittaria longiloba	Gregg arrowhead								X		X													X		
Sagittaria montevidensis ssp. *calycina*	California arrowhead	X	X	X	X		X	X	X		X	X		X									X	X		
Araceae (Lemnaceae)	**Arum Family (Duckweed Family)**																									
Lemna sp.	Duckweed	X	X	X				X	X	X	X	X				X							X	X		
Cyperaceae	**Sedge Family**																									
Bolboschoenus maritimus (Scirpus maritimus)	Prairie bulrush			X				X			X															
Cyperus esculentus	Nutsedge	X	X	X	X		X	X			X			X											X	

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
*Cyperus difformis**	Variable flatsedge			X				X			X	X		X		X								X	X	
Cyperus eragrostis	Umbrella sedge	X	X	X	X		X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Cyperus odoratus	Fragrant flatsedge							X			X															
Eleocharis acicularis	Needle spikerush	X																								
Eleocharis macrostachya	Creeping spikerush						X	X			X		X			X	X	X	X					X		
Eleocharis engelmannii (Eleocharis obtusa var. *engelmannii)*	Blunt spikerush/ Engelmann's spikerush			X				X			X													X		
Schoenoplectus acutus (Scirpus acutus var. *occidentalis)*	Common tule	X	X	X				X			X	X		X		X	X		X	X		X	X	X	X	
*Schoenoplectus mucronatus (Scirpus mucronatus)**	Ricefield bulrush			X	X			X	X		X	X				X								X		
Hydrocharitaceae	**Waterweed Family**																									
Elodea canadensis	Canadian pondweed								X																	
Juncaceae	**Rush Family**																									
Juncus balticus	Baltic rush			X												X						X				
Juncus bufonius	Toad rush	X		X		X		X			X	X		X	X	X	X		X	X				X	X	X
Juncus effusus	Soft rush	X		X	X		X									X										
Poaceae	**Grass Family**																									
*Agrostis avenacea**	Pacific bentgrass	X	X	X				X			X	X												X		
Alopecurus carolinianus	Tufted foxtail							X			X												X			
Alopecurus saccatus	Foxtail	X	X	X								X		X						X						
*Arundo donax**	Giant reed															X										
*Avena barbata**	Slender wild oats	X		X			X	X	X	X	X	X	X	X		X		X			X				X	X
*Avena fatua**	Common wild oats		X					X			X						X		X	X		X	X	X		X

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
*Briza minor**	Little quaking grass	X														X										
*Bromus catharticus**	Rescue brome	X	X		X						X												X			
*Bromus diandrus**	Ripgut brome	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
*Bromus hordeaceus**	Soft chess	X	X	X		X	X	X			X	X	X			X	X	X	X	X		X	X	X		
Bromus madritensis ssp. *rubens**	Foxtail chess					X		X																		
Cortaderia jubata	Pampas grass																						X			
*Crypsis schoenoides**	Swamp grass							X			X					X										
*Cynodon dactylon**	Bermuda grass	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	
Deschampsia danthonioides	Annual hairgrass	X	X					X			X	X				X								X		
*Digitaria sanguinalis**	Hairy crabgrass	X		X		X	X			X	X	X	X			X	X	X	X							
Distichlis spicata	Saltgrass					X		X			X				X	X		X			X	X	X			
*Echinochloa crus-galli**	Barnyardgrass	X	X	X	X	X		X	X		X	X		X		X							X	X	X	
*Eleusine tristachya**	Threespike goosegrass															X										
Elymus glaucus	Blue wildrye		X	X				X			X	X											X	X		
Elymus triticoides (Leymus triticoides)	Creeping wildrye					X		X			X															
Eragrostis pectinacea var. *pectinacea*	Tufted lovegrass															X										
Eragrostis sp.*	Lovegrass															X										
*Festuca arundinacea**	Reed fescue	X																						X		
*Festuca bromoides (Vulpia bromoides)**	Foxtail fescue			X					X							X							X			
Festuca microstachys (Vulpia microstachys)	Small fescue		X					X			X	X											X	X		
*Festuca myuros (Vulpia myuros)**	Rattail fescue		X					X								X										

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
*Festuca perennis (Lolium multiflorum)**	Italian ryegrass	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Glyceria occidentalis	Sweet flotegrass			X				X			X	X		X		X	X		X	X					X	
*Holcus lanatus**	Velvetgrass										X													X		
Hordeum brachyantherum	Meadow barley		X					X			X	X				X						X	X		
Hordeum marinum ssp. *gussoneanum**	Mediterranean barley							X			X						X		X	X				X		
*Hordeum murinum**	Foxtail barley	X	X	X			X	X		X	X	X	X	X		X	X	X	X	X		X	X	X	X	X
Leersia oryzoides	Rice cutgrass							X			X															
Leptochloa fusca subsp. *Fascicularis (Leptochloa fascicularis)*	Bearded sprangletop	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X							X	X	X	
Muhlenbergia rigens	Deergrass															X										
*Oryza sativa**	Rice	X	X	X	X		X		X			X	X	X			X	X	X	X	X				X	
*Paspalum dilatatum**	Dallisgrass	X	X	X	X		X	X	X		X	X	X	X		X	X	X	X		X	X			X	
Paspalum distichum	Knotgrass	X	X	X	X						X	X		X		X								X	X	
*Phalaris aquatica**	Harding grass							X									X					X				
*Phalaris minor**	Littleseed canarygrass	X	X					X	X	X	X									X			X	X	X	X
*Phalaris paradoxa**	Paradox canarygrass			X							X	X				X						X		X		
*Poa annua**	Annual bluegrass		X		X		X	X		X	X	X		X		X				X		X	X	X		
*Polypogon interruptus**	Ditch beard grass	X	X			X		X			X												X	X		
*Polypogon monspeliensis**	Rabbit's-foot grass	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X		X	X	X	X	
*Setaria pumila**	Yellow bristle grass		X							X		X				X								X		
*Sorghum bicolor**	Milo	X								X																
*Sorghum halepense**	Johnsongrass	X	X	X	X	X	X	X	X		X		X	X	X		X	X	X	X		X	X	X	X	

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
Sporobolus indicus	Small smutgrass															X										
Stipa pulchra (Nassella pulchra)	Purple needlegrass		X													X										
*Triticum aestivum**	Wheat					X																		X		X
Pontederiaceae	**Mud Plantain Family**																									
*Heteranthera limosa**	Ducksalad				X			X			X			X												
Typhaceae	**Cattail Family**																									
Typha angustifolia	Narrow-leaved cattail			X					X											X						
Typha domingensis	Southern cattail	X	X	X	X	X	X	X				X	X		X		X	X	X		X		X	X	X	X
Typha latifolia	Broadleaf cattail		X	X				X	X		X	X	X	X		X		X	X	X	X		X	X		
Dicotyledons																										
Aceraceae	**Maple Family**																									
Acer negundo	Box-elder					X																	X	X		
Adoxaceae	**Muskroot Family**																									
Sambucus nigra subsp. *canadensis (Sambucus mexicana)*	Blue elderberry	X																					X			
Amaranthaceae	**Amaranth Family**																									
Asclepias fascicularis	Narrow-leaf milkweed										X															
Amaranthaceae	**Amaranth Family**																									
*Amaranthus albus**	Pigweed amaranth															X										
Amaranthus sp.	Amaranth				X	X				X													X			
Anacardiaceae	**Sumac Family**																									
Toxicodendron diversilobum	Poison-oak	X				X																				
Apiaceae	**Carrot Family**																									

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
*Ammi visnaga**	Bisnaga		X			X		X			X															
*Conium maculatum**	Poison hemlock																								X	
*Daucus carota**	Wild carrot								X																	
*Foeniculum vulgare**	Sweet fennel									X												X	X	X	X	
*Torilis arvensis**	Hedge parsley	X																				X				
Araliaceae	**Ginseng Family**																									
*Hedera helix**	English ivy																									X
Asclepiadaceae	**Milkweed Family**																									
Asclepias fascicularis	Narrow-leaf milkweed															X								X		
Asteraceae	**Sunflower Family**																									
Achyrachaena mollis	Blow-wives			X								X				X				X				X		
Ambrosia sp.	Ragweed					X		X			X															
*Anthemis cotula**	Mayweed							X			X															
Baccharis pilularis	Coyote brush	X	X									X				X							X	X		
Baccharis salicifolia	Mulefat															X										
*Carduus pycnocephalus**	Italian thistle										X	X		X		X						X	X			
Centaurium pulchellum	Branched centaury										X	X														
*Centaurea solstitialis**	yellow star-thistle	X	X	X	X			X	X	X	X	X	X	X	X	X	X	X		X	X	X				
Centromadia fitchii	Fitch's spikeweed			X		X										X										
*Cichorium intybus**	Chicory			X					X	X		X				X						X		X		
*Cirsium vulgare**	Bull thistle	X	X	X	X	X	X	X	X		X	X	X		X	X						X	X	X	X	X
*Dittrichia graveolens**	Stinkwort	X						X			X					X			X				X			
Eclipta prostrata	False daisy				X			X			X	X													X	

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
*Erigeron canadensis (Conyza)**	Horseweed	X		X	X	X	X	X	X		X	X	X			X	X	X	X			X	X		X	
*Gnaphalium luteoalbum**	Cudweed everlasting	X	X	X	X	X		X	X	X	X	X	X	X		X					X			X		
Helianthus annuus	Annual sunflower	X																								
*Helminthotheca echioides (Picris echioides)**	Bristly ox-tongue	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Heterotheca grandiflora	Telegraphweed			X												X										
Holocarpha virgata ssp. *virgata*	Common tarweed	X														X										
*Hypochaeris glabra**	Soft cat's-ear															X										
*Lactuca saligna**	Willow lettuce										X													X		
*Lactuca serriola**	Prickly lettuce	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Lasthenia glaberrima	Smooth goldfields															X										
*Leontodon saxstilis (taraxacoides)**	Hairy hawkbit											X														
*Logfia gallica (Filago gallica)**	Narrow-leaved filago															X										
*Matricaria discoidea (Chamomila suaveolens)**	Pineapple weed		X									X				X										
Microseris elegans	Elegant microseris															X										
Psilocarphus brevissimus var. brevissimus	Woollyheads															X										
Psilocarphus tenellus	Slender woollyheads															X										
*Senecio vulgaris**	Common groundsel		X	X				X		X	X	X		X		X				X		X				X
*Silybum marianum**	Milk thistle	X	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X		X	X	X
*Soliva sessilis**	Lawn burweed															X										
Sonchus asper ssp. *asper**	Prickly sow thistle	X	X	X				X			X		X	X	X	X				X		X	X			
*Sonchus oleraceus**	Common sow-thistle	X		X	X	X	X	X	X		X	X	X			X	X	X	X	X		X	X	X	X	X

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
Symphyotrichum subulatum (Aster subulatus var. *ligulatus)*	Annual water-aster	X	X	X	X	X		X			X	X		X		X							X	X	X	
Taraxacum officinale	Dandelion															X								X		
*Tragopogon porrifolius**	Salsify	X																								
Xanthium spinosum	Spiny cocklebur															X										
Bignoniaceae	**Bignonia Family**																									
*Catalpa bignonioides**	Catalpa															X										
Boraginaceae	**Borage Family**																									
Amsinckia menziesii var. *intermedia*	Common fiddleneck	X		X				X	X	X	X	X		X		X						X				
Heliotropium curassavicum	Heliotrope	X								X	X													X	X	
Plagiobothrys stipitatus var. micranthus	Stipitate popcornflower															X										
Brassicaceae	**Mustard Family**																									
*Brassica nigra**	Black mustard	X	X					X		X	X	X	X									X	X	X		
*Brassica rapa**	Field mustard			X	X		X		X		X		X			X	X	X	X				X		X	
*Capsella bursa-pastoris**	Shepherd's-purse				X		X	X	X	X		X		X	X	X	X		X	X		X	X	X		X
Cardamine oligosperma	Idaho bittercress															X										
*Hirschfeldia incana**	Shortpod mustard		X							X	X	X														
Lepidium dictyotum	Alkali pepperweed																									
*Lepidium didymus (Cornopus didymus)**	Lesser swinecress	X	X					X		X	X	X				X							X	X		X
*Lepidium latifolium**	Perennial pepperweed	X		X	X	X					X					X							X		X	
Planodes virginicum (Sibara virginica)	Common rockcress															X							X			

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
*Raphanus sativus**	Wild radish	X	X	X		X			X		X	X	X			X						X	X	X	X	X
Rorippa curvisiliqua	Westwen yellowcress	X	X					X			X	X								X						
*Sinapis arvensis**	Charlock mustard		X			X					X									X				X		
*Sisymbrium officinale**	Hedge mustard				X	X																				
Callitrichaceae	**Water-Starwort Family**																									
Callitriche marginata	Water-starwort			X																						
Caryophyllaceae	**Pink Family**																									
*Cerastium glomeratum**	Mouse-ear chickweed			X																						
*Spergularia rubra**	Red sandspurry			X								X				X										
*Stellaria media**	Common chickweed							X						X		X				X			X	X		
Ceratophyllaceae	**Hornwort Family**																									
Ceratophyllum demersum	Hornwort								X		X	X											X			
Chenopodiaceae	**Goosefoot Family**																									
*Chenopodium album**	White goosefoot										X															
Chenopodium sp.	Goosefoot				X	X										X				X			X			X
*Salsola tragus** *(previous family – Asteraceae)*	Russian thistle, tumbleweed										X		X			X								X		
Convolvulaceae	**Morning Glory Family**																									
*Convolvulus arvensis**	Field bindweed	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Cressa truxillensis	Alkali weed													X		X						X		X		
Crassulaceae	**Stonecrop Family**																									
Crassula aquatica/solieri	Water pygmy-weed										X	X														
*Crassula tillaea**	Moss pygmy-stonecrop									X																

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
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Elatinaceae	**Waterwort Family**																									
*Elatine ambigua**	Asian waterweed							X			X					X							X			
Elatine brachysperma/rubella	Waterweed							X			X															
Euphorbiaceae	**Spurge Family**																									
*Chamaesyce maculata**	Spotted spurge															X									X	
Chamaesyce serpyllifolia ssp. *serpyllifolia*	Thyme-leaved spurge							X			X															
Eremocarpus setiger (setigerus)	Doveweed															X						X		X		
Fabaceae	**Legume Family**																									
Acmispon americanus (Lotus purshianus)	Spanish lotus			X																						
Glycyrrhiza lepidota	Wild licorice																					X		X	X	
*Lotus corniculatus**	Bird's-foot trefoil	X	X	X												X						X		X		
Lupinus bicolor	Miniature lupine			X				X		X	X	X				X										
*Medicago polymorpha**	Bur-clover	X	X				X	X	X	X	X	X	X	X		X	X	X	X	X		X		X	X	X
*Medicago sativa**	Alfalfa					X			X	X				X								X				X
*Melilotus alba**	White sweetclover	X	X	X				X		X	X													X		
*Melilotus indica**	Indian sweetclover		X					X			X													X		
*Robinia pseudoacacia**	Black locust																									
*Trifolium campestre**	Hop clover			X												X							X			
*Trifolium dubium**	Suckling clover			X						X						X								X		
*Trifolium fragiferum**	Strawberry clover															X										
*Trifolium glomeratum**	Clustered clover															X										

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
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Trifolium gracilentum	Pinpoint clover															X										
*Trifolium hirtum**	Rose clover									X														X		
*Trifolium pratense**	Red clover															X										
*Trifolium repens**	White clover															X							X			
*Trifolium subterraneum**	Subterranean clover															X										
*Vicia sativa**	Common vetch			X						X				X		X				X						
*Vicia villosa**	Hairy vetch		X					X		X	X	X				X							X	X		
Fagaceae	**Oak Family**																									
Quercus lobata	Valley oak	X		X		X					X	X		X	X	X						X	X	X	X	X
Gentianaceae	**Gentian Family**																									
Zeltnera muehlenbergii (Centaurium muehlenbergii)	Monterey centaury			X				X	X		X												X			
Geraniaceae	**Geranium Family**																									
*Erodium botrys**	Big stork's-bill		X	X	X		X		X			X	X			X	X	X	X							
*Erodium cicutarium**	Red-stemmed filaree		X		X		X	X	X	X	X	X	X		X	X	X	X	X					X		
*Erodium moschatum**	White-stemmed filaree	X	X					X	X	X	X			X		X				X		X				
*Geranium dissectum**	Cut-leaf geranium	X	X	X	X		X	X	X	X	X		X	X		X	X	X	X	X		X	X	X		
*Geranium molle**	Dove's-foot geranium										X					X										
Haloragaceae	**Water-Milfoil Family**																									
Myriophyllum sp.	Water milfoil							X	X																	
Juglandaceae	**Walnut family**																									
Juglans hindsii (Juglans californica var. *hindsii)*	California black walnut															X						X	X	X		X

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
Lamiaceae	**Mint Family**																									
*Lamium amplexicaule**	Henbit deadnettle									X		X								X						
Lycopus americanus	American bugleweed							X																		
*Mentha pulegium**	Pennyroyal										X					X										
Stachys ajugoides/albens	Hedge nettle	X																								
Trichostema lanceolatum	Vinegarweed			X												X										
Lythraceae	**Loosestrife Family**																									
Ammannia coccinea/robusta	Redstem	X		X	X		X	X			X	X				X							X	X	X	
*Lythrum hyssopifolia**	Hyssop loosestrife	X	X	X	X	X	X	X	X	X	X	X				X				X			X	X		
Malvaceae	**Mallow Family**																									
*Abutilon theophrasti**	Velvet-leaf	X			X	X	X	X		X	X	X										X	X	X	X	X
*Malva neglecta**	Common mallow		X		X		X	X					X				X	X	X			X				
*Malva nicaeensis**	Bull mallow	X	X	X		X		X	X		X	X	X	X		X				X			X	X	X	
Malvella leprosa	Alkali mallow	X	X	X	X	X	X	X	X	X	X			X	X	X	X		X	X	X	X		X	X	
*Modiola caroliniana**	Carolina bristle-mallow															X										
Montiaceae (Split from Portulacaceae)	**Miner's Lettuce Family**																									
Calandrinia ciliata	Red maids		X	X				X	X	X	X	X		X						X			X	X		
Claytonia perfoliata	Miner's lettuce			X										X		X								X		
Moraceae	**Mulberry Family**																									
*Ficus carica**	Edible fig	X		X							X				X	X						X		X		
*Morus alba**	White mulberry	X														X									X	
Myrtaceae	**Myrtle Family**																									

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
*Eucalyptus camulduensis**	River red gum															X							X			
*Eucalyptus globulus**	Blue gum															X										
*Eucalyptus polyanthemos**	Silver dollar gum															X										
Oleaceae	**Olive Family**																									
Fraxinus latifolia	Oregon ash																					X	X		X	X
Onagraceae	**Evening-Primrose Family**																									
Epilobium brachycarpum	Panicled willow-herb				X	X	X						X				X	X	X						X	
Epilobium campestre (Epilobium pygmaeum)	Smooth spike-primrose															X										
Epilobium ciliatum	Fringed willowherb	X	X	X	X	X	X	X			X	X	X		X	X	X	X	X	X		X		X		X
Ludwigia peploides	Floating water-primrose				X			X	X		X									X	X					
Ludwigia peploides ssp. *montevidensis**	Floating water-primrose		X	X				X		X	X	X				X				X						
Ludwigia peploides ssp. *peploides*	Floating water-primrose										X					X								X	X	
Oenothera elata	Evening primrose	X						X																		
Orobanchaceae (split from Scrophulariaceae)	**Broomrape Family**																									
Castilleja attenuata	Valley tassels											X														
Triphysaria eriantha	Johnny-tuck															X										
Triphysaria pusilla	Dwarf owl's clover															X										
Oxalidaceae	**Oxalis Family**																									
*Oxalis corniculata**	Yellow sorrel															X										
Oxalis sp.*	Sorrel																					X				

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
Phrymaceae (split from Scrophulariaceae)	**Lopseed Family**																									
Mimulus guttatus	Seep-spring monkeyflower	X														X										
Plantaginaceae	**Plantain Family**																									
Bacopa eisenii (Bacopa eisenmanii)	Eisen water-hyssop	X	X	X				X	X		X	X												X		
*Dopatrium junceum**	Horsefly's eye			X																						
Gratiola ebracteata	Bractless hedge-hyssop										X															
*Kickxia elatine**	Sharp-leaved fluellin							X																		
Lindernia dubia	Yellowseed false pimpernel			X																						
*Plantago coronopus**	Buckhorn plantain															X										
*Plantago lanceolata**	English plantain							X			X					X	X		X	X						
*Plantago major**	Common plantain															X										
*Veronica anagallis-aquatica**	Water speedwell								X		X									X			X			
*Veronica arvensis**	Corn speedwell															X										
Veronica peregrina ssp. *xalapensis*	Purslane speedwell	X	X	X				X	X	X	X	X		X		X				X		X		X		
*Veronica persica**	Persian speedwell															X										
Platanaceae	**Plane Family**																									
Platanus racemosa	Western sycamore		X									X				X							X			
Polygonaceae	**Buckwheat Family**																									
Persicaria amphibian (Polygonum amphibium)	Water smartweed				X	X	X																			
*Persicaria hydropiper (Polygonum hydropiper)**	Common smartweed, marsh pepper		X	X				X	X	X	X		X											X		

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
Persicaria lapathifolia (Polygonum lapathifolium)	Willow smartweed	X	X		X	X			X	X	X	X	X			X									X	
Polygonum aviculare subsp. *depressum (Polygonum arenastrum)**	Common knotweed	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X
*Rumex conglomeratus**	Clustered dock															X										
*Rumex crispus**	Curly dock	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
*Rumex dentatus**	Toothed dock							X			X															
*Rumex pulcher**	Fiddle dock	X						X			X					X								X		
Portulacaceae	**Purslane Family**																									
*Portulaca oleracea**	Common purslane											X				X										
Primulaceae	**Primrose Family**																									
*Anagallis arvensis**	Scarlet pimpernel	X		X	X	X	X	X	X	X	X	X	X			X	X	X	X				X	X		X
Ranunculaceae	**Buttercup Family**																									
Myosurus minimus	Common mousetail		X									X								X						
Ranunculus bonariensis var. *trisepalus*	Carter's buttercup			X								X		X		X										
*Ranunculus muricatus**	Prickle-fruited buttercup	X						X			X					X							X	X		
Ranunculus sp.	Buttercup							X																		
Rhamnaceae	**Buckthorn Family**																									
Frangula californica (Rhamnus californica)	California coffeeberry																							X		
Rosaceae	**Rose Family**																									
*Pyracantha angustifolia**	Firethorn															X										
Rosa californica	California wild rose	X	X	X												X						X				
*Rubus armeniacus**	Himalayan blackberry	X		X	X	X			X	X					X	X						X	X	X	X	X

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
Rubus ursinus	California blackberry	X	X			X						X				X						X	X	X		X
Rubiaceae	**Madder Family**																									
Cephalanthus occidentalis var. *californicus (formally in Rosaceae family)*	Buttonwillow		X	X				X			X	X										X	X		X	
Galium aparine	Bedstraw	X		X					X													X	X			X
Salicaceae	**Willow Family**																									
Populus fremontii	Fremont cottonwood	X		X		X		X	X	X	X	X		X		X						X	X	X	X	
Salix exigua	Narrow-leaved willow	X	X	X																						
Salix gooddingii	Black willow	X		X				X	X		X	X				X							X	X	X	
Salix lasiolepis	Arroyo willow	X		X				X				X											X		X	
Scrophulariaceae	**Figwort Family**																									
Limosella acaulis	Broad-leaved mudwort							X			X															
Simaroubaceae	**Quassia Family**																									
*Ailanthus altissima**	Tree-of-heaven															X										
Solanaceae	**Nightshade Family**																									
*Datura stramonium**	Jimson weed	X																					X			
*Lycopersicon esculentum**	Tomato								X																	
*Physalis lancifolia**	Narrowleaf tomatillo	X	X										X			X									X	
*Physalis philadelphica**	Tomatillo							X			X					X										
Solanum americanum	Common nightshade			X	X	X					X		X	X		X									X	
Urticaceae	**Nettle Family**																									
*Urtica urens**	Dwarf nettle																						X			

Table B-1. Continued

Scientific Name (previous scientific name)[a]	Common Name	North Basin Reserve														Central Basin Reserve						Fisherman's Lake Reserve				
		Atkinson	Bennett North	Bennett South	Bolen North	Bolen South	Bolen West	Frazer	Huffman East	Huffman West	Lucich North	Lucich South	Nestor	Ruby Ranch	Vestal	BKS	Bianchi West	Elsie	Frazer South	Sills	Tufts	Alleghany	Cummings	Natomas Farms	Rosa East & Central	Souza
Verbenaceae	**Vervain Family**																									
Phyla nodiflora var. *nodiflora*	Turkey tangle fogfruit										X					X										
*Verbena bonariensis**	Purpletop vervain		X		X	X	X	X			X	X	X				X	X	X							
Viscaceae	**Mistletoe Family**																									
Phoradendron serotinum (Phoradendron villosum)	*Oak mistletoe*	X																								
Vitaceae	**Grape Family**																									
Vitis californica	California wild grape	X																				X	X	X	X	
Zygophyllaceae	**Caltrop Family**																									
*Tribulus terrestris**	Puncture vine								X			X														
Total plant taxa for reserve		98	84	99	55	54	45	114	65	57	131	96	47	53	26	160	42	36	42	53	19	61	85	103	58	32

* Nonnative species.

[a] Nomenclature follows the 2012 second edition of *The Jepson Manual;* previous name from the 1993 first edition of *The Jepson Manual* is provided in parentheses.

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Appendix C

Avian and Other Covered Species Survey Results

Table C-1. Common and Scientific Names of Wildlife Species Observed on NBHCP Reserves, 2004–2023

Common Name	Scientific Name
Mammals	
Coyote	*Canis latrans*
Raccoon	*Procyon lotor*
River otter	*Lontra canadensis*
Striped skunk	*Mephitis mephitis*
Mink	*Neovison vison*
Long-tailed weasel	*Neogale frenata*
California ground squirrel	*Otospermophilus beecheyi*
Botta's pocket gopher	*Thomomys bottae*
Deer mouse	*Peromyscus maniculatus*
California meadow vole	*Microtus californicus*
Muskrat	*Ondatra zibethicus*
House mouse	*Mus musculus*
Brown rat	*Rattus norvegicus*
Black-tailed jackrabbit	*Lepus californicus*
Desert cottontail	*Silvilagus audubonii*
Mule deer	*Odocoileus hemionus*
Hoary bat	*Lasiurus cinereus*
Mexican free-tailed bat	*Tadarida brasiliensis mexicanus*
Birds	
Greater white-fronted goose	*Anser albifrons*
Snow goose	*Chen caerulescens*
Canada goose	*Branta canadensis*
Tundra swan	*Cygnus columbianus*
Wood duck	*Aix sponsa*
Gadwall	*Anas strepera*
American wigeon	*Anas americana*
Eurasian wigeon	*Anas penelope*
Mallard	*Anas platyrhynchos*
Blue-winged teal	*Anas discors*
Cinnamon teal	*Anas cyanoptera*
Northern shoveler	*Anas clypeata*
Northern pintail	*Anas acuta*
Green-winged teal	*Anas crecca*
Canvasback	*Aythya valisineria*
Redhead	*Aythya americana*
Ring-necked duck	*Aythya collaris*
Greater scaup	*Aythya marila*
Lesser scaup	*Aythya affinis*
Bufflehead	*Bucephala albeola*
Common goldeneye	*Bucephala clangula*
Hooded merganser	*Lophodytes cucullatus*

Table C-1. Continued

Common Name	Scientific Name
Common merganser	*Mergus merganser*
Ruddy duck	*Oxyura jamaicensis*
Ring-necked pheasant	*Phasianus colchicus*
Wild turkey	*Meleagris gallopavo*
California quail	*Callipepla californica*
Pied-billed grebe	*Podilymbus podiceps*
Eared grebe	*Podiceps nigricollis*
Horned grebe	*Podiceps auritus*
American white pelican	*Pelecanus erythrorhynchos*
Double-crested cormorant	*Phalacrocorax auritus*
American bittern	*Botaurus lentiginosus*
Great blue heron	*Ardea herodias*
Great egret	*Ardea alba*
Snowy egret	*Egretta thula*
Cattle egret	*Bubulcus ibis*
Green heron	*Butorides virescens*
Black-crowned night-heron	*Nycticorax nycticorax*
White-faced ibis	*Plegadis chihi*
Turkey vulture	*Cathartes aura*
Bald eagle	*Haliaeetus leucocephalus*
Osprey	*Pandion haliaetus*
White-tailed kite	*Elanus leucurus*
Northern harrier	*Circus cyaneus*
Sharp-shinned hawk	*Accipiter striatus*
Cooper's hawk	*Accipiter cooperii*
Red-shouldered hawk	*Buteo lineatus*
Swainson's hawk	*Buteo swainsoni*
Ferruginous hawk	*Buteo regalis*
Red-tailed hawk	*Buteo jamaicensis*
Rough-legged hawk	*Buteo lagopus*
American kestrel	*Falco sparverius*
Merlin	*Falco columbarius*
Prairie falcon	*Falco mexicanus*
Peregrine falcon	*Falco peregrinus*
Virginia rail	*Rallus limicola*
Sora	*Porzana carolina*
Common gallinule	*Gallinula galeata*
American coot	*Fulica americana*
Sandhill crane	*Grus canadensis*
Killdeer	*Charadrius vociferus*
Mountain plover	*Charadrius montanus*
Black-necked stilt	*Himantopus mexicanus*
American avocet	*Recurvirostra americana*

Table C-1. Continued

Common Name	Scientific Name
Greater yellowlegs	*Tringa melanoleuca*
Lesser yellowlegs	*Tringa flavipes*
Long-billed curlew	*Numenius americanus*
Western sandpiper	*Calidris mauri*
Least sandpiper	*Calidris minutilla*
Baird's sandpiper	*Calidris bairdii*
Dunlin	*Calidris alpina*
Short-billed dowitcher	*Limnodromus griseus*
Long-billed dowitcher	*Limnodromus scolopaceus*
Wilson's snipe	*Gallinago gallinago*
Wilson's phalarope	*Phalaropus tricolor*
Red-necked phalarope	*Phalaropus lobatus*
Ring-billed gull	*Larus delawarensis*
California gull	*Larus californicus*
Herring gull	*Larus argentatus*
Caspian tern	*Sterna caspia*
Black tern	*Chlidonias niger*
Forster's tern	*Sterna forsteri*
Rock pigeon	*Columba livia*
Eurasian-collared dove	*Streptopelia decaocto*
Mourning dove	*Zenaida macroura*
Barn owl	*Tyto alba*
Great horned owl	*Bubo virginianus*
Burrowing owl	*Athene cunicularia*
Short-eared owl	*Asio flammeus*
Lesser nighthawk	*Chordeiles acutipennis*
White-throated swift	*Aeronautes saxatalis*
Black-chinned hummingbird	*Archilochus alexandri*
Anna's hummingbird	*Calypte anna*
Rufous hummingbird	*Selasphorus rufus*
Belted kingfisher	*Ceryle alcyon*
Acorn woodpecker	*Melanerpes formicivorus*
Nuttall's woodpecker	*Picoides nuttallii*
Downy woodpecker	*Picoides pubescens*
Northern flicker	*Colaptes auratus*
Western wood-pewee	*Contopus sordidulus*
Willow flycatcher	*Empidonax traillii*
Pacific-slope flycatcher	*Empidonax difficilis*
Black phoebe	*Sayornis nigricans*
Say's phoebe	*Sayornis saya*
Ash-throated flycatcher	*Myiarchus cinerascens*
Western kingbird	*Tyrannus verticalis*
Loggerhead shrike	*Lanius ludovicianus*

Table C-1. Continued

Common Name	Scientific Name
Warbling vireo	*Vireo gilvus*
California scrub-jay	*Aphelocoma californica*
Yellow-billed magpie	*Pica nuttalli*
Common raven	*Corvus corax*
American crow	*Corvus brachyrhynchos*
Horned lark	*Eremophila alpestris*
Tree swallow	*Tachycineta bicolor*
Violet-green swallow	*Tachycineta thalassina*
Northern rough-winged swallow	*Stelgidopteryx serripennis*
Cliff swallow	*Petrochelidon pyrrhonota*
Barn swallow	*Hirundo rustica*
Oak titmouse	*Baeolophus inornatus*
Bushtit	*Psaltriparus minimus*
White-breasted nuthatch	*Sitta carolinensis*
Bewick's wren	*Thryomanes bewickii*
House wren	*Troglodytes aedon*
Marsh wren	*Cistothorus palustris*
Ruby-crowned kinglet	*Regulus calendula*
Golden-crowned kinglet	*Regulus satrapa*
Western bluebird	*Sialia mexicana*
Mountain bluebird	*Sialia currucoides*
Swainson's thrush	*Catharus ustulatus*
Hermit thrush	*Catharus guttatus*
American robin	*Turdus migratorius*
Northern mockingbird	*Mimus polyglottos*
European starling	*Sturnus vulgaris*
American pipit	*Anthus rubescens*
Cedar waxwing	*Bombycilla cedrorum*
Phainopepla	*Phainopepla nitens*
Orange-crowned warbler	*Vermivora celata*
Yellow warbler	*Dendroica petechia*
Yellow-rumped warbler	*Dendroica coronata*
Black-throated gray warbler	*Dendroica nigrescens*
Townsend's warbler	*Dendroica townsendi*
MacGillivray's warbler	*Oporornis tolmiei*
Common yellowthroat	*Geothlypis trichas*
Wilson's warbler	*Wilsonia pusilla*
Western tanager	*Piranga ludoviciana*
Spotted towhee	*Pipilo maculatus*
California towhee	*Pipilo crissalis*
Chipping sparrow	*Spizella passerina*
Lark sparrow	*Chondestes grammacus*
Savannah sparrow	*Passerculus sandwichensis*

Table C-1. Continued

Common Name	Scientific Name
Fox sparrow	*Passerella iliaca*
Song sparrow	*Melospiza melodia*
Lincoln's sparrow	*Melospiza lincolnii*
White-crowned sparrow	*Zonotrichia leucophrys*
Golden-crowned sparrow	*Zonotrichia atricapilla*
Dark-eyed junco	*Junco hyemalis*
Black-headed grosbeak	*Pheucticus melanocephalus*
Blue grosbeak	*Guiraca caerulea*
Lazuli bunting	*Passerina amoena*
Red-winged blackbird	*Agelaius phoeniceus*
Tricolored blackbird	*Agelaius tricolor*
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*
Brewer's blackbird	*Euphagus cyanocephalus*
Great-tailed grackle	*Quiscalus mexicanus*
Brown-headed cowbird	*Molothrus ater*
Western meadowlark	*Sturnella neglecta*
Bullock's oriole	*Icterus bullockii*
House finch	*Carpodacus mexicanus*
Lesser goldfinch	*Carduelis psaltria*
American goldfinch	*Carduelis tristis*
House sparrow	*Passer domesticus*
Reptiles	
Pacific pond turtle	*Actinemys marmorata*
Red-eared slider	*Trachemys scripta elegans*
Pacific gopher snake	*Pituophis catenifer catenifer*
Western yellow-bellied racer	*Coluber constrictor mormon*
California king snake	*Lampropeltis getulus californiae*
Giant gartersnake	*Thamnophis gigas*
Valley gartersnake	*Thamnophis sirtalis fitchi*
Western fence lizard	*Sceloporus occidentalis*
California alligator lizard	*Gerrhonotus multicarnatus multicarnatus*
Amphibians	
Sierran tree frog	*Pseudacris sierra*
Bullfrog	*Rana catesbeiana*

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Table C-2. Total Numbers of Bird Detections on NBHCP Mitigation Lands during 2023 Avian Surveys

	North Basin Reserve																		Central Basin Reserve											Fisherman's Lake Reserve						
Common Name	*Atkinson*	*Bennett North*	*Bennett South*	*Bolen North*	*Bolen South*	*Bolen West*	*Frazer*	*Huffman East*	*Huffman West*	*Lauppe North*	*Lauppe South*	*Lucich North*	*Lucich South*	*Nestor*	*Ruby Ranch*	*Verona*	*Vestal*	*Willey*	*Betts Kismat Silva*	*Bianchi West*	*Elsie*	*Elverta Silva South*	*Frazer South*	*Paulson Central*	*Paulson South*	*Richter*	*Sills*	*Tufts*	*Alleghany 50*	*Ann Rudin*	*Cummings*	*Natomas Farms*	*Rosa Central*	*Souza*	**Total**
Greater White-fronted Goose		846		450		5	215	135			80	638	420	75					1630	372		209	1		280		160					60			5576
Snow Goose		7									15								105																127
Canada Goose		103				10	2					268	10						329			7	31							6		37	4		807
Domestic Goose														1																					1
Wood Duck																	2		13											45		10			70
American Wigeon		8										4		1					57	2			1								6	2			81
Mallard	14	68	30	3		5	7	4		6		174	13	4	3	2	6	9	129	13	2	23	226	35	55	4	34	5		72	74	50	2		1072
Blue-winged Teal												9																							9
Cinnamon Teal		10										2	3						23				2												40
Northern Shoveler								2		12		6	80							180				32	3										315
Northern Pintail												8								72				14	8										102
Green-winged Teal			18							16			1200						12	35			6		50										1337
Greater Scaup																			32				12									2			46
Bufflehead												2							32																34
Common Goldeneye																			16				12								2				30
Common Merganser																								3											3
Ruddy Duck												1							5	2															8
Ring-necked Pheasant																			2																2
Wild Turkey	2											1																				2			5
California Quail	9				2						2																		2			1		1	17
Pied-billed Grebe		17										26							43				9							11	1				107
Eared Grebe																															1				1
American White Pelican												51							5																56
Double-crested Cormorant		18										49							23				15									6			111
American Bittern		1						1					1				1										1	1							6
Great Blue Heron	4	13	14	4		4	7	10		7	3	27	22	6	3	1	5	3	21	6	3	12	25	1	3	2	25	11		3	4	7	3		259
Great Egret	10	15	13	9		47	13	17		7	28	73	46	11	6	4	16	9	33	28	6	16	17	7	3	3	25	7		4	4	15	2	1	495
Snowy Egret		2		3		48	4					29	4			22	9		59	6	2	2	1	1		3	6	1					1		203
Cattle Egret								1			1											11													13
Green Heron												1							1											1			1		4
Black-crowned Night-Heron	3		2				1				3	1	98		2		5		25	10		2	6	1			4			1					164
White-faced Ibis						1	1	18		16						8	24		5	1		1	1												76
Turkey Vulture	17	4	5	1						3	1	2	2	1					5		1		1				1				1	1			46
Osprey		1							2	3									1																7
White-tailed Kite																			3												3	3			9
Balld Eagle								1											1																2
Northern Harrier		1	2				2				2	2	2	1	1				2			2	1	1		1	2	2		4		1			29
Cooper's Hawk							1						1	1					3												1				7
Red-shouldered Hawk	3																		1																4
Swainson's Hawk	6		2		2					2						1										1	1	1		1		3	1		21

Table C-2. Continued

	North Basin Reserve																		Central Basin Reserve										Fisherman's Lake Reserve						
Common Name	*Atkinson*	*Bennett North*	*Bennett South*	*Bolen North*	*Bolen South*	*Bolen West*	*Frazer*	*Huffman East*	*Huffman West*	*Lauppe North*	*Lauppe South*	*Lucich North*	*Lucich South*	*Nestor*	*Ruby Ranch*	*Verona*	*Vestal*	*Willey*	*Betts Kismat Silva*	*Bianchi West*	*Elsie*	*Elverta Silva South*	*Frazer South*	*Paulson Central*	*Paulson South*	*Richter*	*Sills*	*Tufts*	*Alleghany 50*	*Ann Rudin*	*Cummings*	*Natomas Farms*	*Rosa Central*	*Souza*	**Total**
Red-tailed Hawk	9	1	6			2	2	1	1			8	8	1			2		14		2	4	2				1	4	3	1	1	1	1		75
Ferruginous Hawk													1																						1
American Kestrel	1		2			1	1	3	3	2	1	1	1	1		1	4		5			2	1			1			1		3	1	2	38
Merlin														1																					1
Peregrine Falcon															1																				1
Prairie Falcon																1																			1
Common Gallinule		2										5							18				3						5						33
American Coot		52										302	303						681	200			159	17					14	26	1				1755
Killdeer	4	27	13	10		1	16	3		12		10	7	10	12		6	6	24	6	8	32	13	5	9	1	8	3			1	4			251
Black-necked Stilt		2					1															3									2				8
American Avocet							4																												4
Greater Yellowlegs			14				7			27	1	15	3						1				14		12		2								96
Long-billed Curlew				63		111		1		68	2		3		2					37					33		45								365
Western Sandpiper												5																							5
Least Sandpiper										143			220		12					36															411
Dunlin																									14										14
Long-billed Dowitcher											22	128	30							42			17		8										247
Ring-billed Gull				1				85			120		1				5		2	24			3	27	28										296
California Gull							1					2																							3
Eurasian Collared-Dove																		27	2													2			31
Mourning Dove	38		2	2	5	4	4			2	1	2	3		9	9			86		2	5	1	9	1		44		9	4	5	25	13	6	291
Great Horned Owl	2								1			6	1						3												1				14
Burrowing Owl																					4							1							5
Anna's Hummingbird																														1	1	1			3
Allen's Humminbird																			1																1
Belted Kingfisher												2							1																3
Acorn Woodpecker	3																																		3
Nuttall's Woodpecker	7																1		1										4			2			15
Northern Flicker	7														1		2																		10
Western Wood-Pewee	2																																		2
Black Phoebe	3	1	2	2	5	3	1				1	3	5		1	1	5		15			1	4						4	3	3	8		4	75
Say's Phoebe													2	1	1																	8			12
Ash-throated Flycatcher																1																			1
Western Kingbird	28	3	2		46	1		3	37	22	9	13	7	1	3	9	6	2	21				4				1		9	1	2	3	10	11	254
Loggerhead Shrike		2																																	2
California Scrub-Jay	27				1					1	1					2	2		1										6			2			43
Yellow-billed Magpie					6																														6
American Crow	10							1	18	1	1		6				10											6	1			6	4	34	98
Common Raven		2								2											1														5
Horned Lark		20			2	25				3				121		1					3					23	69	26					3		296

Table C-2. Continued

	North Basin Reserve																		Central Basin Reserve										Fisherman's Lake Reserve						
Common Name	*Atkinson*	*Bennett North*	*Bennett South*	*Bolen North*	*Bolen South*	*Bolen West*	*Frazer*	*Huffman East*	*Huffman West*	*Lauppe North*	*Lauppe South*	*Lucich North*	*Lucich South*	*Nestor*	*Ruby Ranch*	*Verona*	*Vestal*	*Willey*	*Betts Kismat Silva*	*Bianchi West*	*Elsie*	*Elverta Silva South*	*Frazer South*	*Paulson Central*	*Paulson South*	*Richter*	*Sills*	*Tufts*	*Alleghany 50*	*Ann Rudin*	*Cummings*	*Natomas Farms*	*Rosa Central*	*Souza*	**Total**
Tree Swallow	43	10	2		11					1		22	8		14		6		17				14						6	4	2	1	13		174
Cliff Swallow		31				16						1			17				39		5	3	33	9	1	1	22			28	30	8		3	247
Barn Swallow								2	1			2	16		1	1							2				1			3	12	6		10	57
Oak Titmouse	7																												8						15
Bushtit	10																																		10
White-breasted Nuthatch	2																																		2
Bewick's Wren	10																1																	1	12
House Wren	5																																		5
Marsh Wren		34	18									78	26					1	156				59							42	2				416
Ruby-crowned Kinglet	3																1		1													1			6
Western Bluebird	13				2				10			3					7					6							2		1				44
American Robin	5				1				3		1								1			1											1	13
Northern Mockingbird	6				2		1						2	1					9		1		1							2	2	9	8	5	49
European Starling	25				10			2	41	46							15		115		1	60											33	35	383
American Pipit		8		2		1	7	11		4			3	34	35	11	2	2	12	15	4	14			2	1	6					1			175
Yellow Warbler	1																																		1
Yellow-rumped Warbler	6							1					18				2														1	2			30
Common Yellowthroat	4																		2										2	1	6	4			19
Spotted Towhee	14				2											1													1			1			19
California Towhee										1	1					1													1			3		1	8
Lark Sparrow																			18																18
Savannah Sparrow	86	58	35	60	1	45	78	98	3	32	12	22	99	133	81	35	23	44	116	55	60	74	54	9	20	21	130	46		7	19	23	6	14	1599
Song Sparrow	1	4	16		1		1			1		13	12		1		1		15			1	6						4	10	5			92
White-crowned Sparrow	83	73	32		3		12					113	1			2	1		160			35	118				21		25		11	46	12		748
Golden-crowned Sparrow	33											15							26				14								10	24			122
Red-winged Blackbird	347	458	430	508	105	141	397	78	101	217	39	1910	415	46	307	337	306	253	1323	48	8	791	1139	19	3		228	13	41	19	129	134	94		10384
Tricolored Blackbird		30	10	20						10			10	1	20	20	8	20																	149
Western Meadowlark	60	122	115	73	1	55	92	63	1	32	32	59	121	142	38	116	40	32	66	25	25	19	13	7	6	57	130	26		2	15	96	10		1691
Yellow-headed Blackbird												1																							1
Brewer's Blackbird	41			68	17	12	1	51	14		12		8	6	36		33	14	138	1	8	62			1		8	2	7					6	546
Great-tailed Grackle		3										3	1						5		30		1												43
Brown-headed Cowbird	7	2					1		3			3			2		33		23			22	2						2		2	1			103
Bullock's Oriole	4				2												1												2			1			10
House Finch	103				6		8	15	13	2		8	15			8	9		42			19	12	2			6		36		2	12	20	27	365
Lesser Goldfinch	18				10	8				3					17	1	2		20										20	1				1	101
House Sparrow	7	1	1						4			5					14		26			4	2												64

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the NATOMAS BASIN conservancy

Chapter 10

HABITAT MITIGATION ORDINANCE

Sections:

Article 1. Title and Purposes

Sec. 10-10.101. Title.

This Chapter shall be known as the "Habitat Mitigation Ordinance" of the County. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.102. Purposes.

The County's land use planning efforts have consistently anticipated that local landowners—often in conjunction with assistance from non-profits and state agencies—will voluntarily undertake a modest amount of habitat creation, restoration, enhancement, and preservation actions. Similarly, the County has long coordinated urban development and related land use planning matters with the incorporated cities of Woodland, Davis, Winters, and West Sacramento. Projects within these jurisdictions have occasionally impacted biological resources, and the County intends to continue to accommodate the preservation of land in the unincorporated area as compensatory mitigation for such local habitat impacts.

In the foreseeable future, however, the County expects that the unincorporated area will increasingly be the subject of mitigation projects and similar efforts that arise in connection with impacts to biological resources occurring largely or entirely outside the geographic boundaries of the County. Such projects include mitigation banks with service areas extending far beyond the County—of which there are already a number—as well as various other endeavors to create, restore, enhance, and preserve habitat as a consequence of projects and activities occurring in locations outside of the County. These projects are the focus of this Chapter, while other purely local preservation and mitigation efforts are generally outside of its scope.

This Chapter provides for limited County regulation of certain habitat projects taking place within the County in connection with projects and activities occurring largely or entirely outside of the County. Such projects are unique in many respects. For example, wetland habitat projects can provide important habitat areas for fish, wildlife, and plants. They can also help maintain and enhance water quality, facilitate groundwater recharge, mitigate flooding, and control erosion. Some wetland habitat projects can also provide educational, scientific study, and recreational opportunities. The same is true of other types of habitat projects undertaken as compensatory mitigation. For these and other reasons, such projects can thus be a significant asset to the environment and the general public so long as they adequately replace the habitat area, values, and functions lost due to urban development or other projects or activities.

Nonetheless, to assure these projects benefit the County and do not unduly interfere with its land use planning efforts or the eventual implementation of the Yolo Natural Heritage Program, careful planning is necessary. Attention to matters of location, design, construction, and long-term monitoring and management is essential. Particularly for larger projects, early consideration of ways to integrate appropriate educational, recreational, scientific, and other opportunities is also desirable. Finally, the potential local and regional environmental and economic impacts of habitat projects—such as the conversion of farmland and existing species habitat, as well as conflicts with surrounding land uses and activities—deserves close attention and consideration. It is for these reasons that the Delta Reform Act of 2009 states that the goals of "providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem" are to be achieved in a manner "that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place."

Accordingly, this Chapter is intended to promote the foregoing objectives and to achieve the following purposes:

(a) To help ensure that out of county mitigation projects are located, constructed, and managed in a manner that is consistent with the General Plan and the developing Yolo Natural Heritage Program, compatible with surrounding land uses to the extent feasible, and sensitive to the need for a strong local economy, the protection of existing biological resources, flood protection, vector control, and other appropriate local and regional concerns.

(b) To encourage the proponents of such habitat projects—particularly large out of county mitigation projects—to design and implement projects that achieve multiple environmental and community objectives, and that include management plans or similar means of ensuring the responsible stewardship of such projects over time.

(c) To ensure that habitat projects undertaken in furtherance of the "coequal goals" and the habitat restoration objectives of the Delta Reform Act proceed in a manner that is faithful to the Act in its entirety, including its basic policy direction that the coequal goals of "providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem" are to be achieved in a manner "that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place."

(d) To expand opportunities for the County and interested citizens to participate in the process of reviewing such habitat projects by establishing a permitting process that includes public hearing requirements and other opportunities for public input.

(e) To continue to encourage wildlife-friendly agricultural practices and voluntary habitat restoration and preservation efforts, and to continue to accommodate other habitat projects undertaken in connection with impacts to biological resources arising from local projects and actions.

Nothing in this Chapter is intended to restrict or in any way affect or impair the agricultural use of land within the County. In some cases, state and federal laws may regulate certain types or characteristics of projects covered by this Chapter. This Chapter shall be construed to provide the County with the maximum control consistent with such other laws. (§ 5, Ord. 1426, eff. February 28, 2013)

Article 2. Definitions.

For the purposes of this Chapter, the following terms shall have the meanings stated below:

Sec. 10-10.201. Agriculture or Agricultural.

"Agriculture" or "agricultural" shall have the meaning set forth in Yolo County Code Section 8-2.307. (§ 5, Ord. 1426, eff.

February 28, 2013)

Sec. 10-10.202. Applicant.

"Applicant" shall mean a person who files an application for a permit under this Chapter and who is either the owner of the site, a vendee of that person pursuant to a contract of sale for the site, or an authorized agent for either of those persons. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.203. Covered Habitat Mitigation Project.

A "covered habitat mitigation project" is any project within the scope of that term as it is defined in Title 8, Chapter 2 of the Yolo County Code. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.204. Create or Creation.

"Create" or "creation," in the context of a habitat project, shall mean to construct or otherwise introduce new habitat area, functions, and values by excavating, flooding, or otherwise altering land not currently or historically occupied by such habitat. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.205. Deciding Authority.

"Deciding Authority" shall mean the public official(s) or County employee with authority to decide an application for a permit under this Chapter. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.206. Director.

"Director" shall mean the Director of the Planning and Public Works Department, or his or her designee or successor in function. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.207. Enhance or Enhancement.

"Enhance" or "enhancement," in the context of a habitat project, shall mean to rehabilitate a degraded or disturbed natural habitat area to bring back one or more functions or values that have been partially or completely lost due to natural causes or actions such as draining, grading, or other land uses and activities. Any project that changes the function or values of an existing habitat type so that it more closely resembles the natural (i.e., prior to disturbance by human activities) condition of a site shall be considered a habitat enhancement project for the purposes of this Ordinance. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.208. General Plan.

"General Plan" shall mean the adopted General Plan of Yolo County, as may be amended from time to time. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.209. Grading.

"Grading" shall have the same meaning as in Appendix J of the California Building Code, 2007 edition, as may be amended from time to time. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.210. Habitat.

"Habitat" shall mean the environmental factors that support one or more plant or wildlife species at a particular place or region, providing food, water, cover, and space needed for survival and reproduction. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.211. Person.

"Person" shall mean an individual, firm, partnership, corporation, or local agency (as defined in Government Code Section 53090), their successors or assigns, or the agent of any of the foregoing, and shall include any applicant or permit holder under this Chapter.

Sec. 10-10.212. Preserve or Preservation.

"Preserve" or "preservation" means the permanent protection of ecologically important habitat resources through the implementation of appropriate legal and physical mechanisms, including but not limited to conservation easements.

(§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.213. Project.

"Project" shall mean the whole of any activity or activities undertaken in connection with creating, enhancing, restoring, or preserving habitat on a site, and shall be interpreted broadly to include all related activities. This includes, by way of example only and without limitation, activities such as pilot projects, conservation easement transactions, grading, tree or vegetation removal, and the creation, restoration, or enhancement of associated buffer areas. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.214. Restore or Restoration.

"Restore" or "restoration," in the context of a habitat project, shall mean to restore lost habitat area, generally by excavating, flooding, and otherwise manipulating the physical, chemical, or biological characteristics of a site with the goal of reestablishing the natural or historic habitat values and functions of that area. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.215. Site.

"Site" shall mean all areas of real property that are within the boundaries of a proposed project, and may include more than one legal parcel. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.216. Substantial Evidence.

"Substantial evidence" includes facts, a reasonable assumption predicated upon facts, or expert opinion supported by facts. Substantial evidence is not argument, speculation, unsubstantiated opinion or narrative, or evidence that is clearly inaccurate or erroneous. (§ 5, Ord. 1426, eff. February 28, 2013)

Article 3. Permits

Sec. 10-10.301. Permit Requirement; Exemptions and Excluded Activities.

(a) Generally. Subject to the exemptions set forth below, no person shall engage in grading, clearing, or other activities, including the recordation of a conservation easement, with the intent to implement a covered habitat mitigation project without first applying for and receiving a use permit under this Chapter, together with any other approvals required by federal, state, or local law.

(b) *Advisory Determination Regarding Coverage*. Prior to asserting an exemption under subsection (c)(iii) or (vi), below, a prospective project applicant must conduct a pre-application consultation regarding the need for a use permit under this Chapter or other potential County approvals. This consultation may be initiated by contacting the Office of the County Administrator, Natural Resources Division and submitting a written project description with sufficient detail to enable an evaluation of the applicability of one or more exemptions. Prospective project applicants asserting their project is exempt under other provisions of subsection (c) may, but are not required to, also seek a pre-project consultation in the same manner.

(c) Exemptions. The following projects shall be exempt from the use permit requirement and the other provisions of this Chapter:

(i) All covered habitat mitigation projects that do not create 10 or more acres of habitat.

(ii) All covered habitat mitigation projects that do not enhance, restore, or preserve 40 or more acres of habitat. This exemption may not be combined with the exemption in subsection (a), above, to exempt any covered habitat mitigation project that creates, enhances, restores, or preserves 40 or more acres of habitat.

(iii) Covered habitat mitigation projects that create, enhance, restore, or preserve riparian corridor (buffer), oak woodland, vernal pool, or native grassland/prairie habitats, unless any such project also includes one or more other habitat types that exceed the acreage limits set forth in subsections (a) or (b), above. The proponent of any project that qualifies for this exemption shall provide notice to the County of the proposed project before commencing construction or other activities in furtherance of the project.

(iv) Any covered habitat mitigation project that received all necessary County approvals prior to the effective date of this Chapter, or for which a complete application for such approval(s) was submitted prior to effective date (for projects of less than 160 acres only) of Yolo County Ordinance No. 1401, which established a moratorium on certain types of habitat projects.

(v) Any covered habitat mitigation project(s) undertaken by a person that entered into a Memorandum of Understanding or similar written agreement with the County addressing the implementation of such project(s) during the term of Yolo County Ordinance No. 1401 (including the term extension approved pursuant to Ordinance No. 1402), which established a moratorium on certain types of habitat projects. This exemption shall be limited in scope to the project and/or other activities specifically described in the Memorandum of Understanding.

(vi) Limited term pilot projects undertaken for scientific research and related purposes, including feasibility assessments, in connection with the potential future implementation of a covered habitat mitigation project. Such projects are not covered by this Chapter so long as they occur in a time and manner that does not substantially interfere with the reasonable agricultural use of the pilot project site or adversely affect surrounding lands.

(vii) Activities that require discretionary approval pursuant to Chapters 3, 4, or 5 of this Title 10.

Notwithstanding the foregoing, any expansion or other change to a covered habitat mitigation project previously covered by one or more of these exemptions shall require a use permit if the proposed expansion or other change would remove the project, viewed as a whole, from the scope of these exemptions.

(d) Activities Not Covered. The following activities do not constitute covered habitat mitigation projects and are not subject to regulation under this Chapter so long as they are undertaken in the usual and customary manner prevailing in the County at the time this Chapter was adopted:

(i) All activities undertaken in connection with, and in furtherance of, the agricultural use of land. This includes, but is not limited to, the construction and maintenance of stock ponds and small reservoirs, tail-water ponds, irrigation canals and sloughs, rice fields, and similar activities.

(ii) Projects undertaken for the primary purpose of flood control, flood protection, or related matters of flood safety and the protection of life and property.

(iii) The winter flooding of agricultural fields for the primary purpose of providing temporary habitat for migratory waterfowl, provided such flooding does not occur in a time or manner that prevents or substantially interferes with the reasonable agricultural use of the site or adversely affect surrounding lands.

(§ 5, Ord. 1426, eff. February 28, 2013; as amended by §§ 3–4, Ord. 1501, eff. August 23, 2018)

Sec. 10-10.302. Permit Contents, Processing, and Decisions.

(a) Applications, generally. Applications for a use permit under this Chapter shall be submitted to the Director, together with payment of all application fees established by the Board of Supervisors. Except as otherwise provided in this Chapter, all provisions of the Yolo County Code relating generally to use permits shall apply to the review, issuance, and amendment or revocation of permits covered hereunder.

(b) Application contents. An application for a use permit shall include all of the following:

(i) A completed application for a permit under this Chapter, on a form provided by the County, together with payment of the application fee established by resolution of the Board of Supervisors.

(ii) Completed applications for any other required County approvals, such as a grading permit or Flood Hazard Development Permit, together with payment of the application fee(s) established by resolution of the Board of Supervisors. In addition, both with the initial application and thereafter, the applicant shall provide copies of all completed applications for other federal, state, and local approvals associated with the proposed project to facilitate coordination between the County and other agencies.

(iii) Appropriate site-specific technical reports, including but not limited to such documents as a biological resources analysis, a hydrology analysis, a geotechnical analysis, and an engineered excavation plan. The types of reports that may be required should be uniform for applications that are similar in nature, but may vary to the extent that the features of a proposed project or the characteristics of the project site and surrounding lands are unique. Upon request, the Director will advise an applicant of the types of reports that should be submitted with a permit application or, in appropriate instances, in connection with environmental review of a proposed project or at other times as specified by the Director in his or her sole discretion. In some instances, the applicant may be able to satisfy this requirement by providing documents prepared in connection with applications to other federal, state, or local agencies relating to the project.

(iv) A site plan showing property lines, assessor's parcel numbers, onsite and adjoining land uses, topography, access, and existing/proposed patterns of vegetation.

(v) A proposed management plan that identifies how the project will be operated and managed over time. Among other things, the plan should explain how the project will be actively operated and managed in perpetuity to ensure that its environmental and other benefits are realized on a continuous basis, how vector control issues will be addressed, if applicable, and how any unanticipated events and impacts to surrounding land uses will be addressed. The proposed management plan shall also include measures to address crop depredation to the extent it is a reasonably foreseeable consequence of the proposed project. The plan should also state whether the operation and management of the project will be supported by an endowment or other established source of funds.

In addition to the foregoing, the Director may require such other and further information relevant to the project as needed to perform appropriate environmental analysis, to determine whether the proposal may affect public health, safety, and welfare, and for other good cause as determined by the Director in his or her sole discretion.

(c) *Yolo HCP/NCCP and RCIS/LCP Consistency.* In addition to referrals to other County departments, as may be appropriate in the discretion of the Director, all permit applications shall be promptly referred to the following:

(i) To the Executive Director of the Yolo Habitat Conservancy. The referral shall include a request for comments regarding whether the application is consistent with the Habitat Conservation Plan/Natural Communities Conservation Plan (HCP/NCCP) and the Local Conservation Plan included within the Yolo County Regional Conservation Investment Strategy, described below.

(ii) To the Implementation Sponsor for the Yolo County Regional Conservation Investment Strategy (RCIS). As with the Yolo HCP/NCCP, the referral shall include a request for comments regarding whether the application is consistent with the RCIS.

Referrals shall encourage a response within thirty (30) days. Additional referrals may also be made later in the planning and environmental review process.

(d) Deciding Authority. The Deciding Authority for permit applications shall be as follows:

(i) For projects of less than 40 acres, the Zoning Administrator shall be the Deciding Authority.

(ii) For projects of between 40 and 159 acres, the Planning Commission shall be the Deciding Authority. For projects that

are 160 or more acres, the Planning Commission shall act in an advisory capacity to the Board of Supervisors. Acting in such capacity, the Planning Commission shall hold at least one noticed public hearing on the project prior to making a recommendation to the Board of Supervisors. The recommendation of the Planning Commission shall be in writing and shall include a detailed statement of the grounds for the recommendation.

(iii) For projects that are 160 or more acres or that include a proposed alternative approach to addressing the conversion of farmland (as set forth in Section 10-10.303(h), below), the Board of Supervisors shall be the deciding authority. The Board of Supervisors shall hold at least one noticed public hearing on the project prior to making a final decision on the application.

(e) *Decision*. After considering the application materials and, if applicable, the recommendations of County staff and the Planning Commission, the Deciding Authority shall issue, conditionally issue, or deny the application by a written decision supported by findings that address the criteria set forth in Section 10-10.303, below. Due to the unique nature of projects covered by this Chapter, the general conditions that typically apply to the review and approval or denial of a use permit, set forth in Yolo County Code Section 8-2.217, shall not apply.

(f) Costs and expenses. The applicant shall reimburse all costs and expenses reasonably incurred by the County in reviewing applications under this Chapter, including but not limited to staff time and costs and expenses associated with environmental review. At the discretion of the Director, the applicant may be required to provide a reasonable deposit for such costs, enter into a reimbursement agreement with the County, or both.

(§ 5, Ord. 1426, eff. February 28, 2013; as amended by § 5, Ord. 1501, eff. August 23, 2018)

Sec. 10-10.303. Decisionmaking Criteria.

A permit applied for under this Chapter shall be approved if, taking all feasible mitigation measures, conditions of approval, and other relevant facts into account, the Deciding Authority makes all of the following determinations based on substantial evidence in the record:

(a) That the project applicant has substantially complied with the requirements of this Chapter, including but not limited to provisions addressing the submission and contents of a management plan;

(b) That the project would not significantly conflict with surrounding land uses;

(c) That the project would not have a significant adverse effect on biological resources, is not reasonably expected to significantly conflict with the Yolo Natural Heritage Program (HCP/NCCP), and will advance one or more goals and objectives of the HCP/NCCP or otherwise contribute to its implementation

(d) That the project would not significantly compromise flood safety and the protection of life and property;

(e) That the project would not have a significant adverse economic effect—either by itself or cumulatively—within the County or region. This factor shall only be considered for projects that convert 40 or more acres of farmland;

(f) That the project, if undertaken in furtherance of the "co-equal goals" and the habitat restoration objectives of the Delta Reform Act, will proceed in a manner that is faithful to the Act in its entirety, including its basic policy direction that the coequal goals of "providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem" are to be achieved in a manner "that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place";

(g) If the project site is subject to a Williamson Act contract, that the project is an "open space use" under Government Code Section 51201(o) or that it would not otherwise cause a material breach of the contract. Any project that is an "open space" use under Section 51201(o) shall also require approval of an amended Williamson Act contract or other appropriate action to authorize the open space use;

(h) That any conversion of farmland to habitat or other non-agricultural uses will be mitigated in accordance with Yolo County Code Sections 8-2.301 et seq. (notwithstanding anything to the contrary set forth therein regarding its application to habitat projects) or, subject to the approval of the Board of Supervisors, that the applicant will implement an alternative approach to addressing the conversion of farmland that provides an equal or greater level of mitigation; and

(i) That the project would not significantly conflict with other relevant considerations of public health, safety, or welfare, sufficient to require preparation of a statement of overriding considerations pursuant to the California Environmental Quality Act.

Written findings addressing each of these matters shall be prepared in connection with a decision on a permit application.

If the Deciding Authority (other than the Board of Supervisors) finds that a project cannot be approved because one or more of these determinations cannot be made, the permit shall be referred to the Board of Supervisors for consideration at a noticed public hearing. The Board of Supervisors may approve a permit even if it finds that one or more of these determinations cannot be made, provided it finds that issuance of the permit is consistent with the purposes of this Chapter and all applicable provisions of local, state, and federal law. Any decision of the Board of Supervisors following its deliberation of these issues shall include written findings based on substantial evidence that address all of the criteria and other matters set forth above, together with an explanation of any decision to approve or deny a permit.

(§ 5, Ord. 1426, eff. February 28, 2013; as amended by § 6, Ord. 1501, eff. August 23, 2018)

Sec. 10-10.304. Permit Term; Amendments.

(a) Term. The use authorized by a permit issued under this Chapter shall commence within one to five years, as may be appropriate taking all circumstances relating to the project into account. In particular, covered habitat mitigation projects that require numerous federal, state, and local agency approvals that can take a long time to acquire may warrant an initial permit term of up to five years, in the sole discretion of the Deciding Authority. Once the authorized use commences, a permit shall be perpetual in term unless otherwise indicated at the time of its original approval.

(b) Amendments, generally. An amendment to an existing permit issued under this Chapter shall be required for any significant change to an approved covered habitat mitigation project. This shall include, but is not limited to, any change in the size or operation of an approved project that could have a significant effect on the environment. The Director shall have the discretion to determine whether an amendment to an existing permit is required.

(c) Applications for amendments; processing. Applications for amendments to previously issued permits shall be submitted to the Director on forms provided by the County. An application to amend a previously issued permit shall also be accompanied by the appropriate fee, as established by resolution of the Board of Directors. In addition, the Director may require any or all of the additional information and documents described in Section 10-10.302(b), above, that may be reasonably necessary for consideration of the application. An application for an amendment shall be handled in the same manner as an original permit application, as described in Section 10-10.302(b) - (e), above. (§ 5, Ord. 1426, eff. February 28, 2013)

Article 4. Appeals

Sec. 10-10.401. Appeal Procedure.

Any decision made pursuant to this Chapter may be appealed pursuant to Yolo County Code Section 8-2.3301, which shall apply to all appeals arising under this Chapter. (§ 5, Ord. 1426, eff. February 28, 2013)

Article 5. Violations

Sec. 10-10.501. Generally.

Any violation of this Chapter shall be subject to the administrative code enforcement ordinance of the County, set forth in Chapter 5 of Title 1 of the Yolo County Code. Any administrative enforcement action undertaken in response to a violation of this chapter, in the sole discretion of the Enforcement Officer or other responsible staff person, need not utilize the Courtesy Notice or Notice of Violation provisions of Chapter 5 of Title 1, and may instead immediately issue an administrative citation. Fines imposed by an administrative citation for a continuing violation shall apply for each day that the violation is ongoing until it is fully abated in the manner specified in the administrative citation. In the event of any conflict between the provisions of this Section and Chapter 5 of Title 1, this Section shall govern.

(§ 5, Ord. 1426, eff. February 28, 2013; as amended by § 7, Ord. 1501, eff. August 23, 2018)

Sec. 10-10.502. Public Nuisance.

Any activity in violation of this Chapter or any permit issued hereunder shall be considered a public nuisance. In his or her sole discretion, the Director may take any action authorized by law to address the public nuisance, including but not limited to referral of the matter to the District attorney for civil or criminal action. (§ 5, Ord. 1426, eff. February 28, 2013)

Article 6. Periodic Reviews; Mapping

Sec. 10-10.601. Initial Review.

Five years after this Chapter becomes effective, the Board of Supervisors shall hold a public hearing for the purpose of considering its effectiveness at achieving the purposes set forth in Article 1 hereof. During such hearing, the Board of Supervisors may identify matters that require further consideration and provide appropriate direction to staff. In addition, the Board of Supervisors may direct staff to prepare an ordinance amending, superseding, or deleting this Chapter, and it may take such other actions as may be necessary and appropriate. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.602. Future Reviews.

Every five years after the initial review under Section10-10.601, above, the Board of Supervisors shall review this Chapter at a public hearing for the reasons described in that Section, particularly to ensure its continued effectiveness in achieving the purposes described in Article 1. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.603. Failure to Conduct Reviews.

The failure to conduct a review in the time or manner required by this Article shall not affect the continuing validity of this Chapter, not shall it have any affect on the status of a permit issued hereunder. (§ 5, Ord. 1426, eff. February 28, 2013)

Sec. 10-10.604. Project Mapping.

The Director shall maintain a map reflecting the location of each project approved pursuant to this Chapter. Other relevant information may also be included on the map, such as the location of preexisting mitigation banks, conservation easements, and other matters. The map shall be provided to the Deciding Authority in conjunction with each permit application presented for consideration. It shall also be provided to the Board of Supervisors as part of each periodic review. (§ 5, Ord. 1426, eff. February 28, 2013)

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RESEARCH ARTICLE

Defining population structure and genetic signatures of decline in the giant gartersnake (*Thamnophis gigas*): implications for conserving threatened species within highly altered landscapes

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Abstract Anthropogenic habitat fragmentation can disrupt the ability of species to disperse across landscapes, which can alter the levels and distribution of genetic diversity within populations and negatively impact long-term viability. The giant gartersnake (*Thamnophis gigas*) is a state and federally threatened species that historically occurred in the wetland habitats of California's Great Central Valley. Despite the loss of 93 % of historic wetlands throughout the Central Valley, giant gartersnakes continue to persist in relatively small, isolated patches of highly modified agricultural wetlands. Gathering information regarding genetic diversity and effective population size represents an essential component for conservation management programs aimed at this species. Previous mitochondrial sequence studies have revealed historical patterns of differentiation, yet little is known about contemporary population structure and diversity. On the basis of 15 microsatellite loci, we estimate population structure and compare indices of genetic diversity among populations spanning seven drainage basins within the Central Valley. We sought to understand how habitat loss may have affected genetic differentiation, genetic diversity and effective population size, and what these patterns suggest in terms of management and restoration actions. We recovered five genetic clusters that were consistent with regional drainage basins, although three northern basins within the Sacramento Valley formed a single genetic cluster. Our results show that northern drainage basin populations have higher connectivity than among central and southern basins populations, and that greater differentiation exists among the more geographically isolated populations in the central and southern portion of the species' range. Genetic diversity measures among basins were significantly different, and were generally lower in southern basin populations. Levels of inbreeding and evidence of population bottlenecks were detected in about half the populations we sampled, and effective population size estimates were well below recommended minimum thresholds to avoid inbreeding. Efforts focused on maintaining and enhancing existing wetlands to facilitate dispersal between basins and increase local effective population sizes may be critical for these otherwise isolated populations.

Keywords Population structure · Genetic diversity · *Thamnophis gigas* · Microsatellite · Bottleneck · Effective population size · Fragmentation

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Introduction

Anthropogenic habitat fragmentation can negatively impact species persistence and population resilience to environmental change. When individuals cannot disperse across landscapes, the levels and distribution of genetic

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diversity can increasingly erode within populations leading to variable effective population sizes and increased potential for inbreeding effects that ultimately limit long-term viability (Fischer and Lindenmayer 2007; Frankham 2005; Miller and Hobbs 2002). Some of the most dramatic human-induced environmental disturbances have occurred within the wetland habitats of the California's Great Central Valley over the past century-and-a-half. Prior to the mid 1800s the 13 million acre Great Central Valley consisted of as much as 4 million acres of well-connected wetlands. With the encouragement of the federal government, farmers began diking and draining these wetlands for agricultural production with over 2 million acres included in the Swamp Lands Act of 1850, which provided incentives for the draining of wetlands (Gates 1975; Peterson 1974). The subsequent agricultural development, water diversion and damming, and urbanization that followed have resulted in the loss of over 93 % of historic wetlands in the Central Valley (Frayer et al. 1989; USDOI 1994).

Despite the considerable loss and degradation of aquatic ecosystems throughout the Central Valley, some species, such as the giant gartersnake (*Thamnophis gigas*) continue to persist in highly modified agricultural wetlands. The giant gartersnake is a state and federally threatened species that historically occurred in the low-gradient streams, wetlands and marshes of California's Great Central Valley (Fitch 1941; Hansen and Brode 1980). Giant gartersnake populations have become increasingly fragmented in recent decades and persist as small clusters of populations primarily in irrigation canals and drains associated with rice agriculture and remnant managed wetlands (Halstead et al. 2010). The current range of the giant gartersnake extends from the Sacramento Valley near the vicinity of Chico, CA southward to the northern and central San Joaquin Valley just north of Fresno, CA (Fig. 1). This range is currently divided into three recovery units (Fig. 1): Northern Sacramento Valley Recovery Unit (Butte, Colusa, and Sutter Basins); Southern Sacramento Valley Recovery Unit (American, Yolo, and Delta Basins); and San Joaquin Valley Recovery Unit (San Joaquin and Tulare Basins). The recovery units are presumed to be distinct from one another based on ecological and geographical characteristics and unique recovery actions needed within them (USFWS 1993, 2006). Populations of the giant gartersnake have been nearly extirpated from the San Joaquin Valley Recovery Unit, where only a few isolated populations remain within the San Joaquin Basin and are presumed extirpated further south in the Tulare Basin (Dickert 2005; Wylie and Amarello 2008). Although habitat loss remains the greatest threat to population persistence, other factors include flood control and water conveyance projects that limit water availability, maintenance activities along canals and drains, poor water quality resulting from agricultural runoff from herbicide and pesticide application, heavy metal contaminants (e.g., mercury and selenium), road disturbance, and predation and competition by non-native species all of which may contribute to further habitat degradation and population declines (USFWS 2006; Wylie et al. 2009).

Many of the remaining populations of giant gartersnakes currently exist in relatively small, isolated patches of habitat surrounded by heavily altered landscapes. Identifying populations that could be prioritized for conservation requires an understanding the species current genetic diversity and population structure (Petit et al. 1998). The reintroduction of giant gartersnakes to restored wetlands is just one example of a conservation action that would be greatly informed by understanding giant gartersnake population structure (Miller et al. 2010). Information regarding genetic diversity and effective population size are also positively linked to population persistence and represent an essential component for species genetic management and recovery programs (Frankham and Ralls 1998). Although previous genetic studies attempted to elucidate population structure and diversity of giant gartersnakes (Engstrom 2010; Paquin et al. 2006), much of the data analyzed in these studies were from a single mitochondrial gene. The studies revealed historical patterns of broad regional genetic differentiation, but little is known about more contemporary population structure and connectivity.

Here we conducted a fine-scale analysis of the genetic characteristics for giant gartersnakes using 15 microsatellite loci to characterize the genetic relationships of extant populations. Our aims were to estimate population structure and compare genetic diversity indices among populations spanning the seven drainage basins within the Central Valley. In addition, we sought to better resolve the extent to which habitat loss and fragmentation have affected genetic differentiation, loss of genetic diversity and effective population size, and what the results suggest in terms of potential management and restoration actions.

Materials and methods

Sampling

A total of 477 tissues were used in this study that covered the contemporary range of the giant gartersnake. We acquired tissue samples and DNAs from previous studies (Engstrom 2010; Paquin et al. 2006) and tail-tip and ventral scale clips from our own surveys. To define populations, we grouped individual samples that were separated by 6 km or less, an approximate maximum dispersal distance for the giant gartersnake (Valcarcel 2011; Wylie and Amarello 2006), into a single population for analyses

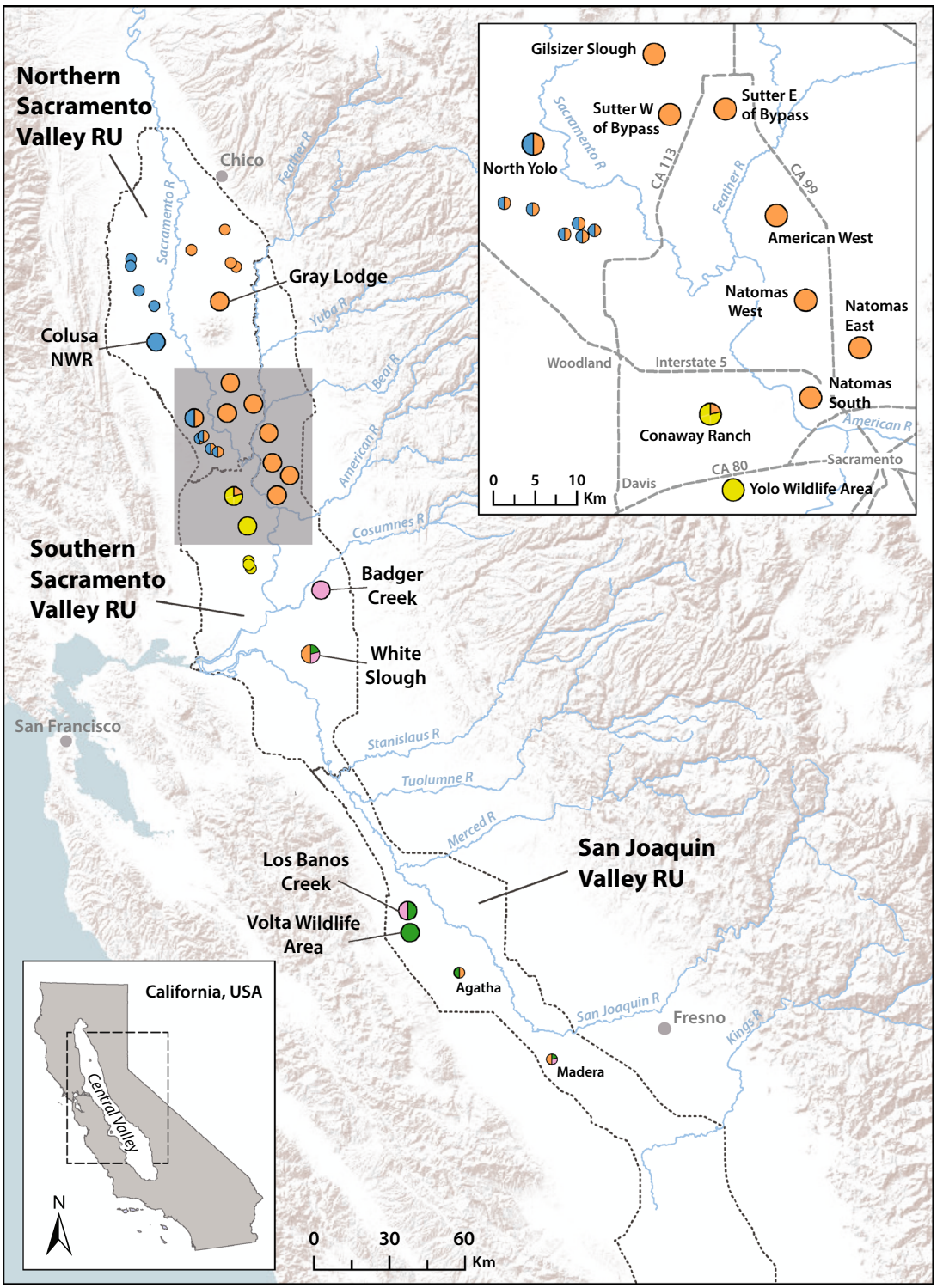

Fig. 1 Map of collection locations for giant gartersnakes in California's Great Central Valley. Populations (*large circles*) are colored according to cluster membership shown in Fig. 2. *Smaller circles* are individual samples that were grouped according to drainage basin and used only in the STRUCTURE analyses. The *lower inset* map highlights the region of study within California and the *upper inset* map highlights collections sites within the Sacramento Valley and the major highways that intersect them. The three Recovery Units are indicated with the *dashed line*: (1) Northern Sacramento Valley Recovery Unit (RU) extending from the north to the confluence of the Sacramento and Feather Rivers, (2) Southern Sacramento Valley RU extending east of the Feather River southward to the Stanislaus River, and (3) San Joaquin Valley RU extending south from the Stanislaus River to the Kern River (off the map)

unless samples were divided by potential barriers (e.g. highway, river, etc.). This resulted in 459 snakes sampled from 16 populations across the Central Valley (Fig. 1): Colusa Basin (Colusa NWR, North Yolo); Butte Basin (Gray Lodge); Sutter Basin (Gilsizer Slough, Sutter East of bypass, Sutter West of bypass); American Basin (American West, Natomas West, Natomas East, Natomas South); Yolo Basin (Conaway Ranch, Yolo Wildlife Area); Delta (Badger Creek, White Slough); San Joaquin Basin (Los Banos Creek, Volta Wildlife Area). For the individual-based population structure analyses (see below), we also included an additional 18 samples that could not be grouped into any of the 16 populations. We extracted genomic DNA from tissue samples with the Qiagen DNeasy Blood and Tissue Kit (Qiagen Inc., Valencia, CA, USA).

Microsatellite development

We developed a microsatellite library at the USGS San Diego Field Station from a single shot-gun sequencing run on a 454Jr-automated DNA sequencer (F. Hoffman—La Roche, Ltd., Basel, Switzerland). We used the program MSATCOMMANDER to scan the nucleotide sequence files that were generated from the 454Jr for dinucleotide, trinucleotide, tetranucleotide, and pentanucleotide repeat sequences and recovered 3624 sequences that contained microsatellite repeats. From these we selected 48 loci that contained adequate flanking regions for which primers could be designed.

We used three individual samples that spanned the species' range to test whether the microsatellite loci were variable. Among the 48 loci that we screened, we found 15 that were variable, consistent in amplification, and yielded reliable genotyping scores. Prior to polymerase chain reaction (PCR) amplification, one primer from each locus was labeled with a fluorescent dye for genotype assessment. We divided these loci into four groups (Table 1). Within each group, 3–4 loci were simultaneously amplified with a Qiagen multiplex PCR kit in 10 μL reactions containing 5 μL of Qiagen multiplex PCR Master Mix, 1 μL primer mix (containing 2 μM of each primer), 1 μL Q-solution and 2 μL of RNase-free water. Amplified products were genotyped at BATJ, Inc. (San Diego, CA) on an Applied Biosystems 3130 Genetic Analyzer using the LIZ 500 size standard.

Genetic diversity

We used GENE-MARKER v1.90 (SoftGenetics®) to edit the raw allelic data and score allele sizes. We used several different methods to minimize genotyping errors. First, the possibility of scoring errors and presence of null alleles were evaluated with MICROCHECKER (Van Oosterhout et al. 2004). Additionally, approximately ten percent of the samples were arbitrarily chosen and reanalyzed across all loci for quality assurance. We also tested each microsatellite locus for evidence of linkage disequilibrium and departure from Hardy–Weinberg equilibrium with the program GENEPOP ON THE WEB (Raymond and Rousset 1995; Rousset 2008). For both linkage disequilibrium and Hardy–Weinberg tests, we performed global (i.e., across all loci) and population-level tests (i.e., across loci in each population).

We evaluated genetic diversity by calculating allelic richness (A), corrected for sample size, with FSTAT 2.9 (Goudet 1995) and observed heterozygosity (H_O), and expected heterozygosity (H_E) with GENALEX v6.41 (Peakall and Smouse 2012). We used a nonparametric, two-sided test implemented in FSTAT with 10,000 permutations to assess whether expected heterozygosity (H_E) and allelic richness (A) differed significantly between regional basins and between populations. The inbreeding coefficient (F_{IS}; Nei 1987), which relates the observed heterozygosity within a subpopulation to the expected heterozygosity, is expected to be elevated in individuals that are a product of non-random mating and has been widely used as an indicator of inbreeding. We estimated F_{IS} for each population and assessed whether F_{IS} differed significantly among populations in GENODIVE 2.0b23 (Meirmans and Van Tienderen 2004) on the basis of 5000 permutations.

Inferring population structure

We evaluated patterns of population genetic structure with multiple analytical methods. First, we used the Bayesian clustering framework implemented in STRUCTURE version 2.3.2 (Pritchard et al. 2000) to identify discrete genetic clusters across the range of the giant gartersnake. This approach uses Markov Chain Monte Carlo (MCMC) simulations to simultaneously estimate population-level allele frequencies and probabilistically group individuals into the most likely number of genetic clusters (K) that maximizes the within-cluster Hardy–Weinberg and linkage equilibria. The expectations of Hardy–Weinberg and linkage equilibria are met when a group of individuals has a common gene pool, without major barriers to gene flow among them for numerous generations. We used the admixture model option for all runs and evaluated two different allele frequency models (correlated and uncorrelated; Falush et al. 2003).

For all STRUCTURE analyses we arbitrarily specified a range for the maximum number of clusters ($K = 1$–16) to which individuals could be assigned. For each K that was evaluated, we performed 10 separate runs with 500,000 iterations of the MCMC algorithm after a burn-in of 500,000 iterations, and then calculated the mean posterior

Table 1 Characteristics of polymorphic microsatellite loci developed in the giant gartersnake (*Thamnophis gigas*)

Locus	Repeat motif	Primer sequences (5′–3″)	Dye	Multiplex	Allele range (bp)	Number of alleles	H_O	H_E
DI_907	GT	F: GAAACGGAGATGAGCACACA	NED	MP1	178–188	6	0.362	0.372
		R: AGGCCTCTTCCACATGTTTC						
DI_2229	CT	F: TCAAAGTTACGACGACACAGAAA	6-FAM	MP2	147–179	15	0.716	0.709
		R: TGAAATAGCTCGAGGCGTTC						
TRI_3VL	GTT	F: GAACATGAGCCCCATGAACT	PET	MP4	350–365	4	0.515	0.496
		R: TTCATCCATCCATTTGGACA						
TRI_58P	GAT	F: AGTTTTGATGCCACCCACTCa	VIC	MP1	219–258	13	0.716	0.705
		R: TCCCACAAGATCTTCACCATC						
TRI_AOC	TAG	F: ACAGTGGGAATTGAGGTGGA	PET	MP3	227–254	10	0.703	0.671
		R: CAGAAGGCCGAAATGAAAAC						
TRI_ISV	AAC	F: GCTAGGTGCAGGTGTGTGTC	NED	MP2	232–247	5	0.283	0.287
		R: ATGGCTCCTGCATATCCATC						
TRI_ONY	CAT	F: ACCCTTAGAGTTGGGGGTGA	NED	MP3	223–253	7	0.426	0.454
		R: CAGGATATGCATTGCTCCAA						
TRI_TOA	GTT	F: TTTTCCCCTTCCTCAGGATT	VIC	MP2	167–185	6	0.494	0.484
		R: AATTGCAACAACAGCAGCAG						
TRI_TSC	ATT	F: CCAATAAAGCTGGGGATCAA	PET	MP1	324–351	8	0.422	0.472
		R: CTCCTCCTCTGCACTCACCT						
TET_567	CATA	F: CACATGCATACATACAGACGAAG	NED	MP4	138–174	10	0.469	0.676
		R: CCAGGCAAAGGAAGAAAGTG						
TET_790	ATCC	F: CTTCCCATCTTTTTGCCAGA	6-FAM	MP4	192–224	9	0.663	0.692
		R: GGCTTTGCAGTTCTGGAGAT						
TET969	AAGG	F: TTGCGTTAGCCTCCCATATC	6-FAM	MP3	303–331	8	0.500	0.487
		R: TCCAACAACCAGTTCACCAA						
PEN_5ZB	ACGCC	F: ACATTATGGCCGGTTCAGAG	PET	MP2	265–295	7	0.698	0.695
		R: TTCCACCTTCCCTAGGCTTT						
PEN_61U	AGAAT	F: GAGGGCTTTTTGTTTTGTTTGT	VIC	MP4	154–189	8	0.578	0.641
		R: AAGACCATATGCACCAAAGACA						
PEN1170	ATGGT	F: GGAACAGAAATTGCCTCCAG	VIC	MP3	281–306	6	0.141	0.295
		R: TCAACCAGGTCTATATCAGCACA						

Locus designation, repeat motif, primer sequences, 5′ primer fluorescent dye, allele range, total number of alleles, observed heterozygosity (H_O), and expected heterozygosity (H_E) in the giant gartersnake across all 477 snakes

We divided these loci into 4 multiplex groups (MP) and performed PCRs (annealing temperature at 58 °C) using a Qiagen Multiplex PCR Kit®, and following recommended PCR conditions: 10 μL reactions contained 5 μL of Qiagen multiplex PCR Master Mix, 1 μL primer mix (containing 2 μM of each primer), 1 μL Q-solution and 2 μL of RNase-free water

probability of the data for a given K at each step of the MCMC for the 10 runs combined. The most probable number of clusters (K) was inferred by comparing the average scores of the log likelihood of the data for each K value (LnP(D|K)) against the K_{MAX} (i.e. where the LnP(D|K) curve plateaus) and the ΔK criterion of Evanno et al. (2005) using the online program STRUCTURE HARVESTER (Earl and vonHoldt 2012). Once the optimal K value was identified, we summarized 10 independent runs at the optimal K value with the program CLUMPP (Jakobsson and Rosenberg 2007) with LargeKGreedy algorithm and 10,000 repeats. We used the program DISTRUCT (Rosenberg 2004) to graphically display the result of the CLUMPP output.

We estimated population genetic differentiation (F_{ST}) using Weir and Cockerham's (1984). We estimated F_{ST} globally, between pairs of populations, and among drainage basins. We used the program GENALEX v6.41 to estimate F_{ST} and assessed statistical significance with 9999 permutations. Alpha significance ($\alpha = 0.05$) was adjusted for multiple tests with the B–Y correction method (Narum 2006) and set at 0.009 for population comparisons and 0.002 for drainage basin comparisons. We also performed

an analysis of molecular variance (AMOVA; Excoffier et al. 1992) to determine the partitioning of genetic variation among four hierarchical levels: within individuals, among individuals at each population, among populations within each drainage basin, and among drainage basins using GENODIVE (Meirmans and Van Tienderen 2004).

To test whether genetic differentiation among populations increased as geographic distance increased (indicating a stepping-stone model of gene flow), we compared pairwise matrices of Euclidean geographic distance and pairwise estimates of F_{ST} with Mantel tests for matrix correlation (Mantel 1967). We assessed significance with 10,000 randomizations of the genetic distance matrix. All isolation-by-distance analyses were performed in IBDWS 3.21 (Jensen et al. 2005).

Population bottleneck and effective population size estimation

We used the program BOTTLENECK (Cornuet and Luikart 1996; Piry et al. 1999) to determine if populations within basins may have undergone significant reductions in size (i.e., population bottleneck) in the recent past (i.e. $2N_e$–$4N_e$ generations; Luikart and Cornuet 1998). The method is based on the assumption that large declines in effective population size (N_e) decrease allelic diversity at a greater rate than overall heterozygosity. Therefore, if a population exhibits an excess of heterozygotes relative to what would be expected on the basis of observed allelic diversity, then the population may have experienced a bottleneck. We used the Wilcoxon signed-rank test, implemented in BOTTLENECK, to examine whether each population exhibited an excess of observed heterozygotes relative to that predicted for a population at mutation-drift equilibrium. Because this method is sensitive to the mutational model under which the null range of alleles is simulated, heterozygote excess and allele frequencies were tested with 10,000 simulations under the infinite alleles (IAM), two-phase (TPM), and strict step-wise (SMM) mutation models. For the TPM model, we implemented recommendations of Peery et al. (2012) and Miller et al. (2012) for testing significance across a range of two specified parameters: (1) the proportion of single step mutations ($p_g = 0.3$, 0.6, and 0.8) and (2) the mean sizes (δ_g) of multistep mutations (4, 8, and 16) that incrementally approached the SSM model.

We also estimated effective population sizes (N_e) for each population and genetic cluster using approximate Bayesian computation in ONeSAMP 1.2 (Tallmon et al. 2008). For each ONeSAMP analysis, we specified a noninformative, flat prior on N_e (2–5000) and performed replicate analyses to verify the consistency in our results.

Results

Genetic diversity

All 15 loci conformed to mutational expectations in that they varied in accordance with repeat type.

The global tests for Hardy–Weinberg equilibrium for all loci were non-significant (in ESM Appendix 1, 2). However, our population-level tests of Hardy–Weinberg equilibrium recovered ten populations that had at least one locus not in equilibrium (alpha significance was corrected for 16 tests with the B–Y method and set at 0.0147). All loci were in equilibrium for North Yolo, Gray Lodge, Sutter East, Sutter West, Conaway Ranch, and White Slough populations. Global evaluations for linkage disequilibrium indicated six pairs of loci had non-random associations. When tested within populations, significant non-random associations were revealed between the same pairs of loci as in the global test, but each pair was restricted to specific populations: Natomas West (TRI_AOC and TRI_58P), Yolo Wildlife Area (TRI_AOC and TRI_ONY), and Volta Wildlife Area (DI_2229 with TRI_ONY and TRI_TSC; PEN_61U with TRI_ISV and TRI_TSC). We detected genetic bottlenecks in most of these populations, and effective population size estimates were low for all populations (see below). Both bottlenecks and low effective population size are expected to increase non-random mating within populations and therefore influence overall linkage disequilibrium. Nonetheless, we removed three main loci (TRI_AOC, DI_2229, and PEN_61U) with apparent non-random associations to test whether these loci affected our results. Removal of these loci did not change the results of population structure, genetic differentiation, or molecular variance, so we made no adjustments to the data in any of our analyses (in ESM Appendix 3–6). We also detected the possible presence of null alleles at two loci: PEN1170 and TET567. However, the only measurable effect that we observed in analyses run with and without these loci was a change in significance among genetic differentiation estimates between Gray Lodge and the Natomas basin populations (in ESM Appendix 3).

Allelic richness ranged from 3.08 (Volta Wildlife Area) to 4.03 (Natomas West) and expected heterozygosity (H_E) ranged from 0.467 (Los Banos Creek) to 0.604 (Gray Lodge). Comparisons of both measures of diversity were significantly different among drainage basins ($P < 0.002$ and $P < 0.006$, respectively) with the southern basins (e.g. Yolo, Delta, and San Joaquin Basins) generally having lower estimates than more northern basins. Levels of inbreeding (F_{IS}) were nonsignificant and close to zero for many populations. However, five populations had statistically significant F_{IS}: Gilsizer Slough, Natomas West,

Table 2 Summary of genetic diversity statistics by population: number of samples (N), the average number of alleles at each locus (A_L), allelic richness corrected for sample sizes (A_R), observed heterozygosity (H_O), expected heterozygosity (H_E), the inbreeding coefficient (F_{IS})

Drainage Basin	Population	N	A_L	A_R	H_O	H_E	F_{IS}
Colusa Basin	Colusa NWR	46	4.53	3.33	0.530	0.543	0.024
	North Yolo	15	4.13	3.60	0.502	0.558	0.099
Butte Basin	Gray Lodge	14	4.27	3.59	0.627	0.604	0.000
Sutter Basin	Gilsizer Slough	37	4.40	3.66	0.539	0.601	**0.102**
	Sutter East of Bypass	15	3.50	3.27	0.492	0.531	0.073
	Sutter West of Bypass	32	4.73	3.66	0.561	0.562	0.002
American Basin	American West	35	3.93	3.44	0.547	0.558	0.020
	Natomas West	30	5.27	4.03	0.546	0.593	**0.080**
	Natomas East	30	4.27	3.58	0.502	0.574	**0.124**
	Natomas South	8	3.33	3.20	0.446	0.488	0.086
Yolo Basin	Conaway Ranch	34	4.00	3.25	0.483	0.493	0.022
	Yolo Wildlife Area	41	4.73	3.22	0.458	0.499	**0.083**
Delta Basin	Badger Creek	45	4.20	3.53	0.494	0.538	**0.082**
	White Slough	20	3.93	3.58	0.497	0.522	0.047
San Joaquin Basin	Los Banos Creek	10	3.33	3.28	0.450	0.467	0.036
	Volta Wildlife Area	47	3.87	3.08	0.488	0.525	0.070

Bold values indicate $P < 0.001$; based on 5000 permutations

Natomas East, Conaway Ranch, and Badger Creek (Table 2).

Population structure and genetic differentiation

Bayesian clustering analysis strongly supported five genetic units (Fig. 2), and we obtained similar results whether we assumed the allele frequencies were correlated or uncorrelated across populations. Several populations were highly distinctive and there was a strong relationship between the geographic location of populations and the grouping of individuals.

Populations from the Colusa Basin west of the Sacramento River (i.e., Colusa National Wildlife Refuge and all other singleton samples within Colusa and Glenn Counties) formed the first genetic cluster. Multiple populations east of the Sacramento Valley formed the second cluster (Figs. 1, 2): Butte Basin (Gray Lodge), Sutter Basin (Gilsizer Slough, Sutter East of Bypass, and Sutter West of Bypass), and American Basin (American West, Natomas West, Natomas East, Natomas South), and all singletons from northern Butte and Glenn Counties east of the Sacramento River. Admixture among these two clusters was detected in southern Colusa Basin, where individuals from North Yolo (and further south along the Yolo Bypass) had equal (0.5) probability of membership in clusters one and two (Fig. 2). Individuals from within the Yolo Basin at the Conaway Ranch and Yolo Wildlife Area formed the third cluster. However, individuals from Conaway Ranch (the more northern population) shared ~40 % of their

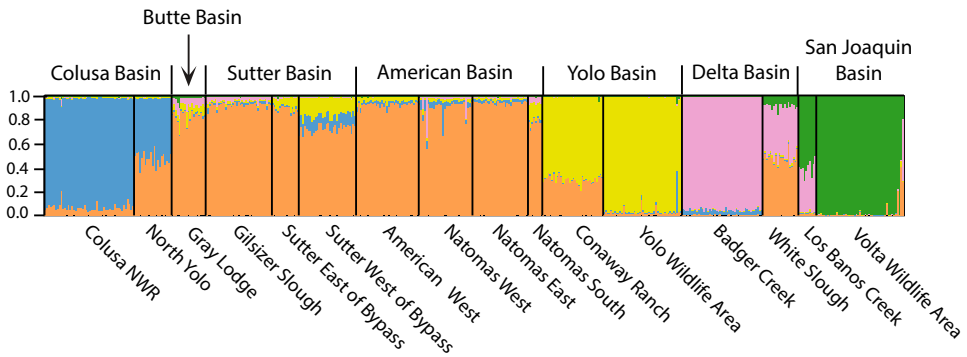

Fig. 2 Assignment plot on the basis of a correlated allele frequencies model estimated in STRUCTURE at $K_{MAX} = 5$. Drainage basins (*top label*) and populations (*bottom label*) are arranged in geographic order from north to south (*left* to *right*, respectively), each of which are denoted with *solid black lines*. Within each population, assignment probabilities for each individual are indicated as the relative proportion of each color

overall membership probabilities with more northern genotypes from cluster two. The fourth and fifth clusters were comprised of Badger Creek and Volta Wildlife Area, each of which contained individuals with distinctive genotypes that likely reflect their geographic isolation. Genotypes of individuals from White Slough had mixed assignments from those from Badger Creek, more northern drainage basins, and Volta (clusters 2, 4, and 5), and individuals from Los Banos Creek shared membership probabilities with their geographically proximate sister site (Volta Wildlife Area) and the more northern Badger Creek cluster. One individual from Agatha (Merced County) and one from Madera (Fresno County) had admixed assignment probabilities between San Joaquin and more northern Basins (Fig. 1, southernmost individuals in the map).

Population differentiation (F_{ST}) ranged from 0.00 to 0.297 and the global population differentiation was statistically significant (F_{ST} = 0.108; $P < 0.001$). Pairwise F_{ST} estimates were statistically significant in most population comparisons. Pairwise comparisons between northern populations across the Sacramento Valley (within Butte, Sutter, and American Basins) were the only non-significant estimates (Table 3); these patterns were consistent with the population structure inferred from the Bayesian cluster analysis. Pairwise differentiation estimates among drainage basins showed a similar pattern: only pairwise comparisons between Butte Basin and American Basin were non-significant (Table 4). Partitioning of genetic variation from the seven drainage basins revealed significant structure among hierarchical groups but percentage of variance was low with 9 % of the total variation partitioned among basins ($P < 0.001$), 4 % among populations within basins ($P < 0.001$), 5 % among individuals within populations ($P < 0.001$), and the remainder within individuals.

Isolation by distance was evident among populations ($r = 0.86$, $P = 0.001$; Fig. 3a). This pattern remained significant even when the geographically separated populations from within the San Joaquin Basin (Los Banos Creek and Volta Wildlife Area) were removed from the analysis ($r = 0.425$, $p = 0.015$; Fig. 3b).

Population bottlenecks and effective population size

We detected evidence of bottlenecks (i.e., heterozygote excess) in several populations using the Wilcoxon test. Regardless of the mutational model employed, there was no evidence of population bottlenecks recovered for Sutter West, Yolo Wildlife Area, and Los Banos Creek populations. Under the IAM model, all other populations showed significant heterozygote excess. Under the TPM model, eight of the sixteen populations were significant for heterozygote excess, although significance decreased as we adjusted parameters to approach a strict step-wise mutation model (Table 5). Overall, the population bottlenecks were most consistently detected at Gray Lodge, Gilsizer Slough, American West, Natomas East, Badger Creek, and Volta Wildlife Area, many of which also had significant inbreeding coefficients (F_{IS}; Table 2).

Effective population size (N_e) estimates varied across the Central Valley, with the lowest population estimate recovered in the south at Volta Wildlife Area ($N_e = 7.5$) and the highest estimate found in the Sacramento Valley at Gilsizer Slough ($N_e = 101.8$). Overall population N_e estimates were generally low (Table 6). We also estimated N_e for each of the genetic clusters that were identified in our STRUCTURE analyses, each of which comprised multiple populations. These estimates mirrored those at the population level, where the lowest estimate was recovered in the south within the San Joaquin Basin ($N_e = 56.9$) and highest estimates recovered within the more interior drainage basins (Table 6).

Discussion

Genetic diversity

Genetic diversity of giant gartersnake populations across the Central Valley, as measured by allelic richness and expected heterozygosity, was relatively low compared to other diversity estimates for snakes (Anderson et al. 2009; Chiucchi and Gibbs 2010; Clark et al. 2008; Manier and Arnold 2005; Marshall Jr et al. 2008; Tzika et al. 2008). Although direct comparisons are not possible because the above studies were based on different microsatellite loci, another obligate wetland snake listed as threatened under federal and state endangered species acts (Copperbelly watersnake, *Nerodia erythrogaster*; Marshall Jr et al. 2008) had higher estimated levels of genetic diversity than the giant gartersnake. Compared to giant gartersnakes, the copperbelly watersnake is not as strongly associated with permanent wetlands and is more likely to move over land. Thus, the difference in genetic diversity between the two species might reflect differences in ecology and demography. Alternatively, low levels of genetic diversity in the giant gartersnake may stem from reductions in local population size and inbreeding, which can reduce population viability by mechanisms such as inbreeding depression and accumulation of deleterious mutations that can ultimately lead to loss of adaptive potential (Frankham et al. 2010, 2014). Small populations and low genetic diversity in snakes have been associated with chromosomal abnormalities and birth deformities resulting in reduced juvenile survival rates (e.g., Gautschi et al. 2002; Madsen et al. 1996; Újvári et al. 2002). However, it is unknown whether low levels of genetic variability will affect fitness in the

Table 3 Pairwise genetic differentiation estimates (F_{ST}) among populations (below diagonal) and p values (above diagonal)

	Colusa Basin		Butte Basin	Sutter Basin			American Basin				Yolo Basin		Delta Basin		San Joaquin Basin	
	Colusa NWR	North Yolo	Gray Lodge	Gilsizer Slough	Sutter East Bypass	Sutter West Bypass	American West	Natomas West	Natomas East	Natomas South	Conaway Ranch	Yolo Wildlife Area	Badger Creek	White Slough	Los Banos Creek	Volta Wildlife Area
Colusa NWR	–	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
North Yolo	**0.046**	–	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Gray Lodge	**0.086**	**0.047**	–	0.007	0.007	0.000	0.000	0.045	0.024	0.007	0.000	0.000	0.000	0.000	0.000	0.000
Gilsizer Slough	**0.079**	**0.051**	**0.019**	–	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sutter East Bypass	**0.094**	**0.040**	**0.026**	**0.025**	–	0.001	0.004	0.009	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sutter West Bypass	**0.060**	**0.045**	**0.032**	**0.016**	**0.026**	–	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000
American Basin	**0.089**	**0.042**	**0.032**	**0.047**	**0.022**	**0.045**	–	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Natomas West	**0.062**	**0.027**	0.013	**0.023**	0.018	**0.018**	**0.017**	–	0.693	0.030	0.000	0.000	0.000	0.000	0.000	0.000
Natomas East	**0.066**	**0.038**	0.016	**0.029**	**0.032**	**0.024**	**0.028**	0.000	–	0.056	0.000	0.000	0.000	0.000	0.000	0.000
Natomas South	**0.112**	**0.068**	**0.047**	**0.055**	**0.078**	**0.049**	**0.061**	0.024	0.019	–	0.000	0.000	0.000	0.004	0.000	0.000
Conaway Ranch	**0.136**	**0.112**	**0.062**	**0.074**	**0.082**	**0.069**	**0.071**	**0.077**	**0.075**	**0.072**	–	0.000	0.000	0.000	0.000	0.000
Yolo Wildlife Area	**0.149**	**0.120**	**0.094**	**0.091**	**0.104**	**0.071**	**0.104**	**0.094**	**0.096**	**0.109**	**0.054**	–	0.000	0.000	0.000	0.000
Badger Creek	**0.123**	**0.093**	**0.087**	**0.067**	**0.099**	**0.072**	**0.112**	**0.077**	**0.078**	**0.084**	**0.149**	**0.130**	–	0.000	0.000	0.000
White Slough	**0.140**	**0.116**	**0.057**	**0.058**	**0.085**	**0.060**	**0.095**	**0.053**	**0.045**	**0.044**	**0.116**	**0.107**	**0.063**	–	0.000	0.000
Los Banos Creek	**0.252**	**0.228**	**0.175**	**0.170**	**0.222**	**0.198**	**0.232**	**0.177**	**0.180**	**0.215**	**0.296**	**0.276**	**0.127**	**0.159**	–	0.000
Volta Wildlife Area	**0.255**	**0.225**	**0.179**	**0.199**	**0.214**	**0.222**	**0.224**	**0.194**	**0.197**	**0.210**	**0.287**	**0.297**	**0.182**	**0.187**	**0.125**	–

Statistical significance at $\alpha < 0.009$ after B–Y correction (Narum 2006) is indicated by *bold* face

Table 4 Pairwise genetic differentiation (F_{ST}) among regional drainage basins (below diagonal) and p values (above diagonal)

	Colusa Basin	Butte Basin	Sutter Basin	American Basin	Yolo Basin	Delta Basin	San Joaquin Basin
Colusa Basin	–	0.000	0.000	0.000	0.000	0.000	0.000
Butte Basin	**0.053**	–	0.009	0.075	0.000	0.000	0.000
Sutter Basin	**0.053**	**0.012**	–	0.000	0.000	0.000	0.000
American Basin	**0.047**	0.006	**0.019**	–	0.000	0.000	0.000
Yolo Basin	**0.111**	**0.055**	**0.059**	**0.065**	–	0.000	0.000
Sacramento Delta	**0.095**	**0.057**	**0.052**	**0.062**	**0.103**	–	0.000
San Joaquin Basin	**0.218**	**0.163**	**0.182**	**0.179**	**0.260**	**0.145**	–

Statistical significance at $\alpha < 0.0137$ after B–Y correction (Narum 2006) is indicated by *bold* face

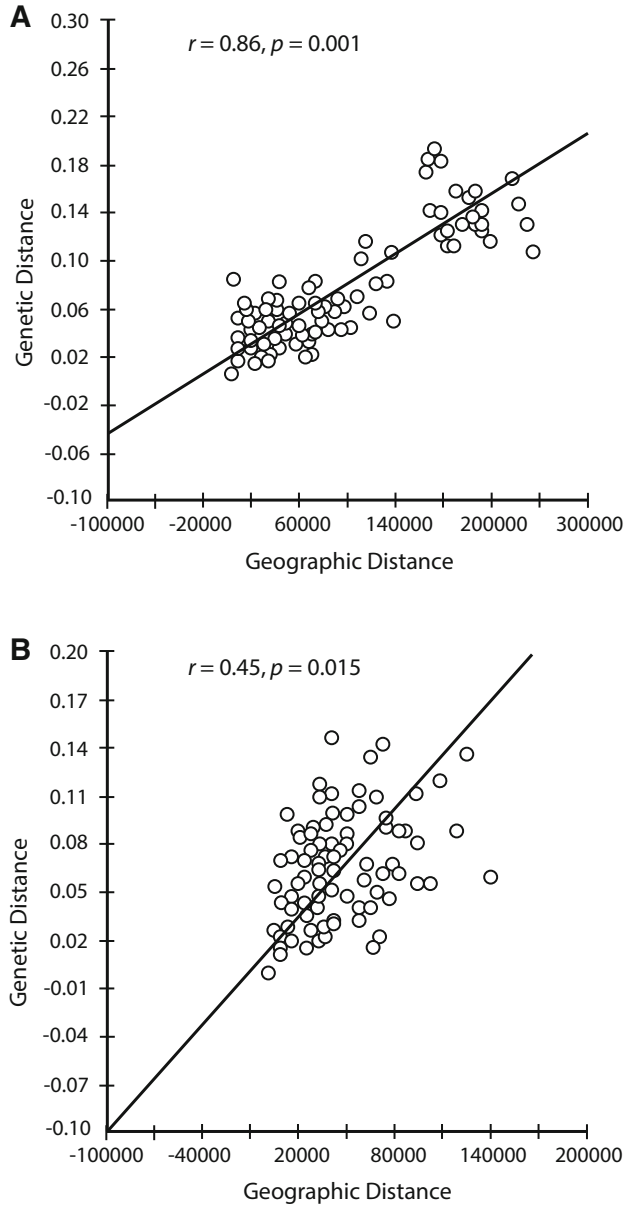

Fig. 3 Mantel tests for matrix correlation between genetic distance and geographic distance for: **a** all 16 populations and **b** after removing San Joaquin populations

giant gartersnake, but these patterns may warrant further investigation. Although detection of inbreeding was not widespread, we did observe significant inbreeding coefficients in Gilsizer Slough, Natomas West, Natomas East, Conaway Ranch, and Badger Creek populations.

Population structure and genetic differentiation

Across the Central Valley, evidence for five regional units are revealed by the microsatellite data: Colusa Basin, Yolo Basin, Delta Basin, San Joaquin Basin, and the Sacramento Valley. Genetic structure within the northern Sacramento Valley appears to be defined largely by the Sacramento River, where significant genetic differentiation (F_{ST}) estimates exist between Colusa Basin and populations immediately east of the river. Differentiation is weaker in the southern portion of the Sacramento Valley (vicinity of North Yolo), where admixture patterns from STRUCTURE analyses indicate genetic exchange in this area across the river. On the east side of the Sacramento River, no genetic subdivision among drainage basins is evident. Butte, Sutter, and American Basins are grouped into a single regional genetic unit in the STRUCTURE analyses and F_{ST} estimates among these basins are low or non-significant. Only pairwise comparisons between the most geographically separated sub-basins were significant (American West with Natomas East and South), indicating that geographic distance among the sub-basins may play a role in restricting gene flow, although fragmentation of habitat likely further inhibits successful migration and gene flow (Fahig 1997; Forman et al. 2003). We also found evidence of genetic subdivision within the central and southern basins, where Yolo, Delta, and San Joaquin Basins each form distinct genetic clusters. Paquin et al. (2006) report similar results for these basin populations using mtDNA. They showed that Badger Creek mtDNA haplotypes were genetically divergent from both northern and southern basins and that this pattern of mtDNA divergence was replicated for more southern populations in the San Joaquin Basin.

Table 5 Genetic bottlenecks in *Thamnophis gigas* populations estimated by heterozygote excess

Population	N	IAM	TPM									SMM
			30|16	30|8	30|4	60|16	60|8	60|4	80|16	80|8	80|4	
Colusa NWR	46	**0.004**	0.076	0.115	0.195	0.227	0.281	0.381	0.532	0.555	0.640	0.932
North Yolo	15	**0.009**	**0.028**	**0.042**	0.084	0.094	0.104	0.179	0.211	0.244	0.281	0.511
Gray Lodge	14	**0.004**	**0.047**	**0.047**	**0.047**	**0.047**	**0.047**	**0.047**	**0.047**	0.053	0.068	0.084
Gilsizer Slough	37	**0.000**	**0.001**	**0.002**	**0.021**	**0.024**	**0.037**	0.138	0.165	0.262	0.281	0.756
Sutter East of Bypass	15	**0.018**	**0.047**	0.054	0.115	0.115	0.115	0.151	0.165	0.179	0.195	0.339
Sutter West of Bypass	32	0.094	0.339	0.402	0.423	0.489	0.555	0.661	0.719	0.756	0.820	0.964
American West	35	**0.000**	**0.000**	**0.001**	**0.002**	**0.005**	**0.011**	**0.015**	**0.024**	**0.032**	0.068	0.360
Natomas West	30	**0.021**	0.195	0.359	0.555	0.511	0.661	0.789	0.820	0.862	0.906	0.991
Natomas East	30	**0.000**	**0.005**	**0.018**	**0.024**	**0.024**	0.054	0.084	0.138	0.195	0.262	0.773
Natomas South	8	n/a		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Conaway Ranch	34	**0.032**	0.126	0.195	0.281	0.402	0.555	0.640	0.681	0.700	0.789	0.958
Yolo Wildlife Area	41	0.115	0.281	0.381	0.489	0.489	0.619	0.700	0.773	0.820	0.874	0.976
Badger Creek	45	**0.000**	**0.005**	**0.009**	**0.018**	**0.032**	0.076	0.104	0.195	0.359	0.402	0.940
White Slough	20	**0.021**	0.054	0.094	0.138	0.195	0.227	0.319	0.340	0.402	0.467	0.773
Los Banos Creek	10	0.271	0.393	0.446	0.473	0.473	0.527	0.527	0.554	0.601	0.632	0.830
Volta Wildlife Area	47	**0.000**	**0.001**	**0.002**	**0.003**	**0.007**	**0.012**	**0.015**	**0.021**	**0.034**	0.067	0.335

Bold values indicate statistical significance of heterzygote excess ($\alpha < 0.05$; one tailed), n, sample size; *IAM* infinite alleles mutation model; *TPM* the two-phase mutation model assessed at various proportions (p_g) and mean sizes (δ_g) of multistep mutations ($p_g|\delta_g$,); *SMM* the step-wise mutation models

Table 6 Effective size estimates and 95 % confidence intervals for populations and clusters

Population	ONeSAMP N_e	Clusters	ONeSAMP N_e
Colusa NWR	44.6 (33.1–115.1)	Colusa Basin	203.3 (94.8–683.4)
North Yolo	21.1 (17.0–44.2)		
Gray Lodge	13.3 (11.1–20.0)	Sacramento Valley	515.3 (258.9–2061.6)
Gilsizer Slough	32.8 (22.7–73.2)		
Sutter East of Bypass	23.4 (18.0–36.6)		
Sutter West of Bypass	33.6 (26.9–59.5)		
American West	54 (42.7–125.5)		
Natomas West	63.7 (39.8–174.6)		
Natomas East	39.7 (29.4–88.8)		
Natomas South	–	–	–
Conaway Ranch	55.1 (40.9–120.3)	Yolo Basin	571.0 (279.3–3496.6)
Yolo Wildlife Area	44.6 (30.8–109.6)		
Badger Creek	82 (54.0–260.6)	Delta Basin	636.2 (285.1–3846.9)
White Slough	41.1 (30.7–107.5)		
Los Banos Creek	14.6 (10.6–32.0)	San Joaquin Basin	56.9 (39.4–199.0)
Volta Wildlife Area	18.9 (15.1–33.3)		

Natomas South had too few individuals sampled (n = 8) to yield reliable estimates

Despite the geographic and genetic isolation evident for populations within the Yolo and Delta genetic units, admixture patterns revealed in the STRUCTURE analyses indicate populations have experienced some past genetic exchange with more northern drainage basins. Within the Delta Basin, White Slough is the only population to exhibit admixed genotypes from the northern Sacramento Valley, Badger Creek, and lower San Joaquin Basin, suggesting that White Slough may have been established during periodic flood events in the past. Similarly, admixtures at

North Yolo and Conaway Ranch sites might also indicate the establishment of populations from multiple sources during flood events. Prior to water diversion, the Central Valley frequently flooded during winter and spring, and on rare occasions floodwaters inundated the entire valley from the foothills of the Coast Ranges to the foothills of the Sierra Nevada (Garone 2007). The confluence of several major river systems at the southern end of the Sacramento Valley likely led to increased frequency and severity of flooding there than farther north in the Sacramento Valley. These historical flood events could have transported individuals across the Sacramento River, resulting in the observed admixtures at North Yolo and Conaway Ranch sites. The admixture observed at Los Banos Creek is more enigmatic, and not readily explained by hydrologic events. Although flooding is a parsimonious hypothesis, we cannot rule out other mechanisms, including human movement of individuals.

Our results show that northern drainage basins have higher connectivity than among central and southern basins. Although moderate levels of genetic differentiation exist among the drainage basins (global $F_{ST} = 0.108$), highest pairwise F_{ST} estimates are recovered among populations that are geographically isolated, especially the southern populations within Yolo, Delta, and San Joaquin Basins (Tables 3, 4). In contrast, genetic differentiation among northern drainage basins east of the Sacramento River is relatively low suggesting greater connectivity between drainages along the Sacramento Valley. These patterns are consistent with expectations based upon both historic and current habitat conditions. Prior to water diversion and agricultural activity, marsh habitat east of the Sacramento River was likely contiguous from the Butte Basin in the north to the Sutter Basin, southward across the downstream reaches of the Feather River and the southern portion of the American Basin (Kuchler 1977). Current land use in the Sacramento Valley region is dominated by rice agriculture, which with its supporting infrastructure of canals, has likely maintained enough habitat connectivity to enable historical levels of gene flow among these basins despite otherwise limited dispersal. While allele frequency differences between drainage basins and populations could result through the population bottleneck events we detected throughout the Central Valley, isolation-by-distance is likely a stronger driver of population structure for the giant gartersnake (Leblois et al. 2006). Our inference of stepping-stone gene flow is consistent with expectations for a species largely distributed along a north–south axis where populations that are close to each other are likely to be more connected, and therefore more genetically similar, than populations that are farther apart (Guillot et al. 2009).

Conservation implications

Populations across the Central Valley have been affected by diversion of water (i.e., dams, levees, and irrigation systems) and the expansion of agriculture for over a century, which has resulted in the loss of over 93 % of historic wetlands in the Central Valley (Frayer et al. 1989; USDOI 1994; USFWS 2006). Our microsatellite data indicate that reductions in effective population size (i.e., genetic bottlenecks) have occurred in about half the populations we sampled throughout the Central Valley. Trapping efforts and field surveys have detected relatively low numbers of individuals in San Joaquin Valley populations relative to more northern Sacramento Valley populations (Hansen 2008, 1988; Sousa and Sloan 2007; Wylie and Amarello 2008), and our estimates of genetic diversity and effective size are consistent with these field data. However, we also found genetic evidence of bottlenecks and relatively small N_e estimates for several northern populations (Tables 5 and 6), indicating that giant gartersnake declines are not limited to the San Joaquin Valley. Although rice cultivation within the Sacramento Valley provides beneficial wetland habitat for giant gartersnakes, flooding of rice fields only occurs during a limited portion of the year (June through August). Therefore, perennial wetland habitat is primarily restricted within irrigation canals or marshes in close proximity to these canals, and may not be sufficient to curb local population declines.

Of five genetic clusters identified in our population structure analyses, only the Sacramento Valley cluster has multiple populations with point estimates of $N_e > 50$ individuals, and enough remaining habitat to potentially support several additional populations (Halstead et al. 2010; Wylie et al. 2010). The San Joaquin Basin cluster, in particular, has only two known extant populations, and both of these have relatively low effective population size estimates, with upper confidence limits of $N_e < 33$. The remaining three clusters (Colusa, Yolo, and Delta Basins) are represented by only a few populations, and with the exception of the Colusa Basin, there is little additional habitat surrounding these sampled populations. Given accounts of historic abundance and what is known about the available habitat at all of our sampling locations, the low N_e values we recovered for the giant gartersnake may be further evidence of declining populations. Although measures of effective population size require careful interpretation, the measure is valuable as a relative comparison despite possible inaccuracies due to sampling close relatives or overlapping generations (as our sampling almost certainly included). Therefore, our estimates may be best viewed as a range of possible values and we place

emphasis on the upper CI for each population estimate. If the effective population sizes of giant gartersnake populations throughout the Central Valley are as low as our analyses suggest, then they may be too small to avoid considerable inbreeding depression in the long term. According to theoretical and empirical evidence, a minimum N_e of 100 individuals is necessary to avoid the negative genetic effects of inbreeding over 5 generations (Frankham et al. 2014; Jamieson and Allendorf 2012). Most of the populations sampled here do not meet these thresholds, having upper N_e estimates below 100, suggesting that the fitness of many populations throughout the Central Valley may be vulnerable. Although our basin-wide N_e estimates reveal higher effective sizes, both Colusa and San Joaquin Basins, which occur at the northern and southern range limits, have N_e estimates well below the minimum threshold of $N_e \geq 1000$ that is recommended for long-term viability and persistence in the face of environmental change (Frankham et al. 2014; Jamieson and Allendorf 2012; Traill et al. 2010). Ensuring the continued existence of the southern-most clusters (Yolo, Delta, and San Joaquin Basin populations) may be critical for maintaining overall genetic diversity within the species. This is especially important considering that populations in the southernmost portion of the Central Valley (Tulare Basin: Buena Vista Lake, Kern Lake, and Tulare Lake) have already been extirpated (Hansen 1988; Hansen and Brode 1980). The Tulare Basin, which extends from the southern portion of the San Joaquin River southward to the Kings River, was connected to the San Joaquin Basin only during rare hydrological events when Tulare Lake (now dry) reached flood stage (Garone 2007). Therefore, if the genetic structure of the now extinct Tulare Basin populations was similar to the divergence patterns we recovered among the other basins in the Central Valley, then it is likely that at least one (Tulare Basin) to as many as three distinct genetic clusters (Buena Vista Lake, Kern Lake, and Tulare Lake populations) have already been lost.

Sustaining populations as distinctive gene pools within Yolo, Delta and San Joaquin Basins, particularly those represented by few individuals, could prove to be a daunting task. Pursuing management actions to ameliorate continued loss of genetic connectivity between existing populations within each cluster may help to decrease their extinction risk. Even with quality wetland habitat surrounding individual populations within a basin, corridors connecting these wetlands are integral to maintain gene flow. Small effective population sizes and geographic isolation leave these populations susceptible to stochastic events (e.g., disease, prolonged drought) and the deleterious consequences of genetic drift, which along with other ecological disturbances (e.g. habitat degradation, invasive species) can interact to drive a small population to extinction (Brook et al. 2008; Gilpin and Soulé 1986). Therefore, management strategies focused on maintaining and enhancing existing wetland habitat and canals for continued migration within basin populations may be critical for these otherwise isolated populations. Furthermore, perennial habitat restoration efforts within each of these basins could potentially improve conditions for giant gartersnakes, and boost regional population sizes. However, it may be that too few individuals currently remain in some basins to consider them as sources for translocation to newly restored wetlands and given their genetic distinctiveness, the translocation of individuals from other basins might be contraindicated (Gautschi et al. 2002; Madsen et al. 1996; Újvári et al. 2002). Should it be deemed necessary to augment populations to achieve long-term persistence, augmenting from the most geographically proximate populations would be consistent with the measured patterns of genetic structure.

Maintaining genetic connectivity would be recommended within the Colusa Basin and in the Sacramento Valley east of the Sacramento River (Butte, Sutter, and American basins) and is consistent with earlier recommendations by Paquin et al. (2006). Managing the landscape to maintain a network of canals that contain water and emergent vegetation during the giant gartersnake's active season may be a cost-effective means of supporting genetic connectivity among populations, but more research is needed on this topic. Additional construction of marshes that approximate historic habitat conditions might promote abundant populations (Wylie et al. 2010) that provide sources of dispersing individuals. The genetically distinctive Yolo Basin cluster may also benefit from increased landscape management. Continued habitat conversion encroaching from the west, as a result of the ongoing expansion of Dixon, Woodland, and Davis communities, may further isolate and reduce these unique populations. Management practices aimed at increasing, then maintaining, large effective population sizes and facilitating dispersal within all these clusters would likely benefit *T. gigas*. Finally, results suggest that a periodic genetic sampling program (e.g., every 2–5 generations) would provide useful information for the management of giant gartersnakes. This would facilitate monitoring efforts to quantify genetic changes resulting from threats and compensatory management actions within each of the drainage basins, and allow for the assessment of management efforts within an adaptive framework.

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Supplemental Material for:

Defining population structure and genetic signatures of decline in the giant gartersnake (*Thamnophis gigas*): Implications for conserving threatened species within highly altered landscapes

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Appendix 1. Hardy-Weinberg equilibrium results (population-level test). Statistical significance at $\alpha < 0.0147$ after B-Y correction is indicated by bold face.

Locus	Colusa NWR	Yolo	Gray Lodge	Gilsizer Slough	Sutter East	Sutter West	American Basin West	Natomas West
TRI_58P	0.438	0.051	0.323	0.247	0.281	0.962	0.363	0.484
DI_907	0.732	0.197	0.051	0.729	0.578	0.598	1.000	0.053
TRI_TSC	0.076	0.264	0.062	**0.001**	0.760	0.140	0.130	0.320
DI_2229	0.357	0.063	0.027	0.190	0.304	0.910	0.520	0.141
TRI_TOA	0.911	0.155	0.297	0.686	0.199	1.000	0.679	0.145
TRI_ISV	0.239	0.232	0.488	0.389	0.102	0.217	0.830	0.018
PEN_5ZB	0.961	0.605	0.515	0.978	0.702	0.273	0.378	0.118
TET969	0.944	0.434	0.448	0.491	1.000	1.000	0.940	0.021
PEN1170	0.016	1.000	0.035	**0.000**	0.034	0.162	**0.000**	**0.000**
TRI_ONY	0.136	0.028	0.279	0.392	0.598	0.317	0.642	0.078
TRI_AOC	0.925	0.070	0.101	0.752	0.710	0.952	0.505	0.061
TET_790	0.357	0.288	0.310	0.266	0.043	0.366	1.000	0.933
TET_567	**0.001**	0.088	0.076	0.017	0.269	**0.010**	**0.001**	**0.001**
PEN_61U	0.219	0.357	0.024	0.094	0.113	0.033	0.798	0.455
TRI_3VL	0.203	0.229	0.320	0.471	0.665	0.705	0.457	0.157

Locus	Natomas East	Natomas South	Conaway Ranch	Yolo Wildlife Area	Badger Creek	White Slough	Los Banos	Volta Wild Life Area
TRI_58P	0.913	0.261	0.983	0.294	0.567	0.273	1.000	0.470
DI_907	0.091	no info	1.000	1.000	0.426	0.032	1.000	0.458
TRI_TSC	0.208	1.000	0.221	**0.000**	0.053	0.249	1.000	0.424
DI_2229	0.750	1.000	0.099	0.086	0.941	0.584	0.811	0.615
TRI_TOA	0.411	0.198	0.522	0.471	0.547	1.000	1.000	0.028
TRI_ISV	0.600	1.000	1.000	1.000	0.066	1.000	no info	0.199
PEN_5ZB	0.206	0.582	0.227	0.793	0.278	0.625	1.000	0.543
TET969	0.742	0.554	0.621	**0.003**	0.389	0.766	0.736	0.369
PEN1170	**0.003**	no info	no info	0.027	**0.000**	0.247	0.018	**0.000**
TRI_ONY	1.000	1.000	0.392	0.282	0.340	0.167	no info	0.849
TRI_AOC	0.747	0.560	0.125	0.027	0.341	0.298	0.794	0.045
TET_790	0.646	0.435	0.894	0.043	0.860	0.124	0.776	0.090
TET_567	**0.000**	0.027	0.056	0.022	**0.000**	0.441	**0.002**	**0.000**
PEN_61U	0.019	0.022	0.594	0.548	0.838	0.396	1.000	0.454
TRI_3VL	0.076	0.483	0.490	0.770	0.666	1.000	no info	no info

Appendix 2. Hardy-Weinberg equilibrium results (global tests) with p-values and standard errors (S.E.).

Population (multi-locus)			Locus (multi-populations)		
Population	p- value	S.E.	Locus	p- value	S.E.
Colusa NWR	0.969	0.003	TRI_58P	0.905	0.007
North Yolo	0.996	0.001	DI_907	0.968	0.002
Gray lodge	0.926	0.005	TRI_TSC	1.000	0.000
Gilsizer Slough	1.000	0.000	DI_2229	0.743	0.012
Sutter East of Bypass	0.953	0.003	TRI_TOA	0.026	0.002
Sutter West of Bypass	0.982	0.002	TRI_ISV	0.846	0.004
American West	0.654	0.009	PEN_5ZB	0.406	0.011
Natomas West	1.000	0.000	TET969	0.708	0.009
Natomas East	1.000	0.000	PEN1170	1.000	0.000
Natomas South	0.916	0.003	TRI_ONY	0.981	0.001
Conaway Ranch	0.972	0.003	TRI_AOC	0.189	0.010
Yolo Wildlife Area	1.000	0.000	TET_790	0.892	0.008
Badger Creek	1.000	0.000	TET_567	1.000	0.000
White Slough	0.947	0.003	PEN_61U	0.996	0.001
Los Banos Creek	0.879	0.005	TRI_3VL	0.747	0.005
Volta Wildlife Area	0.973	0.002	–	–	–

Appendix 3. Pairwise genetic differentiation estimates (F_{ST}) among populations using 12 loci (TRI_AOC, DI_2229, and PEN_61U were removed from the dataset) below the diagonal, and *p*-values above the diagonal. Statistical significance at $\alpha < 0.009$ after B-Y method correction is indicated by bold face.

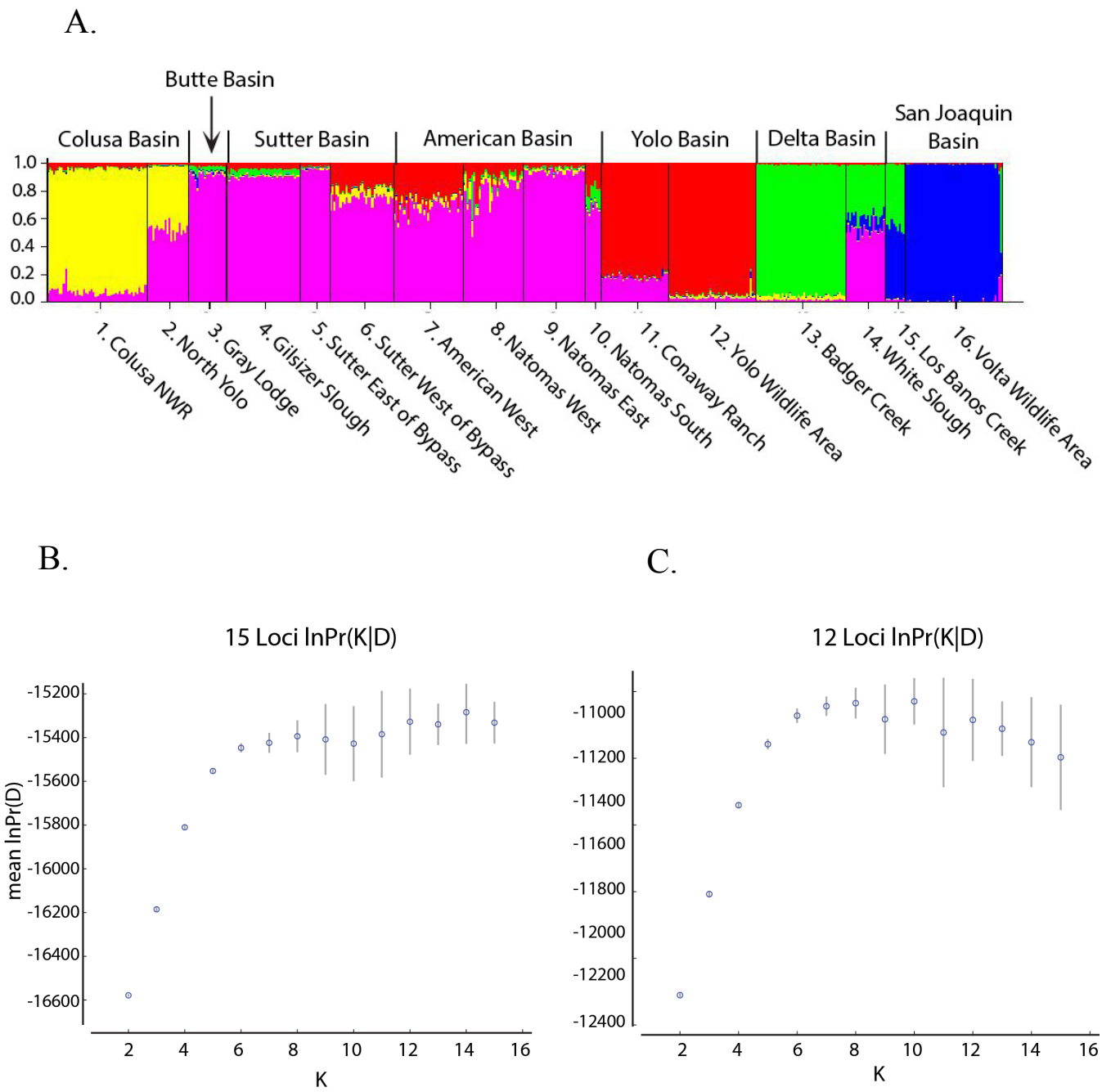
	Colusa Basin		Butte Basin	Sutter Basin			American Basin				Yolo Basin		Delta Basin		San Joaquin Basin	
	Colusa NWR	North Yolo	Gray Lodge	Gilsizer Slough	Sutter East Bypass	Sutter West Bypass	American West	Natomas West	Natomas East	Natomas South	Conaway Ranch	Yolo Wildlife Area	Badger Creek	White Slough	Los Banos Creek	Volta Wildlife Area
Colusa NWR	--	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
North Yolo	**0.042**	--	0.001	0.000	0.002	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Gray Lodge	**0.079**	**0.039**	--	0.027	0.017	0.004	0.006	0.372	0.067	0.021	0.000	0.000	0.000	0.000	0.000	0.000
Gilsizer Slough	**0.089**	**0.046**	0.013	--	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sutter East Bypass	**0.091**	**0.042**	0.022	0.021	--	0.008	0.005	0.049	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sutter West Bypass	**0.063**	**0.040**	**0.020**	**0.019**	**0.021**	--	0.000	0.020	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000
American Basin	**0.085**	**0.040**	**0.019**	**0.047**	**0.026**	**0.041**	--	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Natomas West	**0.058**	**0.026**	0.001	**0.021**	0.014	0.011	**0.016**	--	0.646	0.059	0.000	0.000	0.000	0.000	0.000	0.000
Natomas East	**0.061**	**0.038**	0.011	**0.029**	**0.040**	**0.022**	**0.033**	0.000	--	0.183	0.000	0.000	0.000	0.000	0.000	0.000
Natomas South	**0.123**	**0.080**	0.032	**0.066**	**0.094**	**0.056**	**0.070**	0.021	0.011	--	0.000	0.000	0.000	0.011	0.000	0.000
Conaway Ranch	**0.152**	**0.131**	**0.063**	**0.085**	**0.103**	**0.083**	**0.083**	**0.087**	**0.087**	**0.098**	--	0.000	0.000	0.000	0.000	0.000
Yolo Wildlife Area	**0.132**	**0.118**	**0.068**	**0.070**	**0.099**	**0.057**	**0.084**	**0.080**	**0.082**	**0.097**	**0.034**	--	0.000	0.000	0.000	0.000
Badger Creek	**0.131**	**0.096**	**0.082**	**0.060**	**0.096**	**0.076**	**0.101**	**0.064**	**0.068**	**0.078**	**0.166**	**0.121**	--	0.000	0.000	0.000
White Slough	**0.152**	**0.135**	**0.064**	**0.069**	**0.108**	**0.077**	**0.110**	**0.057**	**0.050**	0.047	**0.145**	**0.105**	**0.061**	--	0.000	0.000
Los Banos Creek	**0.268**	**0.242**	**0.202**	**0.189**	**0.256**	**0.224**	**0.250**	**0.192**	**0.202**	**0.228**	**0.332**	**0.278**	**0.123**	**0.185**	--	0.000
Volta Wildlife Area	**0.262**	**0.228**	**0.188**	**0.204**	**0.230**	**0.231**	**0.225**	**0.185**	**0.196**	**0.205**	**0.308**	**0.280**	**0.191**	**0.191**	**0.110**	--

Appendix 4. Pairwise genetic differentiation (F_{ST}) among regional drainage basins (below diagonal) using 12 loci (TRI_AOC, DI_2229, and PEN_61U were removed from the dataset) and *p*-values (above diagonal). Statistical significance at $\alpha < 0.0137$ after B-Y correction (Narum, 2006) is indicated by bold face.

	Colusa Basin	Butte Basin	Sutter Basin	American Basin	Yolo Basin	Delta Basin	San Joaquin Basin
Colusa Basin	–	0.000	0.000	0.000	0.000	0.000	0.000
Butte Basin	**0.053**	–	0.009	0.080	0.000	0.000	0.000
Sutter Basin	**0.050**	**0.012**	–	0.000	0.000	0.000	0.000
American Basin	**0.047**	0.006	**0.019**	–	0.000	0.000	0.000
Yolo Basin	**0.111**	**0.055**	**0.059**	**0.065**	–	0.000	0.000
Sacramento Delta	**0.095**	**0.057**	**0.052**	**0.062**	**0.103**	–	0.000
San Joaquin Basin	**0.220**	**0.166**	**0.181**	**0.181**	**0.263**	**0.148**	–

Appendix 5. Analysis of molecular variance (AMOVA) with 12 loci (TRI_AOC, DI_2229, and PEN_61U were removed from the dataset).

Source of genetic variation	Percent Variance	P-value
Among Drainage basins	9%	0.000
Among populations with basins	3%	0.000
Among individuals within populations	7%	0.000
Within individuals	81%	0.000



Appendix 6. Genetic structure of populations on the basis of 12 loci and a correlated allele frequencies model. **A**. Each individual sampled is represented by a single column with group membership probabilities for each cluster (*K*) indicated as the relative proportion of each color. **B**. Maximum number of clusters to which individuals could be assigned on the basis of 15 loci where the LnP(*K*|D) plateaus. **C**. Maximum number of clusters to which individuals could be assigned on the basis of 12 loci where the LnP(*K*|D) plateaus. In B and C, data points are the means and standard deviations for 10 MCMC simulations at each *K* (range = 1 - 16).

350 sacramento

October 28, 2024

Julie Newton, Environmental Coordinator
Planning and Environmental Review
Sacramento County
827 7th Street
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Via Email Only: CEQA@saccounty.gov.

Dear Ms. Newton:

UPPER WEST SIDE PROJECT, DRAFT SEIR

We appreciate the opportunity to comment on the County's August 2024 draft Specific Plan and Supplemental Environmental Impact Report (SEIR) for the subject project. Because of the length and complexity of the SEIR, our review is at this time necessarily incomplete, but we have tried to provide feedback on key aspects of the documents.

We include the following outline to facilitate review.

CONTENTS

SECTION I. GENERAL COMMENTS

A. THE CLIMATE CRISIS

350 Sacramento's primary focus is local action to accelerate the transition to climate stability, and we are concerned that the UWSP would make reaching that goal more difficult Temperatures on our planet are now higher than at aimesime since before the last ice age, at least 125,000 years ago and potentially going back at least 1 million years.

To provide further context for these comments, please see Attachment 1, Current Effects of the Climate Crises.

B. THE IMPORTANCE OF LOCAL ACTION

Local Action is critical to effectively address climate change. The two largest sources of greenhouse gas (GHG) emissions are on-road passenger vehicles and building energy, both of which are best and most directly managed through the well-established land-use authorities of local governments. For a Summary of federal, State, Regional, and County guidance. See Attachment 2 for further substantiation.

17-1

C. SACRAMENTO COUNTY'S IMPLEMENTATION HISTORY

Sacramento County has failed consistently to implement adopted climate mitigation measures, including promises made when adopting its:

- 2011 General Plan Update (GPU), re adopting measures into the General Plan;
- 2011 GPU, re adopting a CAP and implementing other climate measures;
- 2011 Phase 1 CAP, "*Strategy and Framework Document*";

Contents

- 2012 County Operations Plan; and
- 2020 Climate Emergency Declaration.

See Attachment 4, County Climate Commitment Failures for further substantiation.

17-1 cont.

II. EFFECTS NOT PREVIOUSLY EXAMINED

PRC § 21094 stipulates that a lead agency may tier from a prior EIR if, *"the lead agency determines"* that the prior EIR mitigated or avoided impacts, or examined the impacts in enough detail to allow imposition of effective site-specific conditions on the later project. Such lead agency determination must consider any significant new information or changes in circumstance relevant to the effectiveness of the prior mitigation and/or examination (PRC § 21088; see also CEQA Guidelines § § 15063(b)(1)(C), (c)(3)(D), 15152). The UWSP presents circumstances and environmental effects not earlier known, examined, or mitigated, as discussed below.

The SEIR must therefore examine and propose mitigation for such previously unconsidered and unmitigated effects, and recirculate that new material for public review.

Specifically, Sacramento County's GPU FEIR did not:

- Substantiate the effectiveness of the County's "*new growth management policies"*
- Examine environmental impacts associated with the County's excess development approvals.

A. THE COUNTY'S GPU FEIR DID NOT EXAMINE OR SUBSTANTIATE THE GPU'S "NEW GROWTH" POLICIES

1. The County's GPU FEIR Included an Alternative 3: "Mixed Use".

The County's April 2010 FEIR considered three project alternatives. Per the certified FEIR, "Alternative 3, Mixed Use":

"…is highly consistent with smart growth principles. [It] directs all development toward the urban core, which will increase densities and support alternative transportation (principle 1); …directs most growth into areas that are already built up, resulting in more compact growth (principle 3); …directs all growth toward existing urban areas (principle 5); and avoids any development within the large open space, farmland, and critical environmental areas of the county (principle 7)…does not identify large new growth areas, and relies on revitalizing existing urbanized areas and infill development".[1,2]

2. The County Adopted a "*Modified Mixed Use Alternative"*

During the 18 months between the FEIR's April 2010 publication, and the County's November 2011 adoption/certification of the GPU/FEIR, the County developed and did adopt what it called, *"a modified version of the Mixed Use Alternative described in the FEIR"*. The "modified version" varied from the one analyzed in the FEIR by,[3]

17-2

[1] Sacramento County, GPU FEIR, Summary of CEQA Alternatives, p. 18-3.

[2] Ibid, p. 18-7

[3] Sacramento County. General Plan Update, Findings of Fact and Statement of Overriding Considerations, pp. 1-2. November 2011.

Contents

a. Deleting policies requiring new housing densification.
b. Reducing the amount of growth assumed within the County's Urban Policy Area growth boundary.[4]
c. Adding "*new growth management policies*" specifying criteria to be met by new development. The new policies (LU-119 and LU-120) authorize the County to expand the County's adopted UPA growth boundary to accommodate "new growth areas" on a project-specific basis (Section VI.D.1 of these comments review**s** the role and importance of the County's growth boundaries).

3. Effect of the County's "Modification"

As detailed in Section III of these comments, the effect of the County's "modifications" to FEIR Alternative 3 has been to invite, approve, and continue to plan multiple large-scale development projects outside the UPA, of which the UWSP is one. Such projects are directly contrary to the intention of the FEIR's Alternative 3 as quoted in section A.1 above, because they:

a. Are outside, "*the urban core"*
b. Are not in areas, "*already built up*" or "*existing urban"*
c. Do not "avoid *any development within the large open space, farmland, and critical environmental areas of the county*".
d. Do, *"identify large new growth areas".*
e. Do not, *"rel[y] on revitalizing existing urbanized areas and infill development".*

17-2 cont.

The County's 2011 CEQA Findings assert that the decision to modify Alternative 3, and adopt the "*new growth management policies"*,

> *"…is supported by the environmental analysis provided in the FEIR, because the approved Project falls within the range of physical impacts which were addressed by the EIR"*.[5]

However, the County provided no substantiation for that assertion.

The County supported its "modification" of Alternative 3 by citing an apparently inapposite legal precedent, Laguna Beach,[6] quoting from the decision: *"It is not unreasonable to conclude that an alternative not discussed in an EIR could be intelligently considered by studying the adequate descriptions of the plans that are discussed".*

However, we question whether adoption of measures not at all considered in the FEIR's analysis; the efficacy of which cannot be deduced from the FEIR's findings; and which in fact conflicts with the FEIR's conclusions, properly falls within the decision-space of Laguna Beach.

[4] The Urban Policy Area (UPA) defines the area expected to receive urban infrastructure and services within the planning period.

[5] GPU FEIR Findings, p. 2.

[6] Village Laguna of Laguna Beach, Inc. v. Orange County Board of Supervisors (1982) 134 Cal.App.3d 1022, 1028-1029 (Laguna Beach)

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5. The County Failed to Examine Potential Impacts of the "*New Growth Management Policies*"

The GPU FEIR did not examine the "*new growth management policies"*, LU-119 and LU-120, which were not proposed until after the FEIR was published. On the contrary, the FEIR found that development outside the UPA would cause significant impacts, mitigable only by phasing development outward from the urban core.

Attachment 3, Sacramento County's Sprawl Mitigation Is Unsupported reviews the FEIR's analysis.

In adopting the "*modified Mixed use alternative"*, and "*New Growth Management Policies*" LU-119 and LU-120, the County included some of the FEIR's Alternative 3 "smart growth" principles, but discarded its central focus: directing growth to densification of the existing urban area. The County assumed, but did not substantiate, that those principles would suffice to mitigate the environmental impacts of the "*new growth management policies"*.

In fact, the County's "*new growth management policies"* present a development strategy not contemplated in the FEIR's examination of Alternative 3, and substantially diverging from it. The GPU FEIR neither examined the potential project-specific and cumulative impacts of Policies LU-119 and LU-120 nor substantiated their claimed mitigation efficacy. To the contrary, as detailed in Attachment 3 the FEIR determined that project-specific expansion of the UPA would result in significant impacts.

The UWSP SEIR references and relies on these policies. Their impacts and mitigation, because never before examined, must be evaluated in the current SEIR.

17-2 cont.

B. THE GPU FEIR DID NOT EXAMINE OR MITIGATE EFFECTS OF THE COUNTY'S EXCESS ENTITLEMENTS

Section II.A above documents the County's 2011 claim of *"modified…mixed use"* as the panacea curing the ills of far-flung, disjunct (aka "sprawl" or "leapfrog") development; and with Attachment 3 demonstrates that the claim is not substantiated by the GPU FEIR.

Here, we additionally assert that the claimed merits of such, "*modified…mixed use"* could not in any case be realized in Sacramento County, because:

- The County has approved, and has in planning, multiple developments with capacity far surpassing housing market demand, and
- Such excess entitlements preclude realizing the mixed-use development the County claims as mitigation.

We substantiate this assertion below.

17-3

1. The County's Approvals Far Exceed Housing Market Demand

The County's long history of permissively approving developments far in excess of foreseeable market demand was formalized and accelerated with the 2011 adoption of "*new growth management policies*". In the County's telling:

> *"When adopted in 2011, the General Plan added policies to the Land Use Element to allow applicants to request an expansion of the UPA anywhere within the USB regardless of demand or existing capacity. The County's intent was to let the market determine the need and location for new growth so long as it could meet the "Smart Growth Criteria" of policies LU-119 and LU-120".*[7]

As a result, the County has approved construction of far more housing than the market requires, and is actively preparing to approve more. As the County reports:

> *"These three master plans [planned outside the UPA and including the UWSP] propose 49,732 additional units. If all of these new master plans are approved, and combined with the potential for infill and the already approved growth areas, the County will have approved growth far exceeding the growth that is projected over the next 20 years. This is apparent given the fact that the County only permitted a total of 5,194 units during the nine years of the last RHNA cycle (2013-2021)".*[8]

17-3 cont.

> *"In fact, at the most recent rate of permit activity in the unincorporated County from 2020 (which is higher than any of the preceding years in the APR) … this existing [infill and approved planned projects] and potential capacity of over 109,000 units would represent over 140 years of potential capacity".*[9]

2. Excess Entitlements Preclude Mixed-Use Development as Claimed Mitigation

The County's historic approval of multiple competing projects, which in their aggregate capacity far exceed market demand, means it is impossible that the competing projects will build-out as quickly or completely as envisioned. In "mixed use" projects, investment in commercial development occurs only after residential growth has built-out enough to support commercial activity.[10] As a direct and foreseeable result of delayed and incomplete build-out, commercial development and the claimed environmental benefits of "mixed use" development (e.g., reduced vehicle miles traveled (VMT) and GHG emissions) will be delayed indefinitely and perhaps permanently, resulting in unmitigated impacts.

3. Effects of Excess Entitlements on "*New Growth Management*" Policies

As noted above, the County's "modified Alternative 3" growth management strategy, allowing consideration of UWSP and other development outside the UPA, is effectuated by new GPU Policies LU-119 and LU-120. LU-120 presents five "criteria based" (CB)

7 Sacramento County. 2030 General Plan 2022 Annual Report, p. 2). March 28, 2023.

8 Ibid.

9 Sacramento County. 2030 General Plan 2020 Annual Report, p. 15). March 24, 2021.

10 *"Typically, commercial development lags behind residential development because retail and service commercial uses are dependent on a critical mass of resident population for support, ⋯retail and service commercial uses envisioned within the heart of the Town Center will develop once enough rooftops are in place to support these uses…"* (UWSP Specific Plan, p. 8-6).

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standards intended to demonstrate compliance with "smart growth" principles. However, the efficacy of all six is sensitive to the effects of delayed, incomplete build-out:

a. CB-1. *Minimum net density*. Partial build-out means that planned densities will not be achieved

b. CB-2. *Proximity of residential units to amenities.* Incomplete build-out means that commercial, "mixed use" amenities, which would rely on an assumed customer base, will not be built.

c. CB-3. *Mixed use.* As with the previous criterion, investment in commercial "mixed use" is based on expectation of a customer base at full build-out, absent which commercial enterprise will not occur.

d. CB-4. *Transit.* Transit service is dependent on ridership density, absent which planned transit will not materialize.[11]

e. CB-5. *Proximity to employment*. Mixed use development of a planned size and density is expected to generate a certain amount of on-site employment, with resulting VMT-reduction. Incomplete and delayed build-out means this expectation will not be met.

4. Effects of Excess Entitlements on UWSP Have Not Been Previously Reviewed

17-3 cont.

a. The SEIR's mitigation for VMT assumes, and relies on, complete build-out supporting "mixed use" development and its claimed mitigation benefits.[12,] The reality that excess entitlements will constrain such build-out is not examined in either the GPU FEIR or this draft UWSP SEIR.

b. The UWSP assumes a 20-year build-out.[13] Build-out period is important, because the mitigation claimed through mixed-use development will only occur, and is only modeled for SEIR analysis, at full build-out. During the build-out period, community population will not support either the planned commercial development or the transit service claimed as VMT mitigation. The longer buildout is delayed, the longer GHG emissions from partial development will be inadequately mitigated. Based on the data presented in Section III of these comments, such build-out is likely to take several generations.

c. The assumed 20-year build-out rate is not substantiated, and is inconsistent with the County's historical housing growth rate; SACOG's growth projections for the County; and the fact of long-delayed build-out for numerous already-approved projects, as documented in Section III of these comments.

The SEIR must therefore substantiate the assumed buildout period; and model and mitigate GHG and AQ emissions, and any related impacts during the protracted build-out period.

11 "It is the County's intent for the Plan area to be served by public transit at such time that it is warranted by demand. However, the county cannot compel Regional Transit to provide such service" (SEIR, p. 8-28)

12 E.g., SEIR Table LU-3: Criteria-Based Standards Determination for Proposed UWSP (p.14-29 ff.); SEIR Table TR-1: Project Trip Generation, showing full build-out (p. 18-29).

13 UWS LLC. UWS Specific Plan, p. 8-6. August 2024.

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Section IV of these comments considers UWSP-specific and cumulative environmental impacts, including from incomplete build-out.

III. THE COUNTY'S EXCESS ENTITLEMENTS

As noted in section II.B above, Sacramento County has approved and is planning multiple residential developments totaling far more homes than the market requires into the foreseeable future. Some of these projects go back decades and are within the UPA. But, since adopting the 2011 GPU and it's "*new managed growth strategy"*, the County has focused on very large projects outside the UPA, basing its mitigation scheme on "mixed-use" build-out, as set forth in GP Policies LU-119 and LU-120. However, the County has failed to explain how these projects, totaling 67-210 years-worth of growth (documented below) could build-out as quickly or completely as envisioned, given documented market constraints.

In fact, few if any projects can build-out as planned; and certainly not all can be completed as assumed, but not substantiated. As explained below, the result of such incomplete build-out, will be widely scattered, partly-completed projects, without sufficient urban mass and density to support transit service or the "mixed use" commercial investment that the UWSP SEIR claims will result in reduced VMT and GHG emissions. The County did not address this impact in its 2011 GPU FEIR. We substantiate these concerns below.

1. SACOG Projected Growth Projections

The Sacramento Area Council of Governments (SACOG) projects regional population, jobs, and housing growth to support mandated regional transportation and land use plans.[14]

Table 1. SACOG PROJECTED GROWTH PROJECTIONS

Planning Period	Needed New Housing	No. of Years	Annual Avg
2016-2040	37,230	24	1,551(1)
2020-2035	16,470	15	1,098(2)
2020-2050	35,610	30	1,187(2)
Median of SACOG's current (June 2024) projections			1,143

(1) SACOG. 2020 MTP/SCS.[15]

(2) SACOG. 2025 Blueprint (MTP/SCS) Adopted Land Use Assumptions. June 2024. Online: https://www.sacog.org/home/showpublisheddocument/2432/638554228380389235

17-4

[14] Sacramento Region Draft Growth Projections – Technical Memo. Online: https://www.sacog.org/home/showpublisheddocument/1414/638334168171000000

[15] Cited in: Sacramento County. 2030 General Plan of 2005-2030 2023 Annual Report, Attachment 1, p.7. April 10, 2024. Online: https://agendanet.saccounty.gov/BoardofSupervisors/Documents/ViewDocument/ATT_1_-_Sacramento_County_2030_General_Plan__2023_Annual_Report.pdf?meetingId=9015&documentType=Minutes&itemId=427588&publishId=1352635&isSection=false

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2. Historic County Growth Rate

The actual growth rate over a recent eleven-year period is substantially lower than SACOG's optimistic projections, as show in Table 2 below.

17-4 cont.

Table 2. HISTORIC COUNTY GROWTH RATE

Period	Permitted New Housing	No. of Years	Annual Avg
2013-2020 [16]	4,658	8	582
2021-2023 [17]	2,189	3	728
Total for Period	**6,757**	**11**	**655**

B. THE COUNTY'S THREE GROWTH STRATEGIES

17-5

The County's General Plan plans for new growth primarily through the following strategies:[18]

1) *infill development in existing communities (including commercial corridors);*
2) *buildout of [approved] planned communities; and,*
3) *master-planning of new growth areas."*

We review below the available housing capacity in each of these categories:

1. "Infill" Strategy, Including Commercial Corridors

The County reports,

> *"Infill is highlighted as a priority in the goals, policies, and implementation measures of multiple General Plan elements… The General Plan estimated that between 10,000 to 18,000 housing units could be accommodated on vacant or underutilized properties in infill areas, and that up to 19,000 housing units could be accommodated by revitalizing commercial corridors.".*[19]

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16 Sacramento County. 2030 General Plan 2020 Annual Report, Attachment 2, Annual Element Progress Report, Table B, Regional Housing Needs Allocation Progress, p. 3. March 24, 2021 Online: https://agendanet.saccounty.gov/BoardofSupervisors/Documents/ViewDocument/ATT%202%20-%20Annual%20Housing%20Element%20Progress%20Report%20(Appendix%20A%20to%20the%20Annual%20R.pdf?meetingId=6898&documentType=Agenda&itemId=378086&publishId=921887&isSection=

17 Sacramento County. 2030 General Plan Annual Report for Calendar Year 2023. Attachment 2, p. 1, Table B, Regional Housing Needs Allocation Progress. April 10, 2024. Online: https://agendanet.saccounty.gov/BoardofSupervisors/Documents/ViewDocument/ATT_2_-_Annual_Housing_Element_Progress_Report_(Appendix_A_to_the_Annual_Report).pdf?meetingId=9015&documentType=Minutes&itemId=427588&publishId=1352636&isSection=false

18 Sacramento County. 2030 General Plan Annual Report for Calendar Year 2023. Attachment 1, p. 6-7. April 10, 2024. Online: https://agendanet.saccounty.gov/BoardofSupervisors/Documents/ViewDocument/ATT%201%20-%20Sacramento%20County%202030%20General%20Plan%2C%202023%20Annual%20Report.pdf.pdf?meetingId=9015&documentType=Agenda&itemId=424991&publishId=1350011&isSection=false

19 Ibid., p. 7.

Accordingly, infill and revitalizing commercial corridors together provide an estimated 29,000-37,000 dwelling units (DU) of available housing capacity.

2. "Buildout of Planned Communities" Strategy

Since 1969 Sacrament County has approved 12 "planned communities" providing 59,175 DU of new housing capacity. None of these have completed build-out – five are in some phase of construction and seven have yet to break ground.[20] The County notes:

"Many of these growth areas have yet to begin construction and offer a stock of land for growth that is anticipated in the unincorporated County".[21]

Table 3 below, displays the twelve approved projects. Of the approved 59,175 DU, 43,348 DU (73 percent) remain unbuilt, and could provide 66 years of approved, appropriately zoned, growth capacity at the historic growth rate (Table 2 above).

TABLE 3. APPROVED RESIDENTIAL DEVELOPMENT PLANS

Approved Plan	Number of Dwelling Units	When Approved	Buildout Status
Rancho Murieta	5,189	1969	50% BO (est)[22]
North Vineyard Station	6,063	1998	63% BO
Vineyard Springs	5,942	2000	68% BO
Elverta	5,601	2007	Not begun
Easton	1,644	2009	Not begun
Glenborough	3,239	2009	Not begun
Florin Vineyard (Gap)	9,919	2010	28% BO
Cordova Hills (Braden)	8,000	2013	Ground broken
Mather Field	1,291	2016	Not begun
Mather South	3,522	2020	Not begun
NewBridge	3,075	2020	Not begun
Jackson Township	5,690	2022	Not begun
Total	**59,175**	**Avail Un-built Capacity:**	**43,348**

17-5 cont.

[20] Ibid., p. 8.

[21] Ibid., p. 8

[22] Rancho Murietta County Service District. Current Active projects. January 2021. Online: https://www.ranchomurietacsd.com/files/524809a78/%402021-01+Development+project+updates+AWpsAW.pdf

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3. "New Growth Areas" Strategy

The County reports,

> *"When adopted in 2011, the General Plan added policies to the Land Use Element to allow applicants to request an expansion of the Urban Policy Area (UPA) within the Urban Services Boundary…subject to…proposing logical planning boundaries and "Smart Growth" criteria. Since these new growth policies were added to the General Plan, the County has accepted seven applications... for new growth areas. Three master plans amending the UPA have been approved… [shown in Table 3] the four remaining …are still in-progress….[comprising] a total of 48,495 additional units"*

Table 4 shows the four pending plans, the three largest of which lie outside the UPA .

Table 4. PENDING "NEW GROWTH" AREAS

Pending New Growth Plans	Number of Dwelling Units
Upper Westside **	9,356
Grandpark **	21,705
West Jackson *	16,484
Antelope Acres	950
Total Pending	48,495

* Outside the Urban Planning Area (UPA), which is designated in the General Plan as accommodating all growth for the current planning period (2005-2030).

** Outside both the UPA, and the Urban Services Boundary (USB), which is designated in the General Plan as the boundary of ultimate growth beyond which it is intended urban services will never be provided, and which should be modified only under "extraordinary circumstances.[23]

17-5 cont.

Table 5 below shows the five large projects outside the UPA, two of which are approved and three pending:

[23] Sacramento County. General Plan 2030, Land Use Element, p.20. November 2011..

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TABLE 5. "NEW GROWTH" OUTSIDE UPA

Project	Status	Number of Dwelling Units
NewBridge	Approved	3,075
Jackson Township		5,690
Sub Total - Approved		**8,765**
West Jackson	Pending	16,484
Upper Westside		9,356
Grandpark		21,705
Sub-Total - Pending		**47,545**
Total - Approved & Pending		**56,310**

17-5 cont.

C. THE COUNTY HAS APPROVED FAR MORE HOMES THAN THE MARKET REQUIRES

Sacramento County has ignored housing growth projections and historical growth rates in its development decisions; has allowed planning of every "new growth" project proposed to it; has approved two such projects; and has three more in planning. Added to existing infill capacity and the twelve previously approve protects, the result is a many-fold over-supply of approved homes over market demand, as documented below.

1. Sacramento County – Existing Housing Capacity

The below table displays the County's current housing capacity in each of its three growth accommodation strategies, and the total available capacity.

TABLE 6. AVAILABLE COUNTY HOUSING CAPACITY

Growth Strategies	Available Growth Capacities (DU)
Infill, incl. Commercial Corridors	29,000-37,000 Median = 33,000
Approved Planned Communities	43,348
Subtotal – Currently Avail Capacity	**76,348**
Pending "New Growth" Projects	48,495
Total Avail and Planned Capacity	**120,843-128,843 Median = ~125,000**

17-6

2. Growth Capacity Greatly Exceeds Foreseeable Market Demand

As displayed below in Table 7, applying SACOG's current growth projections, the County has to-date approved 67 years-worth of growth.

Applying the probably more realistic historical County growth rate, and recognizing that Supervisors have historically approved every proposal put before them, and will likely favor approving the currently pending projects, the County is on course to approve almost 200 years-worth of growth.

TABLE 7. YEARS TO BUILD OUT EXISTING AND PLANNED CAPACITIES

Foreseeable Annual Growth Rates (DU)		Years to Build Out	
		Currently Available Capacity (76,348 DU)	Incl. Pending New Growth (125,000 DU)
SACOG Median Projection (Table 1)	1,143	67 years	109 years
County Historical (Table 2)	655	116 years	190 years
County Calculation	–	–	140+ years [24]

17-6 cont.

As previously noted, Sacramento County's 2011 GPU,

> *"…allow[ed] applicants to request an expansion of the UPA anywhere within the USB regardless of demand or existing capacity…[t]he County's intent was to let the market determine the need and location for new growth…."*

However, a 67-190 year timeframe to recoup development investment defies normal market supply/demand dynamics, and suggests the County's "come one, come all" approvals have encouraged speculation on future land values, to the detriment of investment in well-planned, lower VMT infill housing.[25]

D. LAND USE EFFECTS OF EXCESS ENTITLEMENTS

The direct effects of excess entitlements would be scattered, disjunct, incomplete development, incapable of supporting claimed "mixed use" development and transit service.

17-7

1. Scattered Sprawl Development

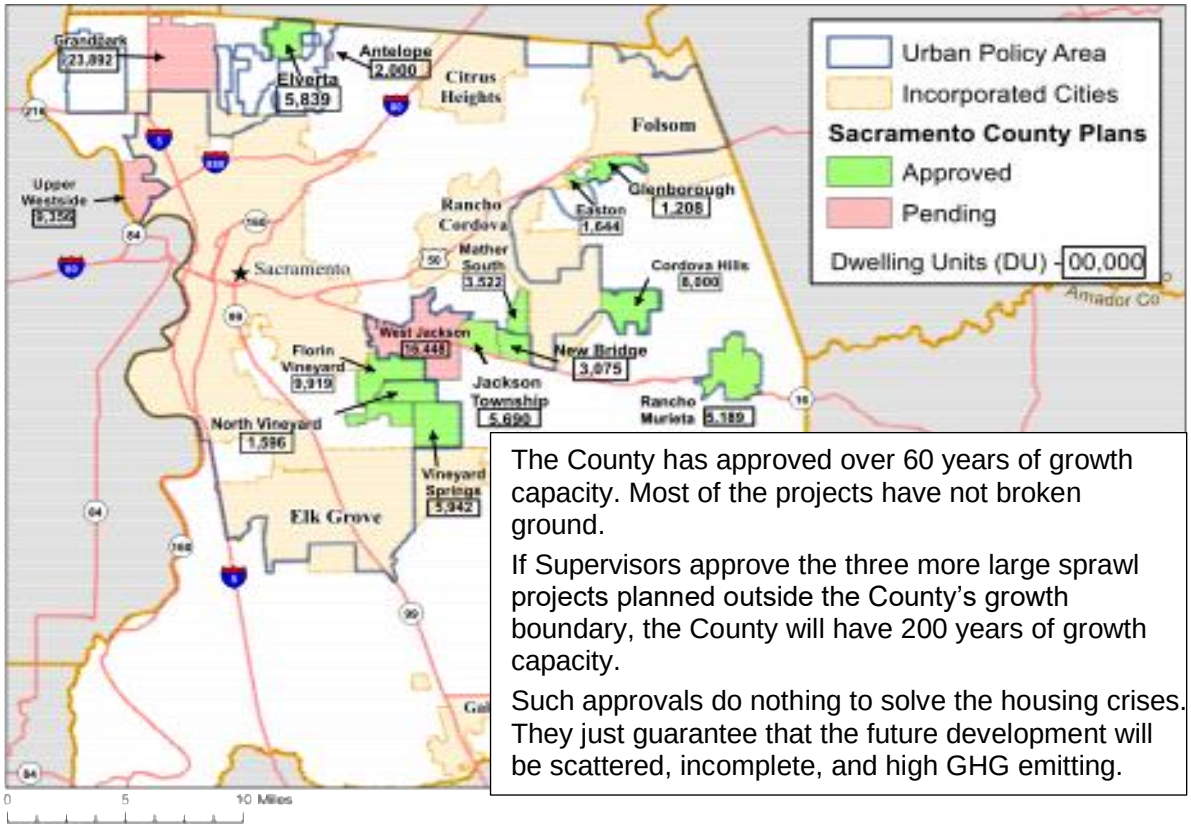
As displayed on the below map, the County's 12 approved and four currently planned sprawl projects are scattered across much of the County. Of the approved projects only the three Vineyard projects and Rancho Murieta are in some phase of construction. Their remaining capacity, and that of the others awaiting ground-breaking, represent

[24] Sacramento County. Sacramento County 2030 General Plan 2020 Annual Report, Attachment 1, p. 13.

[25] *"Locating…growth…within an area dominated by open space and agriculture conflicts with smart growth. …this superabundance of greenfield growth area is likely to draw development away from the more challenging infill and redevelopment projects…"* (GPU FEIR, pp. 3-31 - 3-32).

undeveloped, approved, available, housing capacity. Clearly, the County housing crises is not caused by insufficient approvals, nor will it be cured by additional approvals.

Fig 1. COUNTY RESIDENTIAL DEVELOPMENT PROJECTS, APPROVED AND PENDING



The County has approved over 60 years of growth capacity. Most of the projects have not broken ground.

If Supervisors approve the three more large sprawl projects planned outside the County's growth boundary, the County will have 200 years of growth capacity.

Such approvals do nothing to solve the housing crises. They just guarantee that the future development will be scattered, incomplete, and high GHG emitting.

17-7 cont.

2. Incomplete Development

As demonstrated in Table 3, premature land entitlements have resulted in "zombie" subdivisions, lying undeveloped, or at best partially developed, for decades, with adverse social, economic, and environmental effects.[26]

[26] *"Local jurisdictions shape the future of their communities through the entitlement of land… When land is entitled and subdivided prematurely, before the market demands new housing, the following problems can result:*

"Threats to health and safety. Lots that sit undeveloped for many years can foster …[environmental] and other health and safety hazards…

Fiscal threats. …local…costs… from houses that were planned but remain unconstructed.

"Fragmented development patterns. Remote…poorly located developments … worsen the environmental impacts of roads and other public services. [and] disrupt wildlife habitat and migration corridors.

"Market flooding and distortions. The oversupply of vacant lots depresses the value of even…well-located lots that could and should be serving… demand…". (Lincoln Institute of Land Policy. Arrested

IV. UWSP ENVIRONMENTAL IMPACTS

A. CUMULATIVE EFFECTS CONTRARY TO STATE AND REGIONAL PLANS AND GUIDANCE

The cumulative effects of the County's approved and proposed development outside the UPA to open space, agricultural, and habitat lands would be considerable. Such greenfield development is far more impacting than would be accommodating growth in infill development. [27] ,[28]

In addition, the State has long and clearly maintained that, notwithstanding future phase-out of gasoline-fueled vehicles, reducing VMT by directing growth into existing communities is critical to meeting the State's GHG ; and avoids a wide variety of other environmental harms. For example (emphases added):

1. SB 375 states:

"*Section 1(c). Greenhouse gas emissions from automobiles and light trucks can be substantially reduced by new vehicle technology and by the increased use of low carbon fuel. However, even taking these measures into account, it will be necessary to achieve significant additional greenhouse gas reductions from changed land use patterns and improved transportation. Without improved land use and transportation policy, California will not be able to achieve the goals of AB 32",* (emphasis added).

17-8

A chief way to achieve "improved transportation" is expanded public transit, which depends heavily on increasing rider density through infill development.

2. CARB's Scoping Document States: [29]

"*…strategies that support more compact development infill areas…have the greatest potential to reduce emissions* (p. 5) … t*he State has long been clear that urban infill projects, particularly in high-resource and low-VMT areas, would be generally supportive of the State's climate and regional air quality goals"* (p. 20).

Developments, Combating Zombie Subdivisions and Other Excess Entitlements", pp. 6-8. January 2014. Online: *https://www.lincolninst.edu/publications/policy-focus-reports/arrested-developments*).

[27] Decker, N. et al. Right Type, Right Place - Assessing the Environmental and Economic Impacts of Infill Residential Development through 2030. Next 10. March 28, 2017. Online: https://www.next10.org/publications/right-housing.

[28] Popovich, N et al. The Climate Impact of Your Neighborhood, Mapped. NY Times. December 13, 2022. Online: https://www.nytimes.com/interactive/2022/12/13/climate/climate-footprint-map-neighborhood.html https://www.nytimes.com/interactive/2022/12/13/climate/climate-footprint- map-neighborhood.html

[29] California Air Resources Board. 2022 Scoping Plan, appendix D, Local Actions. November 2022. Online: https://ww2.arb.ca.gov/sites/default/files/2022-05/2022-draft-sp-appendix-d-local- actions_0.pdf)Appendx D

3. CARB's Priority GHG Reduction Strategies" include: [30]

"*… enable mixed-use, walkable, transit-oriented, and compact infill development"*, and, "*Preserve natural and working lands … guide development toward infill areas and do not convert "greenfield" land to urban uses* (p.12).

4. CARB's SCS Progress Report

SB 375 requires regional agencies like the Sacramento Council of Governments (SACOG) to adopt a regional Sustainable Community Strategies (SCS) to reduce VMT through coordinated transportation, housing, and land use planning. CARB sets VMT-reduction targets SCS's and evaluates compliance. Developments consistent with the SCS are relieved of certain CEQA requirements.[31] However, CARB reports,

"Many local agencies have not successfully advanced infill and climate-friendly development as needed, even with many regions identifying priority areas in the SCSs to do that. Too often growth is still being planned for land outside existing communities or built there first". [32]

5. CARB Mitigation Recommendations

17-8 cont.

In the context of SCS consistency in Sacramento County, CARB has recommended mitigation criteria:[33]

"SB 375 GHG emissions mitigation should address diversion of investment from more environmentally sustainable infill … inclusion of transit and active transportation… does not resolve the negative impacts from continuing those types of longstanding investment patterns. Mitigation should address this by…increasing investment in infill…"

"*Over three quarters of Californians see climate change as a threat to our economy and quality of life. The significant and negative impacts of climate change already occurring today on our shared transportation infrastructure and mobility are warnings of the dire future impacts that will occur without consistent and sustained local and regional investment consistent with climate commitments".*

6. The Office of Planning and Research states,

" *Infill development is critical to… be environmentally- and socially-sustainable. …. OPR is committed to promoting compact development in order to: Reduce greenhouse gas emissions and improve regional air quality by reducing the distance people need to travel; reduce conversion of agricultural land, sensitive habitat, and*

30 "*…designated as 'priority' because they are the GHG reduction opportunities over which local governments have the most authority and that have the highest GHG reduction potential"* (CARB, Scoping Plan, Table 1, 2022).

31 CARB. Sustainable Communities & Climate Protection Program. Online: https://ww2.arb.ca.gov/our-work/programs/sustainable-communities-climate-protection-program

32 California Air Resources Board. 2022 Progress Report, California's Sustainable Communities and Climate Protection Act (SB 375) (p. 36). 2022.

33 CARB. Comments on the Sacramento County Transportation Maintenance, Safety, and Congestion Relief Act of 2022—Retail Transactions and Use Tax (Measure A). October 10, 2022. Online: https://drive.google.com/file/d/1-vFaHEOCBJDzs26rNj_3Po9Fk3evyi17/view?usp=sharing.

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open space for new development; reduce costs to build and maintain expensive infrastructure; facilitate healthy and environmentally-friendly active transportation; reduce storm-water runoff resulting in flooding and pollution of waterways; bring vibrancy, community and social connection to neighborhoods".[34]

17-8 cont.

B. CHAPTER 8, CLIMATE CHANGE

Mitigation Measure (MM) CC-1b claims to mitigate operational GHG emissions, but despite a great deal of verbiage avoids imposing substantive GHG-reduction requirements on either the residential or commercial components of the UWSP. We have the following comments.

1. MM CC-1b is Inconsistent with SMAQMD Requirements

SEIR MM CC-1b incorrectly asserts that the UWSP is consistent with the Sacramento Metropolitan Air Quality Management District (SMAQMD)'s best management practices (BMPs) to mitigate GHG emissions[35] (the SMAQMD BMPs have also been adopted by Sacramento County [36]).

SMAQMD's GHG BMP 1 requires that, *"Projects shall be designed and constructed without natural gas infrastructure"* (SEIR, p. 8-26); whereas SEIR MM CC-1b states, "*Consistent with SMAQMD's GHG BMP 1, natural gas shall be prohibitedin all residential land uses"*.

17-9

The assertion of consistency is unfounded, since the UWSP proposes that only residential uses be without natural gas infrastructure; and per the SEIR, natural gas use in UWSP commercial spaces would emit 5,996 $MTCO_2e$ per year. The key failing is that SMAQMD's BMPs avoid impacts; whereas the UWSP will cause impacts, for which the SEIR proposes various mitigations, the feasibility of which is questioned below in these comments.

The SEIR should explain why it is infeasible to avoid installing natural gas service to commercial spaces as well as residential, in order to prevent the above-cited emissions of 5,996 $MTCO_2e$ per year.

2. Avoiding Residential Gas Infrastructure is Not Additional

MM CC-1b states, "*Consistent with SMAQMD's GHG BMP 1, natural gas shall be prohibited in all residential land uses"* (SEIR, p. 8-34). This requirement repeats State Building Code requirements, which strongly dis-incentivize new mixed-fuel residential construction.[37]

17-10

CEQA requires that mitigation be additional to what is already required (Guidelines § 15126.4(c)(3)). To the extent that new construction will avoid natural gas infrastructure

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34 Office of Planning and Research. Infill Development. Online: https://opr.ca.gov/planning/land-use/infill-development.

35 SEIR, p. 8-31.

36 "Sacramento County adopted SMAQMD's thresholds of significance…on December 16, 2020, by Resolution #2020-0855" (SEIR, p. 8-24)

37 Natural Resources Defense Council. California Code Takes Another Step Toward Clean Buildings. September 11, 2024. Online: https://www.nrdc.org/bio/merrian-borgeson/california-code-takes-another-step-toward-clean-buildings

due to State regulatory action, the propose mitigation is not eligible for mitigation credit under CEQA. 17-10 cont.

3. Procuring Renewable Energy to Mitigate Commercial GHG Emissions Would be Non-Additional.

MM CC-1b identifies numerous options to demonstrate GHG reductions from future commercial uses, the simplest and most direct being , *"Procure renewable energy…via purchases from…SMUD…"* (SEIR, p. 8-36).

The State of California requires all-renewable electricity. SB 100 directs that all electrical utilities generate 100 percent carbon-free (i.e. renewable) electricity on a mandated schedule: 50 percent by 2026; 60 percent by 2020; and 100 percent by 2045. In addition, SMUD has adopted a policy-goal of generating 100 percent of its electrical production renewably by 2030. SMUD is progressing towards that goal, and will almost certainly reach it well before 2045. All these dates are within the UPWSP's 20-year build-out timeframe. 17-11

CEQA requires that mitigation be additional to what is already required (Guidelines § 15126.4(c)(3)) or already existing. To the extent that renewable, carbon-free energy is available as a result of State legal requirements and/or SMUD's initiative, it is not eligible for mitigation credit under CEQA. The SEIR should reflect this caution in the SEIR's discussion, and substantiate the feasibility of any such mitigation by describing how mitigation credits (MTCO2e per year) would be calculated over time to reflect the source's increasing renewable energy mix, phasing out non-renewable energy in 2045 or earlier.

4. SEIR Table CC-6 Inaccurately Claims Consistency with CARB's Scoping Plan

Table CC-6 (SEIR, pp. 8-40 - 8-42) purportedly demonstrates that, "the proposed UWSP generally aligns with most of the recommended project attributes outlined in the 2022 Scoping Plan and would be consistent with the state's GHG goals" (SEIR, p. 8-43).

This is incorrect. Notwithstanding the SEIR's rationalizations and claims of equivalency, the UWSP is inconsistent with at least the following of CARB's "key suggested project attributes". As with assertion of consistency with the SMAQMD BMPs, the key failing is that CARB's "project attributes" all avoid impacts; whereas the UWSP will cause impacts, for which the SEIR proposes various mitigations, the feasibility of which is questioned elsewhere in these comments. 17-12

CARB Key Attributes:

a. CARB Attribute: "Is located on infill sites that are surrounded by existing urban uses and reuses or redevelops previously undeveloped or underutilized land that is presently served by existing utilities and essential public services (e.g., transit, streets, water, sewer)."

, the UWSP is not infill *surrounded by existing urban uses* , or on a site with existing utilities and services.

b. CARB Attribute: "Does not result in the loss or conversion of natural and working lands".

, the UWSP will result in the loss or conversion of natural and working lands

c. CARB Attribute: "Consists of transit-supportive densities (minimum of 20 residential dwelling units per acre), is in proximity to existing transit stops (within a half mile) or satisfies more detailed and stringent criteria specified in the region's SCS."

, the UWSP does not consist of transit-supportive densities (only a portion of the project meets this criterion), and the project site is not in proximity to existing transit.

d. CARB Attribute: "Uses all-electric appliances without any natural gas connections and does not use propane or other fossil fuels for space heating, water heating, or indoor cooking".

, the UWSP would use fossil fuels for commercial property space heating, water heating, or indoor cooking, resulting in emissions of 5,996 $MTCO_2e$ per year.

17-12 cont.

5. The Mitigation Scheme Conflicts with the Normal Development Cycle

a. Commercial Space in Early Phases is Unlikely to Build-out.[38] MM CC-1b directs that a GHG Reduction Plan by each individual development will demonstrate that its share of commercial space will contribute to the project's total required GHG reductions. This scheme would require that each individual project includes, in addition to a portion of the UWSP's residential build-out, a commensurate share of the UWSP's total planned commercial development. However, early stages of residential construction will not provide an adequate customer base to support the commercial build-out envisioned at UWSP completion; and the dedicated space will remain un-developed until such time as adequate urban mass has accumulated to support commercial activity.

17-13

b. Lack of Commercial Build-out will Trigger Mitigation Change Requests. The County's excess entitlements would delay build-out of the UWSP and its commercial space long beyond normal investment horizons, and perhaps indefinitely. In response developers will ask the County to modify the Specific Plan, converting the planned commercial space to residential development, thereby further reducing the benefits of mixed-use. This is not a mere speculative possibility – Sacramento County and other jurisdictions have responded, and are responding, favorably to economically-based requests to modify development mitigation conditions.[39],

17-14

C. CHAPTER 14, LAND USE – THE SEIR's RELIANCE ON LU-120 IS UNSUPPORTED

1. The SEIR Relies on GPU Policy LU-120

17-15

The SEIR states:

[38] UWSP Specific Plan, p. 8-6; see earlier quote and full citation, Section II.

[39] *"On February 28, 2023, the Board adopted a major amendment to the North Vineyard Station Specific Plan to implement the updated North Vineyard Station Transportation Mitigation Strategy. This strategy was well-received by the development community with many acknowledging that it significantly reduces the infrastructure and financial burdens…*". Sacramento County is also currently re-considering previously approved mitigation conditions for the Florin Vineyard, Vineyard Springs, and Elverta Specific Plans, regarding roadway improvement, transportation infrastructure, and water supply requirements (Sacramento County, General Plan of 2005-2030 2023 Annual Report, Attachment 1, p. 9).

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"General Plan Policy LU-120 is intended to reduce impacts of many different types – such as growth inducement, unacceptable operating conditions on roadways, poor air quality, and lack of appropriate infrastructure – by establishing design criteria for all amendments to the UPA. A project must be consistent with the policy before it may be considered for approval …the proposed UWSP would meet the requirements of LU-120. The tables below (Table LU-2 and Table LU-3) summarize how the proposed UWSP complies with …Policy LU-120. Given that the proposed UWSP has been deemed consistent, impacts related to conflict with growth management policy would be less than significant (SEIR p. 14-23).

17-15 cont.

2. The Efficacy of Policy LU-120 is Unsubstantiated

As discussed in Section II.A of these comments and Attachment 3, the County's GPU FEIR did not review Policy LU-120. On the contrary, the GPU FEIR determined that project-specific expansion of the UPA would cause significant impacts.

D. CHAPTER 18, TRANSPORTATION

1. Urban Sprawl Induces Increased VMT

That sprawl induces increased VMT is well established.[40,41,42] As noted elsewhere in these comments, State and regional guidance and the County's own planning documents emphasize the need to change the post-WWII paradigm of auto-centric, dispersed development to an infill approach that helps address numerous environmental problems, including by reducing VMT/GHG emissions.

17-16

However, as substantiated in Section III of these comments, Sacramento County continues to approve disjunct greenfield projects remote from existing jobs, services, and infrastructure – i.e. "urban sprawl".

2. UWSP Mitigation for Induced VMT is Based on Full Build-out.

The SEIR asserts that the UWSP will mitigate induced VMT through the benefits of mixed-use development – residents will reduce or eliminate car travel to and from required goods and services because such amenities will be locally available; commercial development will generate local employment opportunities; and there will be regular transit service to more distant locations with frequent headways and conveniently located bus stops.

17-17

However, such benefits are illusory because they are premised on unattainable full and timely project build-out.[43,44]

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40 Karlamangla, S. *What's Your Neighborhood's Climate Impact?* New York Times. February. 6, 2023. Online: https://www.nytimes.com/2023/02/06/us/california-neighborhood-climate-impact.html

41 Sacramento County. See quote at Section V.E.2 of these comments.

42 State of California. Senate Bill 375, Section 1. 2008.

43 SEIR, Table TR-1: Project Trip Generation, p. 18-29. Assumed number of homes is 9,356, the UWSP's full build-out (SEIR, p. 18-29).

44 *"…a GHG Reduction Plan …[will] document GHG emissions reduction for each future development project through project specific GHG reduction measures…to meet the total reduction … upon complete buildout of the proposed UWSP* (SEIR p. 8-35, emphasis added).

Contents

3. Excess Entitlements will Delay or Preclude the Proposed Mitigation

As discussed in Section III of these comments, Sacramento County's past and planned approvals of far more development than the housing market can absorb will result in widely scattered, partially built-out projects.

The 'Regional Retail" and local commercial development to which MM CC-1b assigns a major mitigation role will not occur in the timeframe envisioned, if ever. Since GHG-impacts are caused by emissions accumulating in the atmosphere over time, delayed mitigation isa no mitigation.

17-18

The normal lack of commercial development during the early phases of project development will be extended indefinitely, precluding the internal "trip capture" benefits of mixed-use development, and resulting in VMT and GHG emissions greater than modeled.

And the presumed transit service will not be in place until full build-out provides the requisite ridership.

4. Excess Entitlements as a Regional Problem

The Sacramento Area Council of Governments (SACOG) substantiates this concern, in connection with the region's SB 375-mandated "2025 Sustainable Community Strategy/Metropolitan Traffic Plan" (SCS/MTP). SACOG is required to consider economic constraints (e.g., market demand) in formulating the SCS/MTP. Applying the growth projections and the traffic analysis model used to develop the SCS/MTP. SACOG calculated VMT profiles for regional projects planned and under-construction, and concluded:

17-19

> *"… many… developing communities…show poor VMT and GHG performance because they are only being partially built out over the timeframe of the plan…[partly because] locally planned housing growth in developing communities greatly outnumbers SACOG's regional housing demand projection for 2050; there is more than 400,000 units of developing community housing capacity compared to a total of 278,000 additional units anticipated between 2020 and 2050… This small amount of initial growth is usually insufficient to achieve the mix, density, and intensity of land uses … required to generate the lower VMT performance that many project-specific traffic analyses indicate will be possible at buildout" (emphasis added).*[45]

Sacramento County projects analyzed by SACOG are shown below, with their projected percents of current regional per capita VMT through at least 2050 (the current SACOG planning period).

[45] SACOG. Board of Directors Meeting, Agenda Item No. 15: Staff Report, 2025 Blueprint Discussion Scenario. April 18, 2024.

Table 8: Sacramento County Project-Induced VMT with Economically Constrained Build-Out

Sacramento County Project	Projected Percent of Regional VMT
Jackson West *	120-130
Jackson Township *	120-130
Glenborough *	120-130
Grand Park *	120-130
Vineyard Springs	110-120
North Vineyard Station	110-120
South Mather	110-120
Upper West Side *	**100-120**
Florin Vinyard	85-100

* Projects outside UPA

17-19 cont.

Due to incomplete build-out caused by the over-supply of entitled, competing developments, nearly all the projects would exceed current per capita VMT, which means they would increase total County GHGs in a greater proportion than the rate of population growth. This directly conflicts with the State's goal to reduce total GHGs to net zero by 2045, notwithstanding population growth.

The UWSP compares favorably to most of the other projects, but is still substantially higher than the 85 percent below regional per capita VMT target established in the County's General Plan,[46] consistent with requirements pursuant to SB 743.

[46] Sacramento County. General Plan, Circulation Element, Table CI-1, Significance Thresholds for CEQA Transportation Analysis for Development Projects.

SECTON V. FEIR/GP CONFLICTS

A. FAILURE TO MITIGATE GHG EMISSIONS BY ADOPTING A CAP

1. Sacramento County Promised to Adopt a CAP

The County's 2011 GPU FEIR committed to adopt a climate action plan (CAP) to mitigate climate change impacts of the GPU:

> *"Comprehensive plans to address climate change are being adopted by many jurisdictions, and they have come to be called Climate Action Plans.*[47] *…As stated, mitigation…requires County adoption of the AB 32 goal as a General Plan policy, a Climate Action Plan, and development thresholds. In concert with state and federal activities, this mitigation is intended to offset the Project climate change impact, which has been determined to be significant".*[48]

The FEIR's explicit GHG mitigation language is presented in Attachment 5.

As noted in Section I of these comments, almost none of the County's climate change commitments, including adopting a CAP ("within one year)" have been fulfilled.

17-20

2. The Advantages of CAPs

The State encourages the use of CAPs for GHG mitigation.[49,50] As noted in the FEIR, CAPs can be "comprehensive". As programmatic plans subject to programmatic CEQA review, CAPs can offer better GHG-reduction than project-specific mitigation because they can,

a. Provide an occasion for a more exhaustive consideration of effects and alternatives than would be practical in an EIR on an individual action;

b. Ensure consideration of cumulative impacts that might be slighted in a case-by-case analysis;

c. Avoid duplicative reconsideration of basic policy considerations;

d Allow the lead agency to consider broad policy alternatives and program-wide mitigation measures at an early time when the agency has greater flexibility to deal with basic problems or cumulative impacts; and

e. Allow reduction in paperwork".[51]

Properly done, CAPs can also provide co-benefits such as improved air quality, better health outcomes, energy efficiencies, better mobility options, and more equitable, livable communities.

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47 Sacramento County. General Plan Update FEIR, p. 12-32. April 2010

48 Ibid, p. 12-38.

49 Californai Office of Planning and Research. General Plan Guidance, Chapter 8. Climate Change". Online: https://www.lci.ca.gov/docs/OPR_C8_final.pdf

50 California Air Resources Board. 2022 Scoping Plan, Appendix D, Local Actions, pp. 4, 7 ff. November 2022.

51 14 CCR § 15168(b)

These environmental advantages of CAPs over project-specific environmental analysis and mitigation are what made the County's deferred mitigation promise credible as preferable to the CEQA default of project-specific environmental review.

3. The County has Failed to Adopt a CAP

Section I of these comments reviews the County's 13-year failure to honor it's GPU climate commitments, including by failing to adopt a CAP. As a result, the County has since 2011 approved three large-scale development projects, two outside the UPA, totaling 12,287 new dwelling units (DU),] [52] subject to individual, project-specific environmental review – exactly as if the County had failed in 2011 to offer any climate mitigation at all. The approved projects outside the UPA growth boundary relied on the *"new growth management policies* which in Section II of these comments we assert are of unsubstantiated efficacy.

Consistent with its 2011 mitigation commitments, the County must adopt a CAP to provide comprehensive, programmatic CEQA review and mitigation of GHG emissions, including consideration of the potential cumulative impacts of the enormous amount of growth planned in the County outside the UPA.

17-20 cont.

B. FAILURE TO IMPLEMENT GP POLICIES PRIORITIZING INFILL

1. GPU Direction on Growth Location is Ambiguously Broad

Sacramento County's General Plan provides broad guidance regarding where County growth will occur, stating that new growth should be directed to, *"…previously urbanized areas, planned growth areas and strategically located new growth areas…"* (GP LU Element, Strategy I., Goal, p. 20). GP Policy LU-3, similarly directs,

> *"It is the intent of the County to focus investment of public resources on revitalization efforts within existing communities, especially within commercial corridors, while also allowing planning and development to occur within strategic new growth areas". (GP LU Element, p. 25,)*

Problems associated with such overly-broad, conflicting direction are discussed below in section V.G of these comments)

17-21

2. The GP Prioritizes Infill over "New Growth"

While the GP directs growth broadly, including to "*new growth areas*", it makes clear that infill, corridor revitalization, and buildout of already planned projects has priority:

> *"Near-term urban development will be accommodated through redevelopment and infill of vacant and underutilized parcels within existing urban communities and build-out of planned communities, because it is in these areas that urban infrastructure and services presently exist. New urban growth areas may also accommodate a portion of anticipated future growth" (GP LU Element, "Growth Accommodation", p. 24, emphasis added).*
>
> *"…a balance must be achieved so that reinvestment in existing communities is not overshadowed by planning and development activity in new growth areas. The County must ensure that resources are not prematurely shifted away from corridor*

[52] Mather South, 3,522 DU; Newbridge, 3,075 DU; Jackson Township, 5,690 DU.

revitalization efforts and buildout of planned communities" (GP LU Element, "Assumption-Based vs. Proactive Strategies", p. 25, emphasis added).

Similarly, Policy LU-3 directs:

"It is the intent of the County to focus investment of public resources on revitalization efforts within existing communities, especially within commercial corridors, while also allowing planning and development to occur within strategic new growth areas" (GP LU Element, p. 25, emphasis added)

The GP's "Urban Growth Accommodation Strategy" further states:

"It is the strategy of the County to accommodate as much residential, commercial and employment capacity as feasible within the existing urban area during the timeframe of the Plan" (GP LU Element, p. 26, emphasis added).

Other GP policies similarly direct the County to prioritize its resources to support infill development and commercial corridor redevelopment:

"Give the highest priority for public funding to projects that facilitate infill, reuse, redevelopment and rehabilitation, mixed-use development, and that will result in per person vehicle miles traveled lower than the County average" (GPU Land Use Element, LU-68 p. 71, emphasis added).

"Focus investment of County resources in commercial corridors to facilitate… infrastructure and public amenities to encourage and stimulate private investment" (GPU LU Element, LU-90, p.106, emphasis added).

17-21 cont.

3. Prioritizing is a Practical Necessity

The GP warns about "prematurely" directing staff to "new growth" because processing major sprawl applications is enormously time-consuming and could dominate County workload, to the detriment of infill, rehabilitating unban corridors, and completing already planned and approved projects:

"…buildout of infill parcels and planned communities [will occur] at existing zoned or planned densities… [and] will be done on a case by case basis… [so] will not often require significant additional County resources….

On the other hand, …new growth areas…will require significant investment of County resources, including both financial capital and numerous full-time staff…

The County must ensure that resources are not prematurely shifted away from corridor revitalization efforts and buildout of planned communities to plan for development in the new growth areas" (GP LU Element, Assumption-Based vs. Proactive Strategies, p. 25, emphasis added).

For example, staff involvement in the UWSP includes:

"County Accounting and Fiscal Services, County Counsel, Planning and Environmental Review, Transportation, Water Resources, Special Districts Section, Economic Development, Regional Parks, Libraries", and other departments, "which

shall be useful to County in the review and processing of the [UWSP] Specific Plan".[53]

Staff is required to extensively negotiate with applicants; develop, oversee, and/or review major planning documents, including 1,000-page environmental analyses and technical appendices; conduct numerous briefings, workshops, and hearings; catalog a voluminous administrative record over a multi-year planning period, and prepare multiple decision documents and entitlements; e.g., for the UWSP staff would be required to:

1. Amend the GP to expand the UPA and USB boundaries.
2. Amend the GP Land Use Diagram
3. Amend the GP Transportation Plan
4. Amend the Bicycle Master Plan
5. Amend GP text and policies to align policies with development in Natomas Joint Vision Area,
6. Amend the Zoning Ordinance
7. Ensure adequacy of and process adoption documents for an Urban Services Plan, Affordable Housing Strategy, Water Supply Master Plan, and Public Facilities Financing Plan Adopt a Water Supply Master Plan.

Further indication of work involved in processing "new growth" projects is outlined on County project websites.[54] [55].

17-21 cont.

4. The County has Improperly Prioritized New Growth

No GP policies direct that planning "new growth area" projects should have priority over infill, revitalizing urban corridors, and buildout of planned projects. To the contrary, the GP repeatedly warns against prematurely shifting resources to "new growth", as cited above. GPU Land Use Element Strategy IV, "Built Environment Preservation and Enhancement" discusses infill and corridor revitalization extensively.

But focusing the County's resources on new growth areas is exactly what the County has done.

The GP's admonishments have been ignored. As noted in Section III of these comments, the County has in recent years approved three very large, staff-intensive, "new growth area" projects (two outside the UPA), and is currently planning three more outside the UPA, including the UWSP, for a total of 56,310 DU. These recently adopted and planned projects would together provide 86 years of growth capacity at the historical growth rate shown in Table 2 of these comments.

Meanwhile, as shown in Section III of these comments, numerous already-approved "planned communities" await buildout; and since at least 2011 the County's 2008 infill program - which would have supported, "*revitalization efforts within existing*

[53] Sacramento County. Funding Agreement for Upper Westside Master Plan Process, Paragraph K. February 26, 2019.

[54] Sacramento County. Website: Jackson Township Specific Plan. Online (but out of date): https://planning.saccounty.gov/PlansandProjectsIn-Progress/Pages/JacksonTownshipSpecificPlan.aspx

[55] Sacramento County. Website: New Growth Areas and Master Plans. Online (but out of date): https://planning.saccounty.gov/PlansandProjectsIn-Progress/Pages/New-Growth-Areas-and-Master-Plans.aspx

communities" - has been moribund, and only recently re-activated with non-competitive State grant funds.[56]

The failure to follow the GP's clear direction to prioritize infill has resulted in shifting growth away from more efficient infill development, with low or no GHG, air quality, and open space impacts, to high-impact sprawl, contrary to State plans as, as noted in Section IV.A and elsewhere in these comments.

17-21 cont.

C. FAILURE TO ENSURE LOGICAL PROJECT BOUNDARIES

1. The GP Requires Logical Boundaries

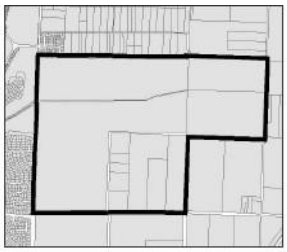
As reviewed in Section II.A of these comments, in 2011 the County adopted *"new growth management policies"* allowing project-specific expansion of the UPA, subject to specified conditions. The effectuating "new policies" are Policies LU-119 and LU-120. Policy LU-119 states in part:

"The County shall only accept applications to expand the UPA…if the Board finds that the proposal meets the following:

… Logical, comprehensive, and cohesive planning boundaries: Proposed UPA expansions/Master Plan processes must consist of a contiguous set of parcels that have a regular outside boundary consistent with the logical planning boundary illustrations below…".

17-22

LU-119 provides the following diagrams to illustrate "logical boundaries":



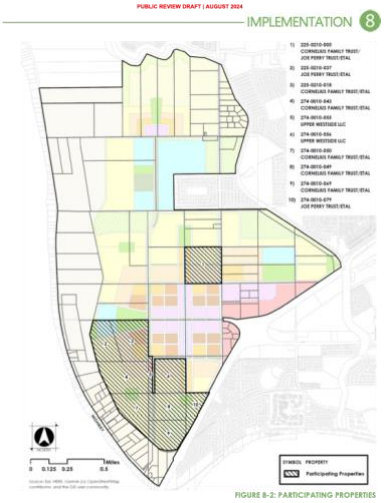
Example of logical planning boundary.

Example of logical planning boundary.

2. The UWSP Boundary is Not Substantiated as "Logical"

[56] Sacramento County. General plan of 2005-2030, 2023 Annual Report, p. 8.

UWSP boundaries are show on the following diagrams:



The diagram on the left (UWSP SEIR, Plate PD-3, "UWSP Area") displays an arbitrary, conceptual project boundary, evidently designed to comply with LU-119's "l*ogical, comprehensive, cohesive, contiguous"* criteria.

The diagram on the right (UWS Specific Plan, Chapter 18, Figure.

Since over 80 percent of the claimed project boundary is in the ownership of non-participating owners, absent further substantiation it appears speculative, at best, to assume the proposed boundaries will be realized so as to satisfy the LU-119 criteria.

Absence of "*Logical, comprehensive, and cohesive planning boundaries",* and an accurate notion of the actual project area, makes it impossible effectively plan for project features, including environmental impact mitigation.

17-22 cont.

D. FAILURE TO JUSTIFY USB BOUNDARY CHANGE

1. The Role of County Growth Boundaries

Sacramento County has adopted two growth boundaries, as described below:

"The UPA and USB are the backbone of Sacramento County's urban planning philosophy. These growth boundaries are intended to protect the County's natural resources from urban encroachment, as well as to limit costly sprawling development patterns…the USB is intended to be a permanent boundary" (GP LU Element, Strategy I: Logical Progression of Urban Development, p.19, emphasis added).

"Intent: The Urban Service Boundary (USB)… indicates the ultimate boundary of the urban area in the unincorporated County… based upon jurisdictional, natural and environmental constraints to urban growth. It is intended to be a permanent growth boundary not subject to modification except under extraordinary circumstances…

…The USB allows for the permanent preservation of agriculture and rangelands, critical habitat and natural resources…" (GP Land Use Element, Logical Progression of Urban Development, p. 20, emphasis added).

17-23

2. The SEIR Identifies No Justifying "Extraordinary Circumstances"

Contents

The SEIR offers no justification for its required project-specific expansion of the USB (p. 14-18). It only:

a. Provides bland assertions, absent substantiation, that the UWSP would be consistent with GP policies (e.g., pp. 5-19, 5-20, 5-23, 14-21, 14-23, 16-13, 22-60, passim)

b. Incorrectly asserts that, *"The Sacramento County 2030 General Plan includes a framework for considering requests to expand the USB and UPA and requires any expansion to meet a series of 'smart growth' performance criteria"*. (p. 14-21). Such a framework exists only for the UPA, as reviewed in Section II.A of these comments.

c. Notes that GP Policy LU-120 requires a statement of, *"how the development will connect to other adjacent…development within the USB"*. The question clearly is premised on the assumption that the development itself will be "within the USB". In response, the SEIR simply ignores its need for an expansion of the existing USB (SEIR Table LU-2, "PC-1",p. 14-24).

17-23 cont.

3. The Proposed Change Has Not been Subject to Environmental Review

The GPU states,

> *" Natomas Joint Vision Area. Subject to the preparation and certification of the appropriate environmental documentation, this development shall be accomplished...by an expansionof the USB…"* (GPU LU Element, p. 15).

Neither the GPU FEIR nor the UWSP SEIR provides the requisite "*appropriate environmental documentation"*.

E. FAILURE TO IMPLEMENT THE COUNTY'S 2011 PHASE I CAP

1. Policy Role of the Phase 1 CAP

When the County updated its General Plan in 2011, it did not identify substantive mitigation measures to reduce GHG. Instead, it obligated itself to, among other things, adopt a *"Community Climate Action Plan"* within one year, which would present GHG-reduction measures.

17-24

To help justify its deferral of mitigation and, "*rather than delaying County action",*[57] the County adopted, concurrent with the General Plan, a "*Phase I CAP, Strategy and Framework Document",*[58] meant to be the *"roadmap"* for the promised phase 2 Community CAP, which would *"flesh out"* the Phase 1 strategy.[59] In adopting the Phase 1 CAP, the Board affirmed its policy role as presenting,

[57] Sacramento County, General Plan FEIR, Chapter 2, "Climate Change", p. 12-33. April 2010., 2011.

[58] Sacramento County, Phase1 Climate Action Plan Framework and Policy Document. October, 2011. Online: https://planning.saccounty.gov/PlansandProjectsIn-Progress/Documents/Climate%20Action%20Plan/CAP%20Strategy%20and%20Framework%20Document.PDF)

[59] Sacramento County. GPU FEIR, p. 12-32. November 2011.

"…overall strategies and goals⋯ [to] augment and inform the Goals, Objectives, Policies and Implementation Measures of the 2030 General Plan"… [and provide] the foundation for the [Community] CAP components which follow".[60]

2. Phase 1 CAP and VMT Reduction

The Strategy document recognizes infill and VMT reduction as critical to reducing GHG emissions within the unincorporated County, e.g.:

"Since transportation accounts for more greenhouse gas emissions than any other sector in the County, reducing transportation-related GHG emissions is critical … As the land use planning authority for the unincorporated county, Sacramento County determines land use patterns, which in turn affect transportation patterns and therefore associated GHG emissions.

As VMT is directly tied to how communities are planned and developed, reducing VMT will require changes to and coordination of land use and transportation policy and practice. Channeling new development to urban areas…can increase walking, bicycling, and transit use and reduce per capita transportation-related emissions …compact development and …smart transportation policies, can significantly reduce carbon emissions. For example, compact development clustered around transit lines can reduce VMT per capita from 20% to 40%. (Ewing, 2008 (Ph1-FSD, p. 33)" (Sacramento County, Strategy and Framework Document, p. 6).

17-24 cont.

3. County Failure to Implement Phase I CAP's VMT-Reduction Focus

As noted above, rather than, "*Channeling new development to urban areas",* Sacramento County has since 2011 approved constriction of 12,287 new dwelling units (DU) in greenfield natural and working lands, and plans to approve 47,545 more such outside the UPA, including the present UWSP. Such sprawl development has far higher environmental impact than the "*compact development clustered around transit lines"* cited by the Phase 1 CAP, but subsequently ignored by the County in its development approvals.

F. FAILURE TO COMPLY WITH GPU REQUIREMENTS FOR ORDERLY, LOGICAL, EFFICIENT LAND USE

1. The GPU Directs Orderly, Logical, and Efficient Land Use

The GPU Land Use Element's overarching policy goal is that land use should be orderly, logical, and efficient.

17-25

a Land Use Element Section II, "Land Use Strategies and Policies", articulates the Land Use Element's fundamental goal (emphases added to quotes in this sub-section):

"Goal: An orderly pattern of land use that concentrates urban development… is functionally linked with transit…and protects the County's natural, environmental and agricultural resources".

[60] Sacramento County. Resolution of the Board of Supervisors of the County of Sacramento, State of California Adopting a Strategy and Framework Document. November 9, 2011.

The Section elaborates:

"Strategies for urban and rural development presented in this Element …have a common theme: efficient land and resource use. …achieved by …land use that concentrates development … to protect valuable agricultural and rangelands, conserve natural areas…, reduce travel distances, reduce air pollutant emissions, conserve energy, and enhance the efficiency of providing infrastructure . Efficient use of land requires reinvestment in existing communities… Efficiency is the central theme …" (GPU LU Element, p. 18, emphases added).

b. Strategy I: "Logical Progression of Urban Development", identifies the County's UPA and USB growth boundaries as the means to support "orderly", "systematic" development through logical geographic progression.

"Objective: Reserve the land supply to amounts that can be systematically provided with urban services and confines the ultimate urban area within limits established by natural resources". (;GPU LU Element, p. 20).

"The UPA and USB are the backbone of Sacramento County's urban planning philosophy. … intended to protect the County's natural resources from urban encroachment, as well as to limit costly sprawling development …". (GPU LU Element, p. 19)

Thae UPA and the USB are designed to promote maximum efficiency of land uses and protection of the County's natural resources (GPU LU Element, p.20).

17-25 cont.

***2.* The UWSP Would Not Provide Orderly, Logical, Efficient Land Use**

a. The UWSP would not be "Orderly" because,

i. It does not "*concentrate urban development*" - on the contrary, it disperses development onto open space distant from the urban core, claiming to justify its location by pointing to nearby small-scale sprawl, in effect arguing that past land use mistakes would somehow justify or mitigate its vastly increased leapfrog impacts.

ii. It is not *"functionally linked with transit"* and likely never will be, as discussed in Sections III.B and IV.C of these comments.

iii. It does not "*protect the County's natural, environmental and agricultural resources.*"; on the contrary it would diminish them.

iv. It would add to the cumulative dis-order resulting from the County's numerous, scattered, approved projects, and the enormous superfluity of entitled DUs. Future County land use - the timing, location, size, and intensity of future development - will be impossible to predict or plan for, because contingent on future un-knowable and un-coordinated market decisions by many individual home builders and investors, with a surfeit of entitled locations to choose from. The UWSP, individually and in tandem with other planned sprawl projects, would exacerbate this antithesis of "orderly" development.

17-26

b. The UWSP would not be "Logical", because it would ignore the UPA and USB boundaries, which are clearly identified in Strategy I as the way the County will achieve the GPU's primary land use goal: "*an orderly pattern of land use"*.

17-27

Contents

A fundamental failure of logic is that Sacramento County's 2011 adoption of Policies LU-119 and LU-120 untethered County land use decisions from both real-world market constraints;[61] and the logic of environmental resource protection as cited in the Land Use Element's fundamental Goal, and in numerous other sections and policies of the Land Use Element and other GP elements. 17-27 cont.

c. The UWSP would not be "Efficient", because the County's helter-skelter approvals, in disregard of the UPA and USB, confound rational long-term planning of infrastructure and protection of natural resources:

"Defining the Urban Policy Area is of key importance in the provision of urban services and infrastructure to the unincorporated County, as it provides the geographic basis for infrastructure master plans, particularly for public water and sewerage, which require large capital investment and relatively long lead time for the installation of capital improvements. …The UPA and the USB are designed to promote maximum efficiency of land uses and protection of the County's natural resources…. These two growth boundaries work in tandem to manage and direct future development, as well as provide infrastructure and service providers with intermediate and ultimate growth boundaries to use to plan for future expansion" (GPU LU Element, p. 20, emphasis added). " 17-28

G. THE PROBLEM OF THE GENERAL PLAN'S INCOHERENT GUIDANCE

General Plans represent a jurisdiction's efforts to balance many competing priorities, As such, total consistency across a plan's many policies may not always be achieved. Interpretation and reconciliation of inconsistencies is generally about policy issue best left to elected decision-makers most closely in touch with the temper of the community and intent of the plan.

At the same time, it is the purpose of a general plan to provide meaningful guidance to decision makers and the public on what the community values are, and to prevent arbitrary decisions. This the Sacramento County's GPU fails to do. The reason is that, as cited elsewhere in these comments, after completion of the 2010 FEIR, Policies LU-119 and LU-120 were added to the GPU, imposing a land use approach at odds with the original draft text that was reviewed by the EIR. In support of those new *laissez faire* policies, references to ***"new growth areas"*** were liberally grafted onto the Land Use Element's prior verbiage. But there was no attempt to reconcile the intrinsic conflicts with the pre-existing text, which was oriented to "*manage and direct"*, "*orderly, logical, efficient"* land use; with growth directed to infill of existing neighborhoods and build-out of approved projects within the UPA, and to protection of natural resources. 17-29

As a result, the Land Use element is replete with contradictory non-sequiturs defying sensible interpretation. The overall sense is that everything is possible, that there is

[61] "*[I]n 2011, the General Plan added policies…to allow applicants to request an expansion of the UPA anywhere within the USB, regardless of demand or existing capacity. The County's intent was to let the market determine the need and location for new growth…".* (Sacramento County, General Plan 2022 Annual Report, See these comments, Attachment 3, Section E.4 for further reference)

no conflict between throwing open the doors to sprawl (with accompanying land speculation) on one hand, and supporting the County's other growth strategies on the other (infill and buildout of approved projects, as reviewed in Section III.B of these comments).

For example:

"This Element's policies…direct future development…toward previously urbanized communities ***and strategically-located new growth areas*** *to:*

- *…improve…existing communities. Plan …commercial corridor…and protection of natural resource…implementing more compact land use patterns ….*
- *Infill vacant parcels and intensify development on underutilized lands improve… existing neighborhoods …relieve growth pressure on the urban fringe.*
- *…reduce automobile dependence,…*
- *Stimulate reinvestment in targeted commercial corridors…*
- *Direct growth toward previously urbanized areas* ***and strategic new growth areas*** *to reduce sprawling development, strengthen existing communities, relieve traffic congestion, improve air quality, preserve open space and natural resources, protect valuable agriculture and rangelands, and realize economies of scale for infrastructure and services.* GPY Land Use Element, p. 2).

17-29 cont.

How directing growth to, *"strategically-located new growth areas" (*all of which are in greenfields outside the UPA) will accomplish any of the diametrically opposed stated objectives is unexplained. The term "*strategic"* is undefined. With a few crude inserts, the "smart growth" intent of the earlier wording was contradicted and scrambled.

The Land Use Element has numerous such passages, e.g., on pp. 2, 19, 20, 24, 25.

With some sense of reality, the Element cautions that the other growth strategies should be given priority; but as shown in Section V.B of these comments, that caution has been ignored.

Presented with this morass of ill-considered, conflicting guidance, all emanating from policies LU-119 and LU-120 - which as discussed in section II.A of these comments were neither reviewed or substantiated in the GPU FEIR - we believe the most reasonable course is to refer to the Element's fundamental Goal, of orderly, logical, efficient land use, and its "backbone" Strategy I, respecting the UPA and USB.

The UWSP does not comply with either the Goal or the Strategy.

Contents

Thank you for considering our comments. As always, our goal is to support the County in adopting feasible, effective, and enforceable local climate change mitigation, as an important contribution to help achieve climate stability.

Sincerely,

Oscar Balaguer, Chair
350 Sacramento CAP Team

cc: Liaisons, CCL, ECOS, Sierra Club, SCC

CURRENT EFFECTS OF THE CLIMATE CRISIS

Temperatures on our planet are higher than any time prior to the last ice age, at least 125,000 years, and potentially going back at least 1 million years.[29] and potentially going back a million years. They are, on average, slightly more than 1 degree C. hotter than in the preindustrial period. It has not been as hot as this for at least 125,000 years, prior to the last ice age, and most likely longer, potentially going back at least 1 million years.[29]

The current rise in global average temperature is primarily caused by humans who have been burning fossil fuels since the Industrial Revolution. Fossil fuel use, deforestation, and some agricultural and industrial practices add to greenhouse gases.

Many climate change impacts have been felt in recent years, with 2023 the warmest year on record at +1.48°C (2.66°F) since regular tracking began in 1850.[21][22] Additional warming will increase these impacts and can trigger tipping points, such as melting all of the Greenland ice sheet.[23] Under the 2015 Paris Agreement, nations collectively agreed to keep warming "well under 2°C". However, with pledges made under the Agreement, global warming would still reach about 2.7°C (4.9°F) by the end of the century.[24] Limiting warming to 1.5 C would require halving emissions by 2030 and achieving net-zero emissions by 2050.[25][26][27][28]

Climate change is having an increasingly large impact on the environment. Deserts are expanding, while heat waves and wildfires are becoming more common.[7][8] Amplified warming in the Arctic has contributed to thawing permafrost, retreat of glaciers and sea ice decline.[9] Higher temperatures are also causing more intense storms, droughts, and other weather extremes.[10] Rapid environmental change in mountains, coral reefs, and the Arctic is forcing many species to relocate or become extinct.[11] Even if efforts to minimize future warming are successful, some effects will continue for centuries. These include ocean heating, ocean acidification and sea level rise.[12]

Climate change threatens people with increased flooding, extreme heat, increased food and water scarcity, more disease, and economic loss. Human migration and conflict can also be a result.[13] The World Health Organization (WHO) calls climate change one of the biggest threats to global health in the 21st century.[14] Societies and ecosystems will experience more severe risks without action to limit warming[15] and health impacts in the U.S. are already severe.[33]

July 2024 was globally the hottest ever recorded.[29] Sacramento County also broke high temperature records. According to the Weather Service, in July there were 26 days with temperatures over 100; nine of which were over 110°.[30] There were a record-breaking 16 consecutive days of temperatures over 100°, a one-day break and then nine more consecutive days over 100°. Previously, the largest number of consecutive days over 100 was ten, in July 1960.[31]

Sacramento never recorded a September temperature at/above 110F in 145 years until it hit 116 in September 2022. Beating a monthly record by 7 degrees is virtually unheard of. This was not anomalous. Highs have warmed 1.4 degrees since the 1940's. Scorching heat is accompanied by drought. In 2021, Sacramento experienced 212 days of no rain, a period higher than any on record. That dry spell ended with flooding: 5.44 inches fell in one day (October 24, 2021).[32]

CITATION LIST

1. *"GISS Surface Temperature Analysis (v4)". NASA. Retrieved 12 January 2024.*
2. IPCC AR6 WG1 2021, SPM-7
3. IPCC SR15 Ch1 2018, p. 54: "These global-level rates of human-driven change far exceed the rates of change driven by geophysical or biosphere forces that have altered the Earth System trajectory in the past (e.g., Summerhayes, 2015; Foster et al., 2017); even abrupt geophysical events do not approach current rates of human-driven change."
4. *Lynas, Mark; Houlton, Benjamin Z.; Perry, Simon (19 October 2021). "Greater than 99% consensus on human caused climate change in the peer-reviewed scientific literature". Environmental Research Letters. **16** (11): 114005. Bibcode:2021ERL....16k4005L. doi:10.1088/1748-9326/ac2966. ISSN 1748-9326. S2CID 239032360.*
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6. IPCC AR6 WG1 Technical Summary 2021, p. 67: "Concentrations of CO_2, methane (CH_4), and nitrous oxide (N_2O) have increased to levels unprecedented in at least 800,000 years, and there is high confidence that current CO_2 concentrations have not been experienced for at least 2 million years."
7. IPCC SRCCL 2019, p. 7: "Since the pre-industrial period, the land surface air temperature has risen nearly twice as much as the global average temperature (high confidence). Climate change... contributed to desertification and land degradation in many regions (high confidence)."
8. IPCC SRCCL 2019, p. 45: "Climate change is playing an increasing role in determining wildfire regimes alongside human activity (medium confidence), with future climate variability expected to enhance the risk and severity of wildfires in many biomes such as tropical rainforests (high confidence)."
9. IPCC SROCC 2019, p. 16: "Over the last decades, global warming has led to widespread shrinking of the cryosphere, with mass loss from ice sheets and glaciers (very high confidence), reductions in snow cover (high confidence) and Arctic sea ice extent and thickness (very high confidence), and increased permafrost temperature (very high confidence)."
10. IPCC AR6 WG1 Ch11 2021, p. 1517
11. *EPA (19 January 2017). "Climate Impacts on Ecosystems". Archived from the original on 27 January 2018. Retrieved 5 February2019. Mountain and arctic ecosystems and species are particularly sensitive to climate change... As ocean temperatures warm and the acidity of the ocean increases, bleaching and coral die-offs are likely to become more frequent.*
12. IPCC SR15 Ch1 2018, p. 64: "Sustained net zero anthropogenic emissions of CO_2 and declining net anthropogenic non-CO_2 radiative forcing over a multi-decade period would halt anthropogenic global warming over that period, although it would not halt sea level rise or many other aspects of climate system adjustment."
13. Cattaneo et al. 2019; IPCC AR6 WG2 2022, pp. 15, 53
14. *"We must fight one of the world's biggest health threats - climate change".*

15. IPCC AR6 WG2 2022, p. 19
16. IPCC AR6 WG2 2022, pp. 21–26, 2504
17. IPCC AR6 SYR SPM 2023, pp. 8–9: "Effectiveness[15] of adaptation in reducing climate risks[16] is documented for specific contexts, sectors and regions (high confidence)...Soft limits to adaptation are currently being experienced by small-scale farmers and households along some low-lying coastal areas (medium confidence) resulting from financial, governance, institutional and policy constraints (high confidence). Some tropical, coastal, polar and mountain ecosystems have reached hard adaptation limits (high confidence). Adaptation does not prevent all losses and damages, even with effective adaptation and before reaching soft and hard limits (high confidence)."
18. *Tietjen, Bethany (2 November 2022). "Loss and damage: Who is responsible when climate change harms the world's poorest countries?". The Conversation. Retrieved 30 August 2023.*
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22. *"Human, economic, environmental toll of climate change on the rise: WMO | UN News". news.un.org. 21 April 2023. Retrieved 11 April 2024.*
23. IPCC AR6 WG1 Technical Summary 2021, p. 71
24. United Nations Environment Programme 2021, p. 36: "A continuation of the effort implied by the latest unconditional NDCs and announced pledges is at present estimated to result in warming of about 2.7 °C (range: 2.2–3.2 °C) with a 66 per cent chance."
25. IPCC SR15 Ch2 2018, pp. 95–96: "In model pathways with no or limited overshoot of 1.5 °C, global net anthropogenic CO_2emissions decline by about 45% from 2010 levels by 2030 (40–60% interquartile range), reaching net zero around 2050 (2045–2055 interquartile range)"
26. IPCC SR15 2018, p. 17, SPM C.3: "All pathways that limit global warming to 1.5 °C with limited or no overshoot project the use of carbon dioxide removal (CDR) on the order of 100–1000 $GtCO_2$ over the 21st century. CDR would be used to compensate for residual emissions and, in most cases, achieve net negative emissions to return global warming to 1.5 °C following a peak (high confidence). CDR deployment of several hundreds of $GtCO_2$ is subject to multiple feasibility and sustainability constraints (high confidence)."
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28. Hilaire et al. 2019
29. The Guardian. Last month marked the world's hottest July on record, US scientists say. August 15, 2025. Online: https://www.theguardian.com/us-news/article/2024/aug/15/july-world-record-heat
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ATTACHMENT 2

THE IMPORTANCE OF LOCAL CLIMATE ACTION

CONTENTS

This section sets forth federal, State, regional, and County policy guidance relevant to the CAP.

A. FEDERAL GUIDANCE

The. US Environmental Protection Agency identifies "infill" as an effective way to reduce GHGs.

> **"*Smart Growth and Climate Change.*** *The way we develop our communities has significant impacts on greenhouse gas emissions. Communities can reduce greenhouse gas emissions from development and redevelopment if they: … Build compactly and use energy efficient, green building techniques, which reduce emissions from both electricity generation and transportation.*
>
> *… compact development can reduce vehicle miles traveled by 20 to 40 percent compared to conventional development. Based on the amount of development that will take place and the percentage of that development that could reasonably be expected to be compact infill, the study estimated that compact development could reduce carbon dioxide (CO_2) emissions by 7 to 10 percent in 2050"*
>
> (US Environmental Protection Agency. Smart Growth and Climate Change. Online: https://www.epa.gov/smartgrowth/smart-growth-and-climate-change

B. STATE GUIDANCE - CARB.

The California Air Resources control Board (CARB) is legislatively designated as the lead State agency to develop, implement, and monitor California's overall climate program. CARB is mandated to publish and periodically update a "Scoping Plan", describing the State's climate strategy. The Scoping Plan identifies local government action as key to meeting State climate targets,[62] particularly with regard to reducing the

[62] The State has established a number of statutory climate targets, including SB 32 (reduce GHG emissions to 40% below 1990 level by 2030); AB 1279 (reduce GHG emissions to 85% below 1990 levels and achieve net carbon neutrality by 2045); and SB 743 (sets CEQA determination of VMT significance for new projects at more than 85 percent of per capita regional average).

State's largest GHG source, VMT.

"Priority GHG Reduction Strategies,[63] *…[include] "… enable mixed-use, walkable, transit-oriented, and compact infill development"; …"Preserve natural and working lands … guide development toward infill areas and do not convert "greenfield" land to urban uses" (*Source: CARB. 2022 Scoping Plan, appendix D, Local Actions, p. 12. 2022. Online: https://ww2.arb.ca.gov/sites/default/files/2022-05/2022-draft-sp-appendix-d-local-actions_0.pdf).

C. REGIONAL GUIDANCE

1. **Sacramento Area Council of Governments.** SACOG is the designated regional planning agency for the six-County Capitol region. State law (SB 375) requires regional planning agencies, including SACOG, to develop and periodically update land use/transportation plans which, if implemented, would reduce per capita transportation-related emissions by 19 percent by 2035. The primary GHG-reduction strategy proposed for the 2025 update is that at least 2/3 of all future regional growth be infill.

2. **Sacramento Metropolitan Air Quality Management District**. SMAQMD is the air-quality (including GHGs) regulatory agency for the Sacramento region. The District has published best management practices to reduce the GHG impacts of new development; and has adopted a "Climate Action Priorities Plan"[64] to provide a roadmap for climate action in its seven-County jurisdiction and ensure eligibility for federal climate funding. SMAQMD identified five priority implementation projects, one of which *"focuses on reducing VMT by increasing residential density through infill housing and mixed-use development"*. The infill measure is the only one which can be certainly implemented using existing legal authority, without cost to taxpayers.

D. SACRAMENTO COUNTY GUIDANCE.

In its planning documents, the County extensively and consistently emphasizes the value and priority of infill development to accommodate County growth.

1. **The County General Plan**.

   General plans are the legal underpinning for local jurisdictions' land use decisions, and presents a vision for how a community will grow, reflecting community priorities and values. A jurisdiction's land use decisions must be consistent with the General Plan.

   Among other things:

   a. The General Plan's certified Final Environmental Impact Report (FEIR) committed to:

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63 "…designated as 'priority' because they are the GHG reduction opportunities over which local governments have the most authority and that have the highest GHG reduction potential" (CARB, 2022, Table 1)[64] Sacramento Metropolitan Air Quality Management District. Capital Region Climate Priorities Plan. February 2024. Online: http://www.airquality.org/residents/climate-change/climate-pollution-reduction-grants.

64 Sacramento Metropolitan Air Quality Management District. Capital Region Climate Priorities Plan. February 2024. Online: http://www.airquality.org/residents/climate-change/climate-pollution-reduction-grants.

i. Adopt a Phase 1, "Strategy and Framework" Climate Action Plan (CAP), concurrent with the GPU.
ii. Adopt a Phase 2 "Communitywide CAP" as specified, within one year.
iii. Implement a number of other measures.

Attachment 4 and 5 to these comments document the County's failures to fulfill almost all of its 2011 climate commitments

b. *"GOAL: An orderly pattern of land use that concentrates urban development, … functionally linked with transit, … and protects the County's natural… resources…… efficient land and resource use…can be achieved by committing to a pattern of land use that concentrates development…. Efficient use of land requires reinvestment in existing communities …*

"All problems identified above … focus on low-density, auto-dependent land use patterns that characterize the last several decades of urban development… Maintaining the status quo is unrealistic…"

(Sacramento County. General Plan Land Use Element, Land Use Strategies and Policies. Online: https://planning.saccounty.gov/Documents/B12. Land Use Element Amended 12-13-22.pdf)

c. The General Plan Emphasizes the Importance of Adopted Growth Boundaries.

"Objective: Reserve the land supply to amounts that can be systematically provided with urban services… within limits established by natural resources. The Urban Service Boundary (USB)… indicates the ultimate boundary of the urban area… It is intended to be permanent… The Urban Policy Area (UPA)… defines the area… expected to receive urban… infrastructure and services within the planning period. The UPA and the USB… promote… efficiency… and protect… natural resources… limiting arbitrary and sprawling development patterns" (see map at p. 18).

(Sacramento County. General Plan Land Use Element., "Logical Progression of Urban Development (p. 20).

d. Conflicting Language.

However, the General Plan also provides ambiguous or contradictory direction, e.g., Policy LU-3 states,

"It is the intent of the County to focus investment of public resources on revitalization efforts within existing communities, especially within commercial corridors, while also allowing planning and development to occur within strategic new growth areas".

Because the GP does not define "strategic", the practical application of policy LU-3 is subject to wide interpretation.

However, LU-3 also directs that,

"…the County must ensure that resources are not prematurely shifted away from corridor revitalization efforts and buildout of planned communities to plan for development in the new growth areas" (LU Element, p. 25).

The GP thus recognizes the practical tension between revitalizing existing communities and developing new areas, and cautions that the former should have priority, before "shifting" resource to outlying greenfield areas.

2. Phase 1 CAP, "Climate Framework and Strategy Document"

When the County updated its General Plan in 2011, State law [65] required it to mitigate the climate impacts of development authorized under the Plan. The County did not identify substantive mitigation measures to reduce GHG. Instead, it obligated itself to, among other things, adopt a "Community Climate Action Plan" (CAP) within one year, as specified, which would present GHG-reduction measures. (Section III.B below reviews the County's failure to meet almost all of its 2011 specified commitments).

To help justify its deferral of mitigation and "*rather than delaying County action"*,[66] the County adopted, with the General Plan, a "Phase 1 CAP, Strategy and Framework Document" (Strategy document),[67] meant to be the "roadmap" for the promised Phase 2 CAP, which would "flesh out" the Strategy document's measures. In adopting the Strategy document, the Board affirmed its policy role as presenting "*overall strategies and goals*"; meant to "*augment and inform the Goals, Objectives, Policies and Implementation Measures of the 2030 General Plan"; and to be, "the foundation for the CAP components which follow".*[68]

The Strategy document recognizes infill and VMT reduction as critical to reducing GHG emissions within the unincorporated County, e.g.:

> *"Since transportation accounts for more greenhouse gas emissions than any other sector in the County, reducing transportation-related GHG emissions is critical … the County influences emissions from transportation in several ways. As the land use planning authority for the unincorporated county, Sacramento County determines land use patterns, which in turn affect transportation patterns and therefore associated GHG emissions."*
>
> (Sacramento County, Strategy and Framework Document, p. 6. Online: https://planning.saccounty.gov/PlansandProjectsIn-Progress/Documents/Climate%20Action%20Plan/CAP%20Strategy%20and%20Framework%20Document.PDF).

3. The County Climate Emergency Declaration (CED).

In December, 2020, shortly before release of the CAP's first draft, the County adopted a Climate Emergency Declaration, citing the "… *risk of experiencing the devastating effects of extreme heat and weather events caused by rising atmospheric greenhouse gasses…."*

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65 California Environmental Quality Act (CEQA)

66 Sacramento County, General Plan FEIR, Chapter 2, "Climate Change", p. 12-33. November 2011.

67 Sacramento County, *Phase1 Climate Action Plan Framework and Policy Document.* October, 2011.

68 Sacramento County. "Resolution of the Board of Supervisors of the County of Sacramento, State of California Adopting a Strategy and Framework Document". November 9, 2011

The CED directed among other things that the pending CAP:

> *"…shall explain the County's approach to… achieve carbon neutrality by 2030, and… County staff shall evaluate the resources necessary… and… emergency action required… [and] shall identify [funding] gaps and… recommendations".*

Attachment 4, Section D presents the CED's directives and the County's failure to implement them.

4. The County Infill Program

The County adopted an infill Program in 2008 seeking to, *"improve regional air quality by reducing greenhouse gas emissions (GHGs) and vehicles miles traveled".* The program was short-lived and since at least 2011 apparently un-funded. In 2020 the County received State funding to update the Program; a website was posted;[69] and a consultant report completed. Based on this preliminary work, Supervisors adopted Resolutions on April 10, 2024 and June 4, 2024 directing staff to work on developing process- and policy-related initiatives.

We support this program; however, in practice the County continues a decades-old pattern of encouraging more sprawl, including now planning three huge projects outside the County's adopted growth boundary. At a May 16, 2024 SACOG meeting, attending County Supervisors stated they do not support plans to manage growth and intend to continue letting project proponents decide where and when development will occur.

This *de facto* commitment to sprawl makes substantial progress on infill unlikely, contrary to State guidance; regional planning; the County's own planning documents; and the urgent requirements of the climate crises.

[69] Sacramento County. Infill Development Program. Online: https://planning.saccounty.gov/Programs/Pages/InfillDevelopmentProgram.aspx)

SACRAMENTO COUNTY'S SPRAWL MITIGATION IS UNSUPPORTED

Sacramento County's 2011 General Plan Update (GPU) includes Policies LU-119 and LU-120, allowing County Supervisor's to expand the County's adopted Urban Policy Area (UPA) growth boundary on a project-specific basis.

The County's Final Environmental Impact Report (FEIR) did not (and could not) examine the potential environmental impacts of LU-119 and LU-120, because those policies were not formulated until after the FEIR was published.

Moreover, the FEIR's analyses of earlier, less impactful, precursors of LU-119 and LU-120, clearly indicate that those Policies have significant, unmitigated impacts.

Consequently, the UWSP cannot tier from the GPU FEIR's analysis of adopted policies LU-119 and LU-120

We substantiate these concerns below.

A. THE GPU'S "SMART GROWTH" BASIS.

The GPU explicitly states its basis as "smart growth" principles (GPU, Executive Summary, p. 1); and these principles are listed and referred to in the FEIR (GPU FEIR, p. 3-4 and passim) as:

1. Provide a variety of transportation choices, including walkable paths
2. Mix land uses
3. Take advantage of compact building and community design
4. Create a range of housing opportunities and choices
5. Strengthen and direct development toward existing communities
6. Foster distinctive, attractive communities with a strong sense of place
7. Preserve open space, farmland, natural beauty, and critical environmental areas. [70]

The FEIR further explains,

> *"The ultimate purpose of smart growth is sustainable communities, and is a reaction to the recognized health and safety impacts of urban sprawl and vehicle-centric development strategies".*

In explaining principle 2, "Mix land uses", the FEIR states,

> *"A mixed use project would involve multiple uses in the same building (e.g. a building with retail on the first floor and apartments on the second floor) or would at a minimum intersperse and blend multiple uses through a development rather than grouping most of the similar uses together. This involves the inclusion of neighborhood community retail*

[70] Courts have substantiated that directing growth to areas of existing development is intrinsic to smart growth: "*Smart Growth" i*s "*compact, efficient, and environmentally sensitive pattern of development that focuses future growth away from rural areas and closer to existing and planned job centers and public facilities, while preserving open space and making more efficient use of existing urban infrastructure"* (Golden Door Properties, LLC v. County of San Diego (2020) 50 Cal.App.5th 467).

centers, markets, and parks within a ¼ or ½ mile radius, rather than clustering these amenities in regional centers several miles from the average home". (GPU FEIR, p. 3-4).

B. THE FEIR DID NOT EXAMINE GP POLICIES LU-119 AND LU-120

The GPU includes Policies LU-119 and LU-120, allowing the County to expand the County's adopted Urban Policy Area (UPA) on a project-specific basis. As previously documented by 350 Sac,[71,72] and included here by reference, the April 2010 FEIR did not consider Policies LU-119 and LU-120 as adopted in the November 2011 GP, because those policies were developed after the FEIR's publication.

C. THE GPU FEIR ANALYZED JACKSON CORRIDOR PROJECTS WITH CONCERN

The GPU FEIR repeatedly and specifically refers to "Jackson Highway Corridor" projects because that was the only area then proposed for development outside the UPA. However, the FEIR's analysis, concerns, and conclusions with regard to Jackson Corridor are not necessarily limited to that geographic area and apply equally to any projects beyond the UPA boundary, as reviewed below.

The FEIR found that project-specific UPA expansion:

1. Conflicts with smart growth. "The Jackson Highway Corridor [73] conflicts with smart growth principles significantly…" (FEIR, p. 3-75).
2. Confounds Infrastructure Planning. "If this boundary [the UPA] is expanded more frequently than necessary or includes too much land, it makes the logical planning and prioritization of growth and infrastructure difficult to achieve. This policy conflicts with smart growth…" (FEIR, p. 3-39).
3. Undermines County goals, policies, and principles re infill, contiguous urban development and the "Smart Growth" principles which the General Plan claims to embody:[74]

   "Adding the Jackson Highway Corridor, the proposed General Plan can accommodate…more units than is necessary [to meet market demand].... Providing this superabundance of greenfield growth area is likely to draw development away from the more challenging infill and redevelopment projects …[and] it may prove difficult to attract redevelopment interest into the Commercial Corridors. Both because it includes substantial more area away from existing communities than is needed, and

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71 350 Sacramento. Comment letter, pp. 11-12**.** October 8, 2021. Online: https://drive.google.com/file/d/1ZAkYKMse0M-5RY6Ehjvh7CBbg2U3NCUM/view?usp=share_link.

72 350 Sacramento. Comment letter, pp 7-12. January 31, 2024. Online: https://drive.google.com/file/d/1XmNTvyfCgJQlSeHoJstUBlkIozLTX57H/view?usp=share_link

73 In 2010, only three candidates for GPA project-specific UPA expansion were proposed and discussed in the FEIR, all on the Jackson corridor: New Bridge, Jackson Township, and Jackson West (the first two of which are now approved). Subsequently, two more very large GPA projects in North Natomas were approved for planning and are in process. The FEIR's analysis would apply to all.

74 Such policies include: EN-10G, LU-1, LU-3, LU-4, LU-5, LU-6, LU-7, LU -8, LU-11, LU-23, LU-26, LU-60, LU-81, LU-33, LU-34, LU-68, LU-90, LU-57, LU-68, LU-74, LU-82, LU-108B

because it may divert other development away from existing communities, the Jackson Highway Corridor also conflicts with smart growth principle 5" (FEIR, p. 3-31 - 3-32).[75]

4. Creates "leapfrog pressure" and planning complications.

   "Ideally, development would proceed beginning within the areas closest to the urbanized areas and move outward, consistent with principle 5. The larger the area designated for growth becomes, the greater the potential that developments will be requested that are disconnected both from each other and from the existing urbanized area. This kind of scattered, or leapfrog, development makes it difficult to provide adequate transportation choices (principle 1) and walkable neighborhoods (principle 1). … it also causes difficulties with master planning transportation, drainage, and other infrastructure components. Overall, the proposed Jackson Highway Corridor conflicts so significantly with principles 5 and 7 [76] *that it outweighs the potential consistency with the other principles". (FEIR, pp. 3-31 - 3-32).*

5. Would cause significant impacts.

   "The…policy conflicts with smart growth principles…are of great import, because the policies deal with expansion of the Urban Policy Area… The physical effects…are significant". (FEIR, p. 3-40).

6. Is not needed. The FEIR identified three environmentally preferable ways to meet housing needs: development of the Easton growth area; the West of Watt new growth area; and redevelopment of Commercial Corridors adjacent the City of Sacramento.[77]

   "Among their advantages are adjacency to existing urban development, smart growth design, and access to transportation corridors and/or transit…consistent with the smart growth principles, impacts are less than significant". (FEIR, pp. 3-34 3-35)".

7. Could be mitigated in only one way:

   "The Jackson Highway Corridor conflicts with smart growth principles significantly, but the introduction of a policy requiring logical phasing of development in the area would reduce the impact to less-than-significant levels…See LU-1". (GP FEIR p. 3-75).

   "LU-1. Growth within the Jackson Highway Corridor and Grant Line East New Growth Areas shall be phased through master planning processes. The phases shall be defined by a specific geographic area, with the earliest phases closest in to the existing urban areas, and the later phases farthest outward. Each phase shall represent a geographic area that will accommodate no more than 10 years of growth, based on the latest SACOG projections. Development within the phases shall occur sequentially, and residential or commercial development in each subsequent phase

[75] Smart growth principle 5 is: "Strengthen and direct development toward existing communities" (GP FEIR p. 3-4)

[76] Smart growth principle 7: "Preserve open space, farmland, natural beauty, and critical environmental areas".

[77] The identified commercial corridors include those along Franklin Boulevard, Stockton Boulevard South and Central, Florin Road Area, Folsom Boulevard, Fair Oaks Boulevard West, Auburn Boulevard South, and Watt Avenue Central.

shall be prohibited until the prior phase is developed to at least 50% of holding capacity" (GP FEIR p. 3-35).

In the event, two of the three Jackson Corridor projects (NewBridge and Jackson Township) have been adopted under Policies LU-119 and LU-120 without regard to any of the requirements proposed in GPU FEIR LU-1; the third project is pending.

D THE FEIR REVIEWED A PRE-CURSOR TO LU-119/LU-120 WITH CONCERN

The FEIR did consider a then-proposed new Policy LU-120 which would "*allow for private applications to expand the UPA" (FEIR p.3-37 ff).* That policy was a precursor to the policy of the same name and to LU-119m which was subsequently adopted but with substantial changes noted below.

1. Regarding possible "applicant-initiated" expansion of the UPA, the FEIR states,

"Without demonstrating that there is no remaining area within the existing Urban Policy Area that can be developed, expansion of the UPA into these open space areas has the potential to conflict with smart growth policies 5 and 7". (FEIR p. 3-37).

Note: LU-120 as adopted does not require, *"demonstrating that there is no remaining area within the existing Urban Policy Area that can be developed"*.

2. Regarding the requirement for adjacency, the FEIR states:

"…the…criterion does not appear to conflict with smart growth principles, because it requires that the property be adjacent to existing land designated for urban uses and that its shape and extent comprise a logical extension of services. However, …the adjacent land need only be designated for urban uses – the criteria does not require that the adjacent land actually be developed with urban uses. This can lead to… expansion of the Urban Policy Area in a location that is isolated from the existing urban environment (leap-frog development) which conflicts with smart growth principles 5 and 7". (FEIR, pp. 3-37 - 3-38).

Note: This criterion for adjacency to an urban border rather than to actual urban development, which the FEIR points out as ineffective, is in fact adopted as an element of GPU Policy LU-119.

3. Regarding the requirement for a finding of either UPA insufficiency, or minor expansion, the FEIR states:

"… a 'logical or minor' expansion…[provides] no objective … criterion [and] could lead to…expansion of the Urban Policy Area…isolated from the existing urban environment in the open space areas…which conflicts with smart growth principles 5 and 7. The other option, that a 15-year supply of land is not available,…[conflicts with]… policy LU-121 [which] states that the Urban Policy Area is only intended to accommodate 25 years of growth … the 15-year criterion is not very restrictive. Long before the proposed Urban Policy Area has reached build-out, an applicant could successfully argue that the area needs expansion because it no longer contains a 15-year supply of land. This criterion conflicts with smart growth policies 5 and 7, because it may result in expansion into open space areas long before the land closer to the urbanized environment has been utilized". (FEIR, p. 3-38).

Note: Both of these criteria, critiqued in the FEIR as insufficiently protective, were discarded and not replaced in adopted GPU Policies 119 and 120. As cited below (section E.4), the County is approving projects, including those beyond the UPA, without regard to demand (or existing capacity). LU-119/120 do not set lower acreage limits, and the County allows small projects outside the UPA under Policy LU-124, which also was not subjected to review in the FEIR.[78]

E. THE COUNTY IGNORED THE FEIR's ANALYSIS.

1. Supervisors did not adopt the FEIR's proposed mitigation (LU-1).

Instead, they took three actions, none supported by the FEIR's findings:

a. Rejected policies to increase densities,

b. Reduced the amount of growth assumed within the approved UPA,

c. Approved two new land use policies permitting project-specific expansion of the UPA – LU-119 an LU-120:[79]

2. New Policy LU-119

LU-119 permits project-specific UPA expansion, requires that such expansions be contiguous to the existing UPA or a city boundary, and asserts that this assures urban continuity. However, because the UPA boundary is meant to delineate the furthest possible extent of development during the GPU's planning period, it will often not be built-out. As noted in the FEIR (see section D.2 above), the UPA boundary, originally established to demarcate the area within which growth would be accommodated, has become the malleable line from which further disjunct, greenfield encroachment can progressively expand, project-by-project, in "leap-frog" fashion.

3. New Policy LU-120

LU-120 directs the onsite form, but not the location, of development outside the UPA. Onsite mitigation was not considered as a mitigation measure in the FEIR and does not address the location-based problems identified in the FEIR as being inherent to "leapfrog" development.

4. The County's Rationale

According to the County's CEQA Findings,

> *"…accurately predicting future demand is difficult… Given turbulent market conditions that exist today, it is nearly impossible to accurately anticipate future housing demand".*[80]"

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78 Our previously-cited January 31, 2024 comments consider this concern in more detail.

79 Sacramento County. General Plan Update, Findings of Fact and Statement of Overriding Considerations (pp. 1-2). November 9, 2011. New Policy LU-120, directs the onsite form, but not the location, of such development. Onsite mitigation was not considered as a mitigation measure in the FEIR and does not address the location-based problems identified in the FEIR as being inherent to "leapfrog" development.

80 Sacramento County, GPU FEIR Findings, p. 2. November 2011.

As the County later explained,

> *"[I]n 2011, the General Plan added policies…to allow applicants to request an expansion of the UPA anywhere within the USB,*[81] *regardless of demand or existing capacity. The County's intent was to let the market determine the need and location for new growth…".*[82]

5. The Effect of the County's Action

In summary, the mitigation identified in the FEIR (LU-1) was not adopted, and the adopted mitigation, Policies LU-119 and LU-120, were not examined in the FEIR. In 2011 the County abandoned its responsibility to plan orderly, logical, efficient land use, and arranged to used its planning authority to invite inefficient "leapfrog" development outside the adopted County growth boundary, based on the dubious assertion that uncertainties in future growth made rational planning impossible. The observable result today is the multiple sprawl developments, out of all proportion to market demand, already adopted and being planned along the Jackson highway and in North Natomas, including the UWSP.

6. The County's Legal Justification.

The County's 2011 CEQA Findings of Fact recognize that the County's adopted measures are disparate with the FEIR's analysis, and justify the incongruity with an inapposite legal precedent, *Laguna Beach*,[83] which the Findings quote as:

> *"It is not unreasonable to conclude that an alternative not discussed in an EIR could be intelligently considered by studying the adequate descriptions of the plans that are discussed.*

However, we question whether adoption of measures not considered in the FEIR's analysis; the efficacy of which cannot be deduced from the FEIR's findings; and which in fact conflicts with the FEIR's conclusions, properly falls within the decision-scope of *Laguna Beach*.

F. CEQA CONSISTENCY

The UWSP SEIR tiers from the County's 2011 FEIR evaluation of environmental impacts associated with project-specific expansion of the UPA. Such tiering is inconsistent with the requirements of CEQA § 21094 because:

1. Significant effects were identified in the FEIR, but were neither mitigated or avoided.

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81 The Urban Services Boundary (USB) is the line designated in the General Plan as. "the boundary of ultimate growth beyond which it is intended urban services will never be provided, and which should be modified only under extraordinary circumstances" (Sacramento County. General Plan 2030, Land Use Element, p.20. November 2011).

82 Sacramento County. Sacramento County 2030 General Plan 2022 Annual Report, Attachment 1, p. 11. March 28, 2023. Online: https://agendanet.saccounty.gov/BoardofSupervisors/Documents/ViewDocument/ATT%201%20-%20Sacramento%20County%202030%20General%20Plan%2C%202022%20Annual%20Report%20Final.pdf?meetingId=7950&documentType=Agenda&itemId=409030&publishId=1222653&isSection=false

83 Village Laguna of Laguna Beach, Inc. v. Orange County Board of Supervisors (1982) 134 Cal.App.3d 1022, 1028-1029 (Laguna Beach)

2. The FEIR did not examine effects in sufficient detail to enable site-specific mitigation or avoidance , because:
    a. The FEIR did not, and could not, examine the effects of LU-119/120, since the policies were not formulated until after the FEIR was completed.
    b. In examining two precursor draft policies which similarly allowed project-specific expansion of the UPS (Jackson Corridor developments and an initial version of LU-120), the FEIR concluded they had fundamental conflicts with the “smart growth” principles on which the GPU was based, not amenable to site-specific mitigation or avoidance. Only one mitigation measure was identified as possible: FEIR mitigation measure LU-1 – managed phased development outward from the urban core, as discussed in detail in FEIR pp. 3-32 – 3-35).
    c. In adopting Policies LU 119 and LU-120, the County failed either to:
        i. avoid the problems the FEIR identified with the precursor policies;
        ii. adopt the FEIR’s proposed mitigation measure, LU-1;
        iii. adopt a Statement of Overriding Considerations to reconcile those failures.

SACRAMENTO COUNTY UNFULLFILLED CLIMATE COMMITMENTS

Contents

The County has failed to honor multiple legally binding GHG-reduction commitments, as reviewed below.

A. COUNTY GENERAL PLAN UPDATE CLIMATE MITIGATION (November 2011)

As required by CEQA, the County's FEIR identified and committed to mitigation for the GHG impacts of its 2011 General Plan update.[84] The full text of the County's promises is presented as Attachment 5 to these comments. In sum, the County promised to:

1. **General Plan.** Adopt the following measures into the General Plan.
2. **CAP.** Adopt a Phase 2 Climate Action Plan "*within one year… that includes economic analysis and detailed programs and performance measures, including timelines* … "
3. **Inventory.** Complete a GHG emissions inventory every three years.[85]
4. **Green Building.** Adopt a Green Building Program by 2012, and update at minimum every five years.
5. **Fee.** Adopt a development fee to fund the CAP.

Status: Not Done

1. The County did not accurately or faithfully include the climate measures in the General Plan – several were omitted or weakened as shown in Attachment 5, Table 1.
2. Thirteen years after the "one-year" commitment, no CAP has been adopted, and five draft CAPs were critiqued by 350 Sacramento and others as lacking the specified "detailed" elements, and feasible, effective, enforceable mitigation measures.
3. Only two GHG Inventories have been completed, out of five.
4. No Green Building program was adopted, or updates made.
5. No development fee has been adopted.

[84] Sacramento County. General Plan 2030 Final Environmental Impact Report, (GPU FEIR) "Mitigation Measures" (p. 12-39).

[85] Timely GHG inventories are critical for accurately forecasting future emissions and determining the resulting reductions needed to meet mandated targets; and to assess the efficacy of implemented measures. Implementation of the County's commitment would have yielded five updates to the then-existing 2005 Inventory, for base-years 2011, 2014, 2017, 2020, and 2023. The County has prepared only two Inventories, for base-years 2015 and 2021.

B. THE COUNTY'S PHASE 2, COMMUNITY-WIDE CLIMATE ACTION PLAN (2011-2024)

As noted above, in 2011 the County promised, among other climate actions, to adopt a CAP *"within one year… that includes economic analysis and detailed programs and performance measures, including timelines"*.

Status: Not Done. This long-overdue mitigation remains outstanding.
See Attachment 5 to these comments for further details.

C. THE GOVERNMENT OPERATIONS CAP (JUNE 2012)

A CAP focused on reducing GHG from the County's own operations (Gov Ops) was not specified in the County's 2011 mitigation commitments, and so is not legally required. However, such a CAP had been initiated before the General Plan update, apparently under a more pro-active Board, and was published in 2012. The 2012 Gov Ops CAP:

1. identified 25 specific measures to reduce GHG emissions by 6,363 MTCO2e/yr by 2020.
2. Committed to develop metrics to assess effectiveness of the Plan.
3. Committed to report progress to elected officials and public, and to update CAP as needed.

Status: Not Done

1. No indication of status of the 25 specified measures. has been made available.
2. No metrics, reports, or updates have been presented.
3. The latest draft CAP (July 2024) presents a new Gov Ops plan with no evident correlation to or mention of the 2012 plan.

D. THE COUNTY'S CLIMATE EMERGENCY DECLARATION (CED)

The County's December 16, 2020 CED committed to seven climate actions, including reaching net carbon zero by 2030. At a contentious July 11, 2023 Board hearing, staff proposed to delay that target date by 15 years to 2045 (the State's target for carbon neutrality). The Board declined to do so at that time, directing staff to return with it in September-October;[86] however that did not happen

Status: Not Done. None of the promised actions have been performed as specified. In August 2024, the County released for public review a sixth draft Climate Action Plan (CAP), including a *"Communitywide Carbon Neutrality Alternative* which would implement the CED's stated goal. The EIR dismisses this alternative as "*infeasible"*, and implementation as "*remote or speculative*". It seems the County intends the EIR alternative as a low-profile way to abandon the CED.

[86] CAP Radio. Sacramento County doesn't postpone 2030 climate goal — for now. July 12, 2023. Online: Online: https://www.capradio.org/articles/2023/07/12/sacramento-county-doesnt-postpone-2030-climate-goal-for-now/#:~:text=Sacramento%20County%20doesn't%20postpone%202030%20climate%20goal%20—%20for%20now,-Kristin%20Lam&text=Climate%20activist%20Saheb%20Gulati%20speaks,postpone%20a%20carbon%20neutrality%20goal.

SACRAMENTO COUNTY – GHG-MITIGATION COMMITMENTS

2011 General Plan 2030 Update,

Final Environmental Impact Report (FEIR)

Vol II, "Mitigation Measures", p. 12-39;
and
General Plan Policy LU-115, with Implementation Measures F. – I.

Commitments adopted into General Plan were substantially weakened (see Table 1 below).
Most measures remain unfulfilled in either version.

Greenhouse Gas Management Measures

CC-1. The following policy shall be added to the General Plan: It is the goal of the County to reduce greenhouse gas emissions to 1990 levels by the year 2020. This shall be achieved through a mix of State and local action.

CC-2. The following shall be included as implementation measures to the policy required by CC-1:

A. The County shall adopt a first-phase Climate Action Plan, concurrent with approval of the General Plan update, that contains the following elements and policies:

   a. The County shall complete a GHG emissions inventory every three years to track progress with meeting emission reduction targets.

   b. The County shall adopt a Green Building Program by 2012, which shall be updated a minimum of every 5 years.

   c. The County shall enact a Climate Change Program that includes the following:
      i. A fee assessed for all new development project**s** for the purpose of funding the ongoing oversight and maintenance of the Climate Action Plan.
      ii. Reduction targets that apply to new development (Table CC-9).[87]

   d. A section on Targets that discusses the 2020 reduction target.

B. The County shall adopt a second-phase Climate Action Plan within one year of adoption of the General Plan update that includes economic analysis and detailed programs and performance measures, including **t**imelines and the estimated amount of reduction expected from each measure.

C. The County shall update the Energy Element of the General Plan to include policies related to alternative energy production within the County, which may include General Plan Land Use Diagram."

[87] Sacramento County did not enact GHG thresholds of general applicability until December 16, 2020; after having used un-adopted thresholds to approve development projects over 350 Sacramento's objections.

TABLE 1, FEIR/GPU INCONSISTENCIES

Mitigation measures as presented in the FEIR and the GP are shown below.

Bolding highlights discrepancies.

FEIR MEASURE TITLE	**2011 GPU FEIR,** "Mitigation Measures"	**GP 2030, POLICY LU-115 , "**Implementation Measures"	**STATUS**
Implementation Measures	CC-2. **The following shall be included [in the GP]** as implementation measures to the policy required by CC-1	**–**	**Five listed measures were not included** in the GP (see below).
Adopt Phase I CAP Containing the Following:	CC-2.A. Adopt a first-phase Climate Action Plan, concurrent with approval of the General Plan update, **that contains the following**…	F. Adopt by resolution a first-phase Climate Action Plan, concurrent with approval of the General Plan update.	**Phase 1 Plan and GP do not include most elements** specified in the FEIR (see below).
• **Green Building Pgm**	CC-2.A.b. Adopt by 2012; update/5 years	**–**	**Not included** in Phase 1 CAP or GP. Never adopted.
• **Climate Change Pgm:**	CC-2.A.c. …enact a Climate Change Program that includes the following:	**–**	**Not included** in Phase 1 CAP or GP. Not in effect.
• **Fee**	CC-2.A.c.i. A fee…[on] new development... fund...oversight and maintenance of…CAP	**–**	**Not included** in Phase 1 CAP or GP. Never enacted.
• **Reduction Targets - New Development**	CC-2.A.c.ii. Reduction targets that apply to new development	**–**	**Not included** in Phase 1 CAP or GP (see footnote 40) .
• **2020 Targets**	CC-2.A.iii[88]. A section on Targets that discusses the 2020 reduction target.	**–**	Included in Phase 1 CAP; **not GP.**
• **Adopt Phase II CAP**	CC-2.B. Adopt **within 1 year;** include economic analysis, performance measures, timelines, reduction expected from each measure	H. Adopt ASAP, **within 3 years** …economic analysis, performance measures, timelines, reduction expected…	**Timeframe in GP is treble the FEIR's.** Neither schedule has been met. Draft. CAPs have not credibly included specified elements.

[88] Mislabeled in FEIR as "d."

Letter 18

October 28, 2024

TO: CEQA@saccounty.net

FROM: Patrick Tully, President Garden Highway Community Association (GHCA)

SUBJECT: Comments on the UWSP EIR

Issues Throughout the EIR

Falsehoods, Inaccuracies, Misrepresentations

EIR's are intended, by law, to present the public and decision-makers with factual, evidence-based, unbiased information about current circumstances and a project's potential impacts. The UWSP EIR throughout contains false, inaccurate, and misleading statements, raising questions about the truthfulness, completeness and accuracy of the entire EIR document. False statements must be deleted. Misleading statements must be clarified. The EIR does not meet legal requirements or serve the public or decisionmakers if it is not reliably thorough and accurate. 18-1

The project applicant does not have the necessary entitlements to proceed with the project. The UWSP EIR identifies changes the project applicant is seeking to the County's 2030 General Plan policies, County zoning, to the Urban Services Boundary, and to the Urban Policy Area, among others. But throughout the EIR, the EIR makes false claims that the project does not conflict with County plans and policies. That is not true. If the UWSP project was already consistent with, and had no conflicts with County plans and policies, then the project would not be seeking amendments and other entitlements in order to be compliant. 18-2

Under Agricultural Resources, the EIR says, "the proposed UWSP would not conflict with existing agricultural use and zoning." That is untrue. The project site is mostly zoned and used for agriculture and would be rezoned for urban uses, a violation of County policy. Under Land Use, the EIR says, "the proposed UWSP would not conflict with Sacramento County's Land Use Plans." That is inaccurate. There is a long list of County land use plans, policies and codes that the UWSP project seeks to change in order for the project to comply with and not to be in conflict with County policies. 18-3

Under Growth Inducement impacts, the EIR completely fails to address growth inducement impacts directly due to the project applicant's requested changes to County plans, policies and codes. 18-4

The EIR is required by law to identify existing conditions and accurately state impacts from a proposed project. The current zoning for the project area is largely agricultural and has not yet changed. The EIR cannot legally assume a proposed project has entitlements it does not have, such as in the Agricultural Resources section where the EIR says, "Because the entitlements requested as components of the proposed UWSP would change the zoning to make it consistent with the proposal, the proposed UWSP would not conflict with zoning for agricultural use within the UWSP area." That statement is grossly inaccurate, violates the legal requirements for an EIR, and it and any similar assumptions in the EIR that the project applicant has entitlements that the project applicant does not have and is seeking, should be removed. 18-5

Statements in the EIR must be deleted that say or suggest the UWSP project complies with or is consistent with County land use plans, policies and codes when in fact the UWSP does not currently comply with those County policies and when in fact the UWSP is seeking to change those County policy in order to comply.

Any statement that the project agrees in principle with or agrees with objectives in County plans and policies must be restated to make clear that the project does not in fact comply with County plans and policies, and changes would be needed to County plans, policies and codes for the project to comply and not conflict with County policies. 18-6

Mitigation is not Preservation

Throughout the EIR, the County's preservation policies are inaccurately equated with mitigation. The County has policies to preserve habitat and farmland. To preserve means to keep as is, intact. If habitat and farmland that County policy seeks to preserve are lost to urbanization, then there is a significant impact that is not identified in the EIR. Mitigations attempt to replace the loss somewhere else, but that is very different than keeping what exists intact. If the UWSP project is approved, an impact is that the farmland and habitat County policies sought to protect is lost forever. Mitigation may lessen the impact of the environmental harm but does not change the fact that farmland and habitat is not preserved where it currently exists. If I accidentally destroyed a family heirloom you were preserving, I could mitigate the loss by paying you, but the loss would remain. 18-7

Impacts Not Identified

The County's stated General Plan, Urban Services Boundary, and Urban Policy Area policies are intended to reduce urban sprawl and its impacts, preserve habitat and open space, and protect local farming. The UWSP project would have significant environmental impacts that conflict with those policies. These impacts should be and are not fully stated in the EIR. 18-8

Mitigations Outside Sacramento

The EIR fails to state that when mitigations occur outside Sacramento, Sacramento residents lose the benefits of those resources in their community. 18-9

Tables-Charts

The EIR is intended to be a public information document with clearly presented information. As recommended in CEQA guidelines, graphics help decisionmakers and the public rapidly understand the documents. The UWSP EIR would greatly benefit from more charts and tables where existing conditions and proposed changes are easier to see and compare, such as for commercial and retail square footage discussed under Urban Decay, in sections on agricultural acreage, housing units and elsewhere in the EIR where there are presentations of a lot of numbers that should be presented in tables for easy comparison. 18-10

Comments Specific to EIR Sections

Aesthetics

- The EIR notes that nighttime lighting from the UWSP project would have a permanent impact in the area. But the EIR fails to adequately address the harmful impacts of nighttime lighting on human health and on wildlife, including migratory birds using the Pacific Flyway.

- The EIR fails to identify possible nighttime lighting mitigations, such as establishing a minimum one-half mile setback between the UWSP project and any rural areas (i.e. Garden Highway), with the setback to include a minimum 100-foot-wide densely planted tree buffer of tall native evergreen trees at the western project boundary, with the setback established and the tree buffer installed before the first stage of project construction. 18-11

Agricultural Resources

- The proposed UWSP project site is currently primarily farmland classified as prime farmland, farmland of statewide importance, unique farmland, and farmland of local importance. The EIR fails to state clearly that the UWSP project violates County policies that say the County shall protect these types of farmlands located outside of the Urban Services Boundary from the urban encroachment represented by the UWSP project. 18-12

- The UWSP is requesting a General Plan amendment to rezone prime farmland for urban use. The EIR fails to state clearly that the UWSP request conflicts with existing County policy which says the County shall not accept applications for General Plan amendments outside the Urban Services Boundary redesignating valuable farmland for urban use. 18-13

- The EIR fails to adequately assess impacts from changes the UWSP is proposing to County policies regarding farmland preservation. 18-14

- The EIR says, "the proposed UWSP would not conflict with existing agricultural use and zoning." That is not true and must be deleted. The UWSP would conflict with existing agricultural use and zoning, turning farmland to urban use. 18-15

- The EIR says, "Because the entitlements requested as components of the proposed UWSP would change the zoning to make it consistent with the proposal, the proposed UWSP would not conflict with zoning for agricultural use within the UWSP area." That statement is inaccurate, violates the legal requirements for an EIR, and should be removed. The project does not have requested entitlements. Project impacts must be assessed based on existing conditions. 18-16

- The EIR fails to make clear that County policy is focused on farmland rather than on land zoned for agriculture. Land zoned for agriculture may or may not be used for farming. The EIR should more clearly present the current number of acres available for farming, the number acres of farmland the UWSP project would rezone to urban uses, the number of acres of land available for farming if the project is approved, and the number of acres of farmland (land available for farming) that would be lost if the project is approved. 18-17

- The UWSP EIR gives the inaccurate impression that 534 acres of the UWSP would remain as farmland. That is not correct. The EIR must make a clear distinction between the acreage of land that can be farmed if the project is approved, and the acreage of agriculturally zoned open space land (buffer) that will not be used for farming. 18-18

- The EIR fails to identify that land in the UWSP area that would remain available for farming will be long and narrow, just 700 feet wide in some areas, bisected in 4 places by heavily trafficked project roads, and within 30-50 feet of UWSP urban activity conflicts, which together could make the remaining farmland impractical for any commercial farming. If that happened, it would mean the project would wipe out 100% of the farmland in that area – farmland County policy seeks to preserve. 18-19

- If County zoning has setback requirements between farming and urban activity, those setbacks should be clearly identified in the EIR. If the County does not have such setback requirements, the EIR team should contact an appropriate government agency or reputable nonprofit organization that has studied what setbacks should occur between farming and urban activity in order to avoid urban conflicts, and the findings of that research should be included in the EIR next to the proposed setback. The proposed setback of 30-50 feet, basically the width of a rural roadway, seems wholly inadequate. 18-20

- In considering impacts, the EIR fails to make clear that farmland provides multiple community benefits such as health benefits associated with open space, wildlife habitat, fresh food produced locally, as a food resource when there are disruptions to the food distribution system such as happened during the pandemic, and as a flood protection area between the Sacramento River and the Sacramento community. 18-21

Air Quality

- The EIR asserts, with no evidence, that the majority of employment related vehicle trips, and the pollution they create, will be to downtown Sacramento. It is wrong for the EIR to present VMT data as fact when it is not based on evidence. Focusing so much on VMT to downtown Sacramento serves to minimize air pollution generation data. The EIR should have considered VMT more realistically to multiple job centers. While downtown Sacramento is a job center, Sacramento County has more jobs than downtown, as noted in the EIR. Yolo County and Placer County are also job centers. 18-22

- The EIR fails to adequately address that project related air pollution and its resulting serious health impacts, as well as project construction dust, could be more severe on Garden Highway because of the prevailing wind that blows toward Garden Highway. Again, this impact could be partially mitigated by establishing a minimum one-half 18-23

mile setback between the UWSP project and any rural areas (i.e. Garden Highway), with the setback to include a minimum 100-foot-wide densely planted tree buffer of tall native evergreen trees at the western project boundary, with the setback established and the tree buffer installed before the first stage of project construction. 18-23 cont.

- The EIR fails to adequately address that project related air pollution and its resulting serious health impacts would directly impact children in UWSP area schools. 18-24

Biological Resources

- Sacramento County's 2030 General Plan and Urban Services Boundary explicitly state the purposes of the plans, in part, are to preserve habitat and open space. The UWSP project would violate those County goals. The EIR fails to state those violations clearly and fails to clearly and honestly identify impacts from the UWSP violation of those goals. 18-25

- Sacramento County policy says planning and development of new growth areas should be consistent with Sacramento County-adopted Habitat Conservation Plans and other efforts to preserve and protect natural resources. The UWSP project would put urban activity in a habitat conservation corridor in violation of County policy. The UWSP is not currently consistent with the Natomas Basin Habitat Conservation Plan and the Metro Airpark Habitat Conservation Plan. The UWSP conflicts with habitat conservation plans and conflicts with County policy are not clearly identified in the EIR and should be explicitly stated. 18-26

- The EIR fails to discuss the UWSP project impacts to the Sacramento River riparian area by putting urban development so close to the Sacramento River and its unique biological resources, habitat, and provision of a habitat corridor. 18-27

- Sacramento County policy is to actively plan to protect, as open space, areas of natural resource value, which may include but are not limited to wetlands preserves, riparian corridors, woodlands, and floodplains associated with riparian drainages. The EIR fails to point out that the UWSP project area is in the Sacramento River corridor, less than 1,000 feet from the Sacramento River. The EIR says, "No wetlands preserves, riparian corridors or floodplains associated with riparian drainages are present in the UWSP area so none will be affected by the project's development." That is incorrect. The farmland soils, wildlife and other biological resources present within the UWSP area are associated with proximity to the river and are part of the Sacramento River corridor. 18-28

- The UWSP EIR falsely equates the County's stated goals of habitat preservation with habitat mitigation. The EIR says the project's approach for habitat and biological resources present within the UWSP area is to provide compensatory mitigation. Mitigation is very different from the County's goal of preservation. Preservation means to keep as is, in place. Mitigation means to make a significant impact, such as loss of habitat, less severe. Making an environmental impact less severe still means there is an impact. The EIR should make clear the distinction between preservation and mitigation. The EIR should also make clear that even with compensatory mitigation, the UWSP project would still have a significant negative impact on existing area habitat and wildlife, and that loss would be permanent. 18-29

Hydrology and Water Quality

- Sacramento County policy is to actively plan to protect, as open space, areas of natural resource value, which may include but are not limited to riparian corridors and floodplains associated with riparian drainages. The EIR fails to point out that the UWSP project area is in the Sacramento River corridor, less than 1,000 feet from the Sacramento River. The EIR says, "No wetlands preserves, riparian corridors or floodplains associated with riparian drainages are present in the UWSP area so none will be affected by the project's development." That is incorrect. Farmland soils, wildlife and other biological resources, and tribal cultural resources present within the UWSP area are associated with proximity to the river and are part of the Sacramento River corridor. The EIR fails to provide this information. 18-30

- The EIR fails to identify that the proposed UWSP would put new urban development in the Sacramento River floodplain. In addition to exposing new populations to flooding, the impervious surfaces associated with urbanization increase flood risk beyond the project area. While the new Natomas levee is expected to provide 200-year flood protection from the Sacramento River, climate change increases the chance of extreme flooding. Recent flooding in Ashville, North Carolina is proof of that. Around the United States, communities are starting to reserve land near waterways to use as open space for flood protection. Current open space and farmland in the UWSP project area provides an additional level of community flood protection. The EIR fails to indicate that the proposed UWSP project would eliminate this community flood protection. 18-31

Land Use

<u>Violations of County Plans and Policies</u>

- Sacramento County's 2030 General Plan was intended to promote the efficient use of land, encourage economic vitality and reduce urban sprawl and its impacts, preserve habitat and open space, and protect local farming. The Urban Services Boundary was intended to implement that vision and promote orderly growth within the County. The EIR fails to state that the UWSP project violates the County's 2030 General Plan, County zoning, the Urban Services Boundary, the Urban Policy Area, and SACOG's Blueprint for regional development. The EIR fails to clearly and honestly identify impacts from the UWSP violation of those goals and fails to identify impacts from proposed changes to County policies. 18-32

- The EIR falsely says, "the proposed UWSP would not conflict with Sacramento County's Land Use Plans." That is not true. The UWSP violates the County's General Plan land use policies, as well as the Urban Services Boundary, the Urban Policy Area, and zoning policies. False statements do not belong in the EIR and should be removed. 18-33

- County policy says planning and development of new growth areas should be consistent with Sacramento County-adopted Habitat Conservation Plans and other plans and policies to preserve and protect natural resources within an existing community. The EIR then falsely says the UWSP proposes development that would be consistent with the County's growth management policies. The UWSP project violates current County General Plan, Urban Services Boundary and Urban Policy Area growth management policies. False statements must be removed from the EIR. 18-34

<u>USB Violation</u>

- The UWSP EIR does not present or discuss that Sacramento County has an Urban Services Boundary policy that says the County <u>shall not</u> expand the Urban Service Boundary unless there is inadequate vacant land within the USB to accommodate the projected 25-year demand for urban uses…" The EIR does not state clearly under Land Use that there is adequate vacancy inside the Urban Services Bounday for the number of housing units and commercial space the project proposes. 18-35

- The EIR offers no rationale for the County approving urban development outside the Urban Services Boundary. 18-36

- One of the goals of the Urban Services Boundary was to encourage infill development. Infill development advantages residents inside the new development and infill development adds vitality and benefits to the nearby community, maximizes the cost-efficiency of urban services such as transit, and reduces environmental impacts associated with urban sprawl. The EIR fails to discuss ways in which allowing development outside the Urban Services Boundary discourages infill development and disadvantages communities inside the Urban Services Boundary. 18-37

River Corridor Conflicts
New Urban-Rural Land Use Conflicts

- Other than changing the aesthetics and rural character of the area, the EIR fails to address impacts from putting urban development within 700 feet of rural residential zoning, changing the expectations for area rural residents choosing to live in a rural residential zone (this is true for Garden Highway rural residential homeowners and homeowners on UWSP area farmland). 18-38

-The EIR should and does not identify feasible mitigations that might reduce urban-rural conflicts for a project like UWSP near rural residential areas like Garden Highway, such as requiring that the 20–30-year UWSP project construction begin closest to existing urban uses (i.e. near El Centro road), reaching rural areas last (i.e. Garden Highway), and this impact could be partially mitigated by establishing a minimum one-half mile setback between the UWSP project and any rural residential areas (i.e. Garden Highway), with the setback to include a minimum 100-foot-wide densely planted tree buffer of tall native evergreen trees at the western project boundary, with the setback established and the tree buffer installed before the first stage of project construction. 18-39

- If County zoning has setback requirements between rural residential zoning and urban activity, those setbacks should be clearly identified in the EIR. If the County does not have such setback requirements, the EIR team should contact an appropriate government agency or reputable nonprofit organization that has studied what setbacks should occur between rural residential zoning and urban activity in order to avoid conflicts, and the findings of that research should be included in the EIR next to the proposed setbacks. 18-40

Noise

- The EIR fails to adequately address the impacts from a proposed stadium, which would be close to residences in and all around the UWSP project area, including Garden Highway. Stadium traffic, noise, and light do not belong in or near residential areas. Stadium noise can travel miles. County and City Code Enforcement offices and Sacramento stadium operators can confirm stadium conflicts with residential areas. Any stadium should be miles from any homes. 18-41

- The EIR fails to adequately address the impacts from amplified sound from the UWSP area, such as at the outdoor pavilion. Amplified sound should be prohibited in all residential areas. In the past, developers and the County have said that amplified sound can be regulated to minimize impacts. That has proven to be untrue. Over time, sound equipment and the location of speakers can change and noise makers like bull horns and portable sound systems can be introduced, resulting in uncontrolled noise that can travel more than 2 miles. 18-42

- The EIR fails to identify the health impacts of traffic noise, school and park noise, and amplified noise from the outdoor pavilion and stadium. 18-43

- The EIR fails to adequately address that project related noise, as well as project construction noise, could be serious impacts on Garden Highway residents because of the prevailing wind that carries sound toward Garden Highway. 18-44

Population and Housing

- The EIR should, and does not make clear that the UWSP has no commitment to a specific number or percentage of the type of housing Sacramento needs, including very affordable, affordable, missing middle duplexes and triplexes, senior housing and handicapped housing all located near transit. 18-45

- The EIR should and does not make clear that the UWSP has no commitment to including affordable housing as part of each housing development, so affordable housing is integrated in each phase of development, and not targeted for one area of the project, or built in the last phase of development in 20-30 years. 18-46

- The EIR should and does not make clear that the UWSP is unlikely to result in the development of any housing for at least 7 years (the projected time for construction of Phase 1). This project will not help with Sacramento's urgent housing needs. 18-47

Public Services and Recreation

- The EIR fails to mention that County policy says the County shall not provide urban services beyond the Urban Policy Area (UPA), because it is the intent of the County to focus investment of public resources on revitalization efforts within existing communities. The EIR fails to mention that the UWSP project violates this policy, and the EIR fails to identify impacts from the UWSP's violation of this policy. 18-48

- The EIR fails to indicate that the extension of public services to the project area is unanticipated and unplanned. 18-49

- The EIR fails to say the UWSP has no control over when some of the services and recreation areas would be available in the project area, which would, at least, increase vehicle trips to access services in other areas. 18-50

- The EIR fails to identify harms caused by the unplanned extension of public infrastructure and services to accommodate the UWSP outside the Urban Services Boundary and the Urban Policy Area, particularly the harms to the County's efforts to focus investment of public resources on revitalization efforts within existing communities. 18-51

Transportation

- The project EIR says traffic safety is a key consideration. However, the EIR fails to adequately address the severe and dangerous impacts UWSP traffic would have on the Garden Highway roadway and existing Garden Highway roadway users. The EIR suggests the project could add 4,000 trips a day on Garden Highway. Garden Highway is a rural 2-lane, undivided, elevated roadway. Garden Highway is half the width it should be for traffic safety. It has blind curves, no shoulders and no guard rails. The greatest safety issue on Garden Highway, which the EIR fails to identify, is the mixed use of the road by personal vehicles, semitrucks, agricultural equipment, cars pulling boats, golf carts, individual and groups of cyclists, pedestrians, and wildlife, any of which can enter the roadway unexpectedly from farm roads, driveways, and the riverbank. Adding traffic to Garden Highway has life safety consequences which cannot be mitigated. 18-52

- The EIR fails to identify that a mitigation to serious Garden Highway traffic and other rural road safety impacts identified in the EIR is to reroute UWSP traffic to avoid and actively discourage UWSP traffic from using rural roads including Garden Highway. 18-53

- The EIR fails to identify that adding traffic to Garden Highway would change the physical safety characteristics and make recreational use of Garden Highway too dangerous for cyclists and for vehicle clubs such as antique car clubs and motorcycle groups, eliminating a valuable Sacramento recreational opportunity. 18-54

- The EIR fails to highlight that the UWSP would introduce freeway and rural roadway traffic hazards for Sacramentans for which the project applicant has no ability to compel or control mitigations. That could subject Sacramento roadway and freeway users to increased traffic safety hazards, potentially for many years. 18-55

- The EIR asserts, with no evidence, that most employment related vehicle trips will be to downtown Sacramento. It is wrong for the EIR to present VMT data as fact when it is not based on evidence. Focusing so much on VMT to downtown Sacramento serves to minimize VMT. The EIR should have considered VMT more realistically 18-56

to multiple job centers. While downtown Sacramento is a job center, Sacramento County has more jobs than downtown, as noted in the EIR. Yolo County and Placer County are also job centers. 18-56 cont.

- The EIR fails to consider traffic impacts on the surrounding area from the UWSP stadium, outdoor pavilion, or schools. 18-57

- The EIR fails to suggest traffic mitigations such as locating UWSP traffic generating uses (e.g. stadium, outdoor pavilion or schools) near major roadways and commercial uses to reduce traffic dangers, congestion, noise and air pollution in residential areas. 18-58

- The EIR fails to mention that County policy says the County shall not provide urban services, such as road improvements and transit, beyond the Urban Policy Area (UPA), because it is the intent of the County to focus investment of public resources on revitalization efforts within existing communities. The EIR fails to present the impacts from the UWSP violation of this policy and the impacts from the changes to this policy proposed by the project applicant. 18-59

- The EIR fails to identify impacts caused by the unplanned extension of public infrastructure and services, such as transit and roadway improvements, to accommodate the UWSP outside the Urban Services Boundary and the Urban Policy Area, particularly the harms to the County's efforts to focus investment of public resources on revitalization efforts within existing communities. 18-60

Tribal Cultural Resources

- While the UWSP would have a holistic impact on the tribal cultural landscape, the EIR fails to identify priority sites for tribal resource protection within the UWSP area. 18-61

Utilities

- The EIR fails to state that the UWSP violates the County's Urban Services Boundary policy which says that the County shall maintain an Urban Services Boundary (USB) that defines the long-range plans (beyond twenty-five years) for urbanization and extension of public infrastructure and services. The EIR fails to identify impacts associated with this violation and UWSP impacts associated with proposed changes to the County's Urban Services Boundary policy. 18-62

- The EIR fails to mention that County policy says the County shall not provide urban services beyond the Urban Policy Area (UPA), because it is the intent of the County to focus investment of public resources on revitalization efforts within existing communities. The EIR fails to identify UWSP impacts associated with this violation and impacts associated with proposed changes to the County's Urban Policy Area policy. 18-63

- The EIR fails to identify harms caused by the unplanned extension of public infrastructure and services, such as utility services, to accommodate the UWSP outside the Urban Services Boundary and the Urban Policy Area, particularly the harms to the County's efforts to focus investment of public resources on revitalization within existing communities. 18-64

Other Resource Topics- Wildfire

- The EIR says the UWSP is outside an area where CalFire establishes fire hazard zones. Then the EIR makes the misleading statement that the project area is not in a fire hazard zone. It is wrong to say, and dishonest to leave the impression that the area has been assessed for fire hazard when it has not been assessed by CalFire or any other fire 18-65

agency. The EIR should delete incorrect and misleading information and just say the area has not been assessed for wildfire risk and the wildfire risk is unknown. 18-65 cont.

- The EIR is also incorrect about area conditions that could contribute to a wildfire hazard. There is heavy wooded growth adjacent to the river, less than 1,000 feet from the project area, from Sacramento up into rural wildfire hazard areas in Butte County. There are also at different times of the year dried crops and hay bales on farmland on both the Yolo and Sacramento sides of the Sacramento river that could and have caught fire (hay bales can be seen in EIR photos). A wind driven fire could easily jump the river as it has jumped freeways. The 2017 Tubbs fire burned into the City of Santa Rosa where more than a dozen people lost their lives and more than 2500 homes and one Hilton Hotel were destroyed. Wildfire could happen in the project area. 18-66

Cumulative Impacts

- The UWSP projects a 20–30-year buildout. The EIR fails to address ongoing impacts from construction noise, dust, traffic, etc. on area residents over an extensive period of time during which time mitigations the project applicant does not control may not be available to diminish impacts on existing area residents and new project area residents. 18-67

Growth Inducement and Urban Decay

- The EIR fails to accurately identify the UWSP project as unplanned urban development. The UWSP is unplanned – not included or anticipated in the County's General Plan, or the Urban Services Boundary, or the SACOG Blueprint for regional development or plans for transit, regional roadway improvements, utility services extensions, or air quality improvement. 18-68

- In violation of CEQA, the EIR entirely fails to include in this section the long list of changes the UWSP project would require to County plans, policies, codes, etc., and the growth inducement impacts of changing those County plans and policies and codes. 18-69

- Sacramento County's 2030 General Plan and the County's Urban Services Boundary (USB) explicitly state that one of their purposes is to reduce unplanned urban development and its impacts outside the Urban Services Boundary. The EIR fails to clearly state that the UWSP violates the County's policies to prevent urban sprawl. 18-70

- The EIR fails to clearly identify all growth inducement impacts from the UWSP's development outside the County's Urban Services Boundary. 18-71

- The EIR falsely says, "the proposed UWSP is consistent with Sacramento County General Plan Policy LU-120, which is intended to reduce impacts of many different types – such as growth inducement, unacceptable operating conditions on roadways, poor air quality, and lack of appropriate infrastructure." As stated in the EIR, the UWSP creates unacceptable operating conditions on roadways, poor air quality, currently lacks appropriate infrastructure, and in most cases the project applicant cannot compel, and does not control possible mitigations. False statements should be removed from the EIR. 18-72

- The EIR falsely claims the pressure for future development in the area would be reduced because of the need to show consistency with the County General Plan and to receive approval from the Sacramento County Board of Supervisors. Those impediments are not enough to stop the UWSP project applicant. Why would they stop other project applicants? The EIR does not say, and should say, that if the Sacramento County Board of Supervisors approves the project, other similar urban development projects may also be approved using the same criteria. 18-73

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October 28, 2024

SENT VIA EMAIL (CEQA@saccounty.gov)

Sacramento County, Department of Community Development
Planning and Environmental Review Division
Attention: Environmental Coordinator
827 7th Street, Room 225
Sacramento, CA 95814

RE: Draft Environmental Impact Report for the Upper Westside Specific Plan (State Clearinghouse No 2020100069, County Control No. PLNP2018-00284)

Dear Environmental Coordinator for the Upper Westside Specific Plan Project:

On behalf of Environmental Council of Sacramento ("ECOS") and Friends of Swainson's Hawk ("FOSH"), and Natomas resident Brandon Castillo, this letter provides comments regarding the Environmental Impact Report ("DEIR") for the Upper Westside Specific Plan ("Project").

After extensive review,[1] we conclude that the DEIR is woefully inadequate as an informational document. This letter also transmits expert comments on biological resource issues prepared by Shawn Smallwood, PhD (Exhibit 1), expert comments on transportation impacts by Dan Smith (Exhibit 2), and expert comments on air quality by SWAPE (Exhibit 3), which are all incorporated by reference. The County of Sacramento ("County") must prepare and recirculate a new DEIR that addresses the many shortcomings identified in this comment letter and other comment letters. The County must also seriously consider how to prepare a new EIR that complies with its legal duty to objectively analyze the Project and project alternatives including the no project alternative. 19-1

[1] While we have expended extraordinary efforts reviewing the DEIR within the allotted 60 days, the DEIR's pervasive informational deficiencies in a variety of resource areas prevent us from confidently representing that all such defects have been identified. We therefore reserve the right to supplement these comments. (*Galante Vineyards v. Monterey Peninsula Water Management Dist.* (2007) 60 Cal.App.4th 1109, 1121.)

As a threshold matter, the unprecedented scope of the Project's acknowledged significant impacts should give one pause when considering "why" it is proposed. The Project's acknowledged significant and purported unavoidable impacts include:

- Degradation of Existing Views and Visual Quality
- Substantially Degrade Existing Visual Character or Quality
- New Sources of Light
- Conversion of Farmland to Nonagricultural Uses
- Conflict with or Obstruct Implementation of an Applicable Air Quality Plan During Project Operation
- Long-term Operational Emissions of Criteria Air Pollutants and Precursors
- Exposure of Existing Off-site Sensitive Receptors to Toxic Air Contaminants During Operation
- Exposure of Future On-site Sensitive Receptors to Toxic Air Contaminants During Operation
- Historical Resources
- Archaeological Resources
- Human Remains
- Increase in Traffic Noise at Existing Sensitive Receptors
- Increase in Stationary Noise from Plan Components at Existing Receptors
- Increase in Stationary Noise from Plan Components at Proposed Sensitive Receptors
- Induce Substantial Unplanned Population Growth
- Conflict with a Program, Plan, Ordinance or Policy Addressing the Circulation System
- Hazards Due to Design or Incompatible Uses
- Degradation of Existing Views and Visual Quality [cumulative]
- Substantially Degrade Existing Visual Character or Quality [cumulative]
- New Sources of Light [cumulative]
- Conversion of Farmland to Nonagricultural Uses [cumulative]
- Long-term Operational Emissions of Criteria Air Pollutants and Precursors [cumulative]
- Exposure of Existing Sensitive Receptors to Toxic Air Contaminants [cumulative]
- Exposure of Future Sensitive Receptors to Toxic Air Contaminants [cumulative]
- Historical and Archaeological Resources, including Human Remains [cumulative]
- Exceedance of Established Noise Standards – Traffic [cumulative]
- Population Growth [cumulative]
- Program, Plan, Ordinance or Policy Addressing the Circulation System [cumulative]
- Hazards Due to Design or Incompatible Uses [cumulative]

19-2

The sheer breath of these significant and unavoidable impacts alone demonstrates that the Project is fundamentally misguided. This is precisely why the CEQA Guidelines advise, "Where there are impacts that cannot be alleviated without imposing an alternative design, their implications and ***the reasons why the project is being proposed, notwithstanding their effect, should be described***." (CEQA Guidelines, § 15126.2, subd. (c), emphasis added.) It is telling that the DEIR makes no attempt to "explain why the project is being proposed" notwithstanding the unprecedented significant and unavoidable impacts. As will be explained more fully below, the Project's "why" is not to serve any legitimate land use goals – the record amply establishes that the Project is inconsistent with all land use planning in the area – but rather to maximize the financial return on the applicant's speculation on 31 acres of agricultural land. 19-3

Moreover, conspicuously absent from the DEIR is any mention, much less analysis, of County General Plan Land Use Policy LU-127, which provides:

> The County ***shall not expand the Urban Service Boundary unless***:
>
> - There is inadequate vacant land within the USB to accommodate the projected 25 year demand for urban uses; and
> - The proposal calling for such expansion can satisfy the requirements of a master water plan as contained in the Conservation Element; and
> - The proposal calling for such expansion can satisfy the requirements of the Sacramento County Air Quality Attainment Plan; and
> - The area of expansion does not incorporate open space areas for which previously secured open space easements would need to be relinquished; and
> - ***The area of expansion does not include the development of important natural resource areas, aquifer recharge lands or prime agricultural lands***;
> - The area of expansion does not preclude implementation of a Sacramento County-adopted Habitat Conservation Plan;
>
> OR
>
> - The Board approves such expansion by a 4/5ths vote based upon on finding that the expansion would provide extraordinary environmental, social or economic benefits and opportunities to the County.

(Emphasis added.) 19-4

One of the Project's defining characteristics is that it consists almost entirely of prime farmland located outside of the County's urban service boundary ("USB"), and

therefore require expansion of the USB. LU-127 articulates, in clear prohibitory language, the County's policy to prohibit expansion of the USB involving: (i) "development of important natural resource areas," (ii) "aquifer recharge lands," or (iii) "prime agricultural lands." The Project would involve all three of these triggers for prohibiting USB expansion. Even the most cursory reference to LU-127 reveals why the Project is wholly fundamentally misguided—which begs the question why LU-127 was inexcusably omitted from any reference in the DEIR. 19-4 cont.

Applicants are free to seek land use entitlements for their proposed land development projects—no matter how fundamentally flawed and misguided. However, it is the legal and duty of the local land and CEQA lead agency, here the County, to perform an objective analysis of the Project's impacts, mitigation measures, and project alternatives. As will be explained more fully below, the DEIR wholly fails to discharge the County's legal duty to perform that objective analysis. Here, the DEIR is not a document of objective analysis and accountability, but rather a document of advocacy on behalf of the Project applicant. 19-5

The Project would destroy approximately 2,000 acres of productive important farmland[2] that also serves as important habitat for sensitive species, will result in roadway safety hazards to existing and future residents (including families with their driveways on the Garden Highway), and even increased cancer risks to existing and future Natomas residents. Maximizing profit from the applicant's purchase of 31 acres does not override these impacts, and any marginal benefit resulting from increased development in the unincorporated County areas can easily be achieved from alternative locations widely available within the USB. 19-6

I. PROJECT BACKGROUND

The DEIR purports to describe the "Project Background." (DEIR, p. 2-11.) The DEIR unfortunately presents an incomplete and misleading background to the Project. Further, the DEIR dismisses otherwise feasible alternative locations expressly because they are not "controlled" by the applicant. Thus, it is necessary to present a more complete and accurate background of the Project that also sets forth facts relevant to "control." 19-7

The project applicant here is an entity named Upper Westside, LLC ("Upper Westside"). Upper Westside was formed on March 15, 2018 (Exhibit 4, Upper Westside

[2] Expert comments from the Sacramento County Farm Bureau establish that the so-called "ag buffer" will not result in continued productive agricultural uses of that land.

LLC articles.) Upper Westside owns a 31.64-acre parcel within the 2,066-acre Project site that it purchased on May 14, 2019, for a price of $909,500. (Exhibit 5, Property Details.) Upper Westside owns no other land within the 2,066-acre Project area.

Upper Westside is managed solely by Yolo County developer Steve Gidaro. (Exhibit 6, Upper Westside Statement of Information.) No other ownership or management of Upper Westside is disclosed. That said, Upper Westside has been delinquent in filing its updated statement of information since 2022, and so it is possible that Mr. Gidaro has transferred his interest in Upper Westside since that time without any public disclosure. (Exhibit 7, CA Secretary of State database entry.))

In short, the applicant for the Project is an entity wholly controlled by a single person, who purchased merely 31.64 acres for $909,500 back in 2019, and now seeks to leverage that slim ownership (1.53 percent) in order to dictate urban development of 2,066 acres of important and productive farmland.

19-7 cont.

This DEIR conspicuously fails to disclose this information, instead suggesting that the Project's "applicants" include a larger "ownership group" that owns "292 acres or 14 percent of the UWSP area." This is false and misleading. The NOP plainly asserts that the "Applicant" is "Upper Westside, LLC." This is repeated in the DEIR: "The project applicant is Upper Westside LLC." (DEIR, p. 2-1.) These other parties are not "applicants," but instead merely "participating properties." (DEIR, Plate PD-4.) The DEIR asserts, "[T]he project applicant owns and/or controls 10 parcels totaling approximately 292 acres, or 14 percent of the plan area." (DEIR, p. 2-2.) The DEIR provides no information demonstrating such "control" of these properties by Mr. Gidaro. That said, whether Mr. Gidaro controls 1.53 percent or 14 percent of the Project site is of no matter; the vast majority of the Project site, either 86 or 98.47, is not controlled by Mr. Gidaro. This is important because the DEIR relies on the absence of Mr. Gidaro's "control" of alternative locations to dismiss them without any consideration.

Finally, the DEIR's "Project Background" includes a discussion of the Natomas Joint Vision, which it describes as a "Master Plan process for a proposal to move the Urban Services Boundary (USB) and the Urban Policy Area (UPA)." The DEIR suggests that the Project is an outgrowth of the Natomas Joint Visions. Not so. As explained by the California Department of Fish and Wildlife ("CDFW") in response to the NOP:

19-8

> The Projects marks an apparent departure by the County from the principles detailed in its shared vision with the City. The County's web page reads currently, for example, that the Joint Vision project has been withdrawn

and individual landowners are moving forward with their own projects, including this Project.

Indeed, CDFW is correct that the County's webpage now asserts, "The Natomas Joint Vision project has been withdrawn and individual landowners have moved forward with their own projects." (Exhibit 8, County website for the Natomas Vision.) As CDFW further explains, "The MOU, importantly, recognizes the City as the agent of development in the Sacramento portion of the basin and ***the County as the agent of permanent open space, habitat, and farmland/ranchland preservation***." (Emphasis added.) Thus, it is misleading for the DEIR to suggest that the Project is somehow an extension of the Natomas Joint Vision. As explained more fully below, the Project is inconsistent with the Joint Vision as well as decades of land use planning for the Natomas basin.

19-8 cont.

II. THE DEIR'S PROJECT DESCRIPTION AND ASSOCIATED CEQA REVIEW STRATEGY ARE FUNDAMENTALLY FLAWED

The CEQA Guidelines explain, "The statement of objectives should include the underlying purpose of the project." (CEQA Guidelines, § 15124, subd. (b).) The leading CEQA treatise advises, "To avoid claims the project objectives are too narrow, the statement of objectives should not simply repeat the EIR's description of the proposed project, but instead should be based on the project's underlying purpose." (Kostka & Zischke, Practice Under the Cal. Environmental Quality Act (Cont.Ed.Bar 2024) § 12.13, p. 12-23 ["Kostka"].) Here, the EIR fails to comply with both recommendations: (i) the DEIR asserts a list of manipulated "objectives" that merely describes the nature of the Proposed Project, and (ii) the DEIR fails to identify the Project's underlying purpose.

19-9

The Project's background will reveal precisely why the DEIR conspicuously fails to identify an underlying purpose of the Project. This is unsurprising because the Project serves no underlying purpose other than to generate revenue for the project applicant. This is demonstrated with clarity by reviewing the Project's background.

A. Expansion of the USB and UPA Is Not Necessary to Accommodate the County's Share of Future Regional Population Growth

While the Project does not have an underlying purpose (other than maximizing return for the applicant's land speculation), the DEIR's first objective asserts that "expanding the USB and UPA" is required to "accommodat[e] the County's share of future regional population growth." This Project Objective is not supported by substantial evidence. To put it bluntly, no planning documents by the County or the

19-10

Sacramento Area Council of Governments ("SACOG") support the DEIR's false assertion that expansion of the USB is necessary to accommodate the County's share of future regional population growth. In fact, SACOG plainly stated in response to the Project's NOP, "Throughout much of the Sacramento region, the capacity for growth in existing entitled lands far exceeds expected demand for new growth over the next twenty years." SACOG's conclusion is amply supported by the County's Housing Element, which identifies a Regional Housing Needs Allocation ("RHNA") allocation of 21,272 units and supply of 23,653 units. The identified supply number does not account for literally tens of thousands of additional residential units that are part of master plan and specific plan communities virtually identical to the Project. The Housing Element explains:

> The Vineyard Springs Comprehensive Plan, North Vineyard Station Specific Plan, Florin Vineyard Comprehensive Plan, Glenborough at Easton and Easton Place are approved Master Plan with sites that may have been included in prior Housing Elements. The County has also recently approved two additional Master Plans with sites included in this inventory: the Mather South Community Master Plan (Mather South) on January 28, 2020 and the NewBridge Specific Plan (NewBridge) on October 6, 2020.

(Housing Element, p. 134.)

More specifically, Mather South would provide 3,522 units, Newbridge would provide 3,075 units, Cordova Hills would provide 8,000 units, and Easton Place and Glenborough at Easton would provide 4,883. (Housing Element, pp. 134–148.)[3]

While it is true that the Housing Element identifies a deficit of 2,884 units of lower-income units, the Project is not providing lower-income housing. One of the Project's requested entitlements is an "Affordable Housing Strategy that discusses the plan for the provision of moderate, low, and very-low-income housing." The applicant chose not to prepare that Affordable Housing Strategy along with the DEIR, which could have demonstrated a commitment to constructing. This is of no consequence, however, because the lack of any commitment by the applicant is revealed in the draft Specific

19-10 cont.

[3] Several of these projects also provide "a balanced mix of uses, employment opportunities" through commercial and residential areas. (*Ibid*; compare Project Objective 3.) Contrary to the DEIR's improper advocacy, there is nothing novel about including commercial and residential uses in a large specific plan. In particular, see the Cordova Hills and Easton Place land use maps. (Housing Element, pp. 144–146.)

Plan.[4] Unlike other master and specific plan developers in the unincorporated County, the applicant here makes no commitment to constructing affordable housing—which is the one type of housing that is arguably needed in the County. (Compare Housing Element, p. 132 ["Nine sites are in locations where there is an adopted Master Plan, or Specific Plan that guarantees certain sites will be set aside for the construction of deed restricted affordable housing projects"].)

In short, substantial evidence does not support the DEIR's first project objective that expansion of the USB and UPA are required to "accommodat[e] the County's share of future regional population growth." There is a surplus of entitled sites within the existing USB and UBA to accommodate the County's share of regional population growth. To put the matter bluntly, the project serves no actual purpose other than increasing the project applicant's profit from his $900,000 land speculation on a 30-acre parcel within 2,000 acres of important farmland.

19-10 cont.

B. The EIR's Project Objectives are Not Supported by Substantial Evidence and Manipulated to Avoid Otherwise Feasible Project Alternatives

The Project's background, described above, reveals why the DEIR conspicuously fails to identify an underlying purpose of the Project. This is unsurprising because no serious planning document that includes the Natomas basin—the County's Land Use Element, the County's Housing Element and SACOG's Blueprint—find urban uses necessary or even appropriate for the Project site. Thus, the Project serves no underlying purpose other than to generate a return on investment for the applicant's 31-acre land speculation.

Rather than identify a legitimate underlying purpose for the Project, the DEIR instead identifies several project "objectives" that are not supported by substantial evidence and are otherwise manipulated in order to exclude from consideration otherwise feasible project alternatives. The first project objective is addressed in detail immediately above. All of the DEIR's project objectives are addressed in detail below.

19-11

1. Formulate a specific plan and related land use planning documents and regulatory approvals for the UWSP area as a means of expanding the USB and UPA in an orderly manner and accommodating the County's share of future regional population growth.

19-12

[4] The draft Specific Plan states that the Project would "allocate[] 4,007 residential units to high density residential uses (on both residential [791 VHDR] and mixed-use [3,216 CMU] designated lands) with planned densities of 30 du/ac or higher."

- This object is both manipulated and unsupported by substantial evidence. First, formulating a specific plan and related land use planning documents "for the UWSP area" is a transparent attempt to exclude otherwise-feasible off-site project alternatives. Second, as explained above, "expanding the USB and UPA" is unsupported by substantial evidence. Further, expansion of the USB and UPA are themselves not legitimate objectives since General Plan policy is to prohibit expansion involving destruction of farmland, habitat for species, and areas of groundwater recharge.

19-12 cont.

2. Create a land use plan that satisfies County policies, regulations, and expectations, as defined in the General Plan, including Policies LU-114, LU-119, and LU-120.

- This objective is transparently manipulated and not supported by substantial evidence. First, any development project will be required to meet County policies, regulations and expectations. Indeed, the DEIR here reveals that the Project fails to achieve consistency with County policies for growth. Finally, the objective is manipulated because it wholly ignores the most important County Land Use Policy, LU-127.

19-13

3. Provide a comprehensively planned, high quality, large-scale, residential-based community in northwestern Sacramento County, directly northwest of the City of Sacramento, with a balanced mix of uses, employment opportunities, a wide variety of housing types, park and open space, and supporting public and quasi-public uses.

- Again, this objective is manipulated by requiring a community "in northwestern Sacramento County, directly northwest of the city of Sacramento." Further, the balance of the project objective can be satisfied by developments at other locations. As explained by SACOG, "[T]he capacity for growth in existing entitled lands far exceeds expected demand over the next twenty years: collectively, the region's jurisdictions have entitled, or are in the process of entitling 2.5 times the region's projected need for the next 20 years. More than half of that capacity—387,000 units—is in greenfield areas that are on the edge of existing development."

19-14

4. Develop a master-planned community that can be efficiently served by existing infrastructure or proposed infrastructure that would encourage logical, orderly development and would discourage leapfrog or piecemeal development and sprawl.

- This is arguably a legitimate objective, but one that is not met by this Project (including with particularity inadequate transportation infrastructure) and yet can be met by other locations throughout the County. Moreover, substantial evidence does not support this objective since it fails to explain "piecemeal development and sprawl." The Project arguable represents "sprawl" by requiring expansion of

19-15

the USB and UPA to accommodate development that is not required in the County's Land Use Element or Housing Element, or SACOG's Blueprint. Indeed, the DEIR identifies as a significant and unavoidable impact the Project's contribution to growth-inducement. As explained by SACOG, "[T]he capacity for growth in existing entitled lands far exceeds expected demand over the next twenty years: collectively, the region's jurisdictions have entitled, or are in the process of entitling 2.5 times the region's projected need for the next 20 years. More than half of that capacity—387,000 units—is in greenfield areas that are on the edge of existing development." 19-15 cont.

5. Provide residential housing within five miles of the existing job centers of downtown Sacramento and West Sacramento, as well as in close proximity to newly developing or proposed job centers.

- This objective is manipulated and not supported by substantial evidence. While providing residential housing within existing job centers if arguably valid, the same is not true for the undefined terms "newly development or proposed job centers." If a "proposed job center[]" is not approved then what is the value of providing nearby housing? Also, the DEIR fails to explain what is meant by "newly developing" job centers. As explained by SACOG, "[T]he capacity for growth in existing entitled lands far exceeds expected demand over the next twenty years: collectively, the region's jurisdictions have entitled, or are in the process of entitling 2.5 times the region's projected need for the next 20 years. More than half of that capacity—387,000 units—is in greenfield areas that are on the edge of existing development." 19-16

6. Create a development that has an overall positive economic impact on Sacramento County and achieves a neutral to positive fiscal impact on the County's finances and existing ratepayers.

- This finding is not based on any specific location for a "positive economic impact on Sacramento." Further, if it is feasible for the Project to achieve this goal (based on "control" of only 1.53 or 14 percent), then it is feasible for alternative locations to achieve the goal. 19-17

7. Create a community that can be logically and efficiently phased to allow the orderly build-out of the community.

- This objective is arguably valid, but substantial evidence does not support a finding that the Project meets this objective. First, the record establishes that the Project only includes "preliminary" phasing that may be altered at any time without any review or approval by the County or any other public agency. Thus, the Project does not include phasing of any kind, local or otherwise. Second, the 19-18

Project's "preliminary" project phasing is in no way local or orderly because it would first place high-density urban development in the middle of 2,000 acres of prime farmland. This is not logical or orderly; it is based instead on the project applicant's incredibly small ownership of the specific plan area. The Project's phasing is therefore the opposite of logical, efficient and orderly. 19-18 cont.

8. Provide a safe and efficient circulation system that interconnects land uses and promotes pedestrian and bicycle circulation and transit options that will encourage non-vehicular trips, thereby reducing vehicle miles traveled ("VMT"). 19-19

- This is arguably a legitimate project objective, but one that is required by the County's General Plan policies and so would be met by any development in the area. That said, as explained below and in the comments by Dan Smith, the Project does not provide a safe and efficient circulation system. As just one example, the Project would result in unsafe conditions for existing families living on the Garden Highway.

9. Incorporate parks and open space, including an urban farm-greenbelt and canal, into the project design in a manner that provides community connectivity and encourages walking and bicycle use. 19-20

- This is a manipulated project objective that does nothing more than "repeat the EIR's description of the proposed project." (Kostka, *supra,* § 12.13.)

10. Make efficient use of development opportunities as the project site is bordered on three sides by existing or planned urban development. 19-21

- First, this is a manipulated project objective that does nothing more than "repeat the EIR's description of the proposed project." (Kostka, *supra*, § 12.13.) Further, a development at any location would be able to "make efficient use of development opportunities" from nearby development. As explained by SACOG, "[T]he capacity for growth in existing entitled lands far exceeds expected demand over the next twenty years: collectively, the region's jurisdictions have entitled, or are in the process of entitling 2.5 times the region's projected need for the next 20 years. More than half of that capacity—387,000 units—is in greenfield areas that are on the edge of existing development."

11. Plan for enough units to provide housing choices in varying densities to respond to a range of market segments, including opportunities for rental units and affordable housing, and significant commercial uses, consistent with the General Plan and Housing Element. 19-22

- While a potentially legitimate objective, this objective can be achieved by a development at any location. What is more, alternate locations—unlike the

Project—may actually be consistent with the County's General Plan and Housing Element. Neither the County's General Plan Land Use Element nor Housing Element call for any residential development at the Project site. 19-22 cont.

12. Design a land use plan where the development footprint avoids impacts to wetland resources to the extent feasible. 19-23

- This is not a legitimate project objective since it simply restates applicable law and can be achieved at any location.

13. Develop a specific plan that respects existing agricultural land uses and operations to the west of the proposed 1,532-acre Development Area. 19-24

- This is a manipulated project objective that does nothing more than "repeat the EIR's description of the proposed project." (Kostka, *supra,* § 12.13.) Further, substantial evidence does not support that the Project satisfies this objective by directly destroying approximately 1,500 acres of prime farm land and indirectly destroying the rest by ill-conceived "ag buffer" that does not result in productive agricultural operations.

14. Provide for development that meets the seven identified SACOG Blueprint principles, including provision of transportation choice, compact development, mixed use development, housing choice and diversity, use of existing assets, natural resource conservation, and quality design. 19-25

- This is a manipulated project objective that does nothing more than "repeat the EIR's description of the proposed project." (Kostka, *supra,* § 12.13.) A legitimate project objective would be for a development that is consistent with SACOG's Blueprint. As SACOG explains, "The Upper West Side project and the project area itself are not anticipated for development in either the MTP/SCS or the Blueprint." Further, substantial evidence does not support a finding that the Project is consistent with Blueprint principles. The Project is far from "compact," and is in no conserves natural resources by destroying prime farmland that provides important habitat for numerous special-status species.

15. Develop the project and any associated on- and/or off-site mitigation to complement the Natomas Basin Habitat Conservation Plan ("NBHCP") and the Metro Airpark Habitat Conservation Plan. 19-26

- This is a manipulated project objective that does nothing more than "repeat the EIR's description of the proposed project."

16. Designate open space preserves along the south side of Fisherman's Lake Slough or along the West Drainage Canal (Witter Canal) that provide natural buffer to these 19-27

features, and along the westerly edge of the proposed 1,532-acre Development Area to provide a transition between residential and agricultural designations to the west, which will provide a regional benefit for habitat, resources, and open space amenities.

- This is a manipulated project objective that does nothing more than "repeat the EIR's description of the proposed project."

19-27 cont.

17. Balance development with resource protection in an inter-connected, permanent open space.

- This is a legitimate project objective that can be accomplished at any location. Indeed, other locations that do not include 2,000 acres of prime farmland and habitat for special-status species are far better at striking an appropriate balance.

19-28

18. Create multi-functional habitat within open space corridors that provide on-site habitat and contribute to water quality.

- This is a manipulated project objective that does nothing more than "repeat the EIR's description of the proposed project." Further, it is nonsensical. Urban development should be located as far away as possible from habitat and open space corridors. The need to "create multi-functional habitat within open space corridors" arises precisely because urban development is proposed for areas that will have a negative impact on existing habitat. The legitimate objective would be therefore to locate urban uses in areas that avoid existing habitat and so there is no need to create habitat.

19-29

In sum, the DEIR's project objectives are clearly manipulated in order to justify finding that any alternative other than the Project is infeasible.

19-30

C. <u>The DEIR Purports to Analyze the Project Based on a "Phasing Plan" that is Both Arbitrary and Not Enforceable.</u>

An "accurate and stable project description" is a bedrock requirement of CEQA—the *sine qua non* (that without which there is nothing) of an adequate CEQA document:

> Only through an accurate view of the project may affected outsiders and public decision-makers balance the proposal's benefit against its environmental cost, consider mitigation measures, assess the advantage of terminating the proposal (i.e., the "no project" alternative) and weigh other alternatives in the balance. An accurate, stable and finite project description is the sine qua non of an informative and legally sufficient EIR.

19-31

(*Inyo v. Los Angeles* (1977) 71 Cal.App.3d 185, 192–93 [*Inyo*].)

The courts have consistently held that the ability of informed citizens to participate in environmental review is a key component of CEQA. (*Washoe Meadows v. Dept. of Parks and Rec.* (2017) 17 Cal.App.5th 277, 285 ["Informed public participation is essential to environmental review under CEQA."]; *Inyo, supra*, 71 Cal.App.3d at 192 ["The EIR process facilitates CEQA's policy of supplying citizen input."].) An interrelated bedrock CEQA principle of informed public participation is that all aspects of a proposed project, i.e., the "whole of the action," must be analyzed in an EIR. (See CEQA Guidelines, § 15378, subd. (a) [a project is the "whole of an action" which may result in direct or indirect physical changes to the environment].) This requires an EIR to include analysis of "all phases of a project" and all "reasonably foreseeable consequences" of a project. (CEQA Guidelines, § 15126 [EIR's impact analysis must consider all phases of a project]; *Laurel Height Improvement Assn. v. Regents of the Univ. of Cal.* (1988) 47 Cal.3d 376 [*Laurel Heights I*] [EIR must analyze "reasonably foreseeable consequence" of a project].)

The DEIR violates these principles with respect to its so-called "phasing plan." The DEIR repeatedly asserts that the Project would be developed in "phases," beginning with "Phase I," and followed by Phases 2 through 4. A careful review of the DEIR, however, reveals this project description to be inaccurate:

19-31 cont.

> A preliminary phasing plan is illustrated in **Plate PD-22** but would be subject to change as development occurs in response to market demand over time. Changes to the sequencing of individual development phases are permitted without an amendment to the proposed UWSP, provided that the improvements in each phase adequately support the associated development. This includes the ability for the Town Center to commence construction in an earlier phase than is identified on the preliminary phasing plan exhibit. Ultimate development phasing would be coordinated with and approved by County staff with processing of subsequent improvement plans for construction of public facilities.

The above-quoted language rebuts the DEIR's express assumption that "phase 1" will be constructed first, and the EIR's resulting methodology to analyze "Phase I" at a greater level of detail than future phases.[5] Since phases 2 through 4 may ultimately be

[5] As just one example, the EIR's analysis of biological resources includes biological surveys for only 586.7 acres of the Project's 2,066 total acres. What is more, the majority of this limited survey area includes the so-called "ag buffer" area that would not be

constructed before Phase 1 "without amendment to the proposed UWSP" and corresponding CEQA review, then the EIR must analyze all phases of the Project at the same level of detail.

19-31 cont.

The informational defects associated with the Project's sham "phasing" are wide ranging. The DEIR repeatedly justifies its perfunctory and inadequate environmental analysis by claiming more detailed review will occur in future "phases." As just one example, the DEIR asserts with respect with Impact BR-1:

> Because the proposed UWSP is anticipated to be built out in phases by different applicants over an estimated 20 years, different suites of mitigation measures may be required specific to the potential biological resources associated with phases of the build-out. In addition, land cover, land use, and consequently, plant and wildlife habitat may change during the intervening years relative to what is documented in this EIR. To identify whether, when, and where each measure applies, Mitigation Measure BR-1 is provided below, which requires that ***a pre-construction baseline biological resources report be prepared for each phase of development***.

(DEIR, p. 7-40, emphasis added.)

19-32

The EIR makes similar representations regarding weed control and greenhouse gas ("GHG") emissions. (DEIR, p. 7-41 ["Prior to the issuance of a grading permit, the applicant for each phase of the UWSP area development shall prepare a weed control plan for review and approval by the Environmental Coordinator."], p. 8-29 ["As required by Mitigation Measure CC-1b, the applicant would be required to reduce GHG emissions associated with each phase of the proposed UWSP"].) Contrary to the promises of future CEQA review for these "phases," the Project does not identify any County approvals associated with Project "phases." (Draft Specific Plan, pp. 8–6 [Preliminary Development Phasing], 8–15 [Subsequent Entitlements].) Nor is there any identifiable CEQA review associated with these non-existent future Project "phases." (*Ibid*.) In other words, the EIR's claim of future review associated with future Project "phases" is unsupported by the record. There is no County review and approval of "phases," and certainly no identifiable CEQA review associated with such "phases." Accordingly, the EIR may not defer this analysis.

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subject to development. (DEIR, p.7-45 [Plate BR-3].) The vast majority of the Project area, primarily "phases" 2 through 4, has not been surveyed for biological resources.

In short, a careful review of the DEIR and draft Specific Plan reveals that any claimed Project "phasing" and associated future CEQA review is misleading to say the least. The "preliminary phasing plan" is expressly subject to revision at any time without any amendment to the Specific Plan, which also does not provide for actual project "phases" triggering preparation of the deferred environmental analysis that is offered by the EIR to justify the present inadequate review. The EIR's project description and strategy of deferred CEQA review based on that claimed phasing are therefore contrary to CEQA's mandates.

19-32 cont.

III. THE DEIR FAILS TO ADEQUATELY ANALYSIS THE PROJECT'S IMPACTS TO AGRICULTURAL RESOURCES

A. The DEIR Fails to Analyze Countywide Impacts Resulting from General Plan Text Amendments

The DEIR fails to analyze the Project's impacts that extend well beyond the Project's boundaries. Specifically, the Project includes a General Plan text amendment to eliminate County requirement that replacement agricultural land must be within the County. (General Plan Policies AG-1, AG-5). Nothing limits the scope of these text amendments to the Project. Accordingly, the County has a duty under CEQA to analyze all impacts associated with text amendments that would apply to all remaining agricultural lands throughout the County. The DEIR does not even recognize the broad scope of these text amendments, much less provide a good faith analysis of their countywide impacts. The DEIR simply ignores that these General Plan text amendments would apply countywide and makes no attempt to analyze the impact of the countywide effects on the remaining agricultural lands in the County.

19-33

B. The DEIR Fails to Disclose and Analyze General Plan Land Use Policy LU-127 that Prohibits the Project in Order to Protect Prime Farmland

The DEIR further fails as an informational document by conspicuously ignoring the County General Plan land use policy directly related to conserving agricultural resources, LU-127, which provides, "The County ***shall not expand*** the Urban Service Boundary unless . . . The area of expansion does not include the development of important natural resource areas, aquifer recharge lands or ***prime agricultural lands***." (Emphasis added.) The impact of LU-127 is unmistakable, and not subject to dispute. County policy is to prohibit expansion of the USB unless proposed development "does not include the development of . . . prime agricultural lands." Here, the DEIR acknowledges that the Project includes 1,207 acres of prime farmland, which represents approximately 1.4 percent of all prime farmland within the County. General Plan policy

19-34

is clear that this is disqualifying. The County's wholesale failure to disclose LU-127, much less address it, renders the DEIR deficient as an informational document.[6] 19-34 cont.

Finally, the informational deficiency resulting from the DEIR's wholesale failure to mention LU-127 is not limited to agricultural impacts. On its face, LU-127 is intended to protect agricultural production as well as biological resources that rely on agricultural lands for habit and water quality since agricultural lands also facilitate groundwater recharge. Thus, the DEIR's failure to address LU-127 results in informational deficiencies running throughout the DEIR including at minimum, the project description, agricultural impacts, biological impacts, hydrology and water quality, land use and project alternatives. 19-35

C. The "Ag Buffer" Is Inadequate to Minimize and Mitigate Significant Impacts Associated with the Loss of Agricultural Production

The DEIR asserts that the so-called "ag buffer" will "allow or the continuation of existing agricultural, ag-residential, and mitigation uses." (DEIR, p. 2-27.) Accordingly, the DEIR relies on the "ag buffer" to dismiss, minimize and mitigate significant impacts. A few non-exclusive examples include agricultural impacts (DEIR, p. 5-19), biological impacts (DEIR, pp. 7-80-82) and growth inducement (DEIR, p. 23-2.) However, the Sacramento County Farm Bureau letter provides expert testimony that the so-called "ag buffer" is inadequate due to its size and location to allow for ongoing agricultural operations. Accordingly, the "ag buffer" is not effective mitigation for impacts, and may not be relied upon to dismiss, minimize and mitigate significant impacts. 19-36

IV. THE DEIR FAILS AS AN INFORMATIONAL DOCUMENT WITH RESPECT TO BIOLOGICAL RESOURCE IMPACTS

Other commenters, including expert comments by Shawn Smallwood (Exhibit 1) have explained in detail the DEIR's failure to analyze in good faith the Project's impacts 19-37

[6] The DEIR's omission of any reference to LU-127 strongly suggests an intent to mislead since LU-127 was expressly referenced by County staff when the County approved the commencement of master planning for the area: "While Policy LU-119 addresses Master Plan initiation, there are other policies such as LU-120, ***LU-127*** and LU-15 which will be utilized by County staff, later in the Master Plan process, to determine whether or not the Master Plan could be recommended for approval. Initiation of the Master Plan process is only the first step and is not a guarantee of approval. The County strongly cautions that the applicants proceed at their own risk." (Emphasis added.)

on biological resources, including species and habitat addressed by the NBHCP. Those comments do not need to be repeated here. Rather, this comment focuses on the informational deficiency resulting from the DEIR's failure to disclose—and even affirmative misrepresentations regarding—the NBHCP's relevance to this Project.

As part of its analysis of impacts, an EIR must disclose related environmental review and consultation requirements of other jurisdictions and integrate these related requirements into CEQA review. (CEQA Guidelines, § 15124, subd. (d)(1)(C); see *Banning Ranch Conservancy v. City of Newport Beach* (2017) 2 Cal.5th 918, 936 [*Banning Ranch*].) Thus, agencies are encouraged to consult with responsible agencies before and during preparation of an EIR so that the document will meet the needs of all the agencies which will rely on it. (CEQA Guidelines, § 15006, subd. (g); *Banning Ranch*, *supra*, 2 Cal.5th at 936.) Such information is not only necessary for analysis of environmental impacts, but also project alternatives and mitigation measures. (*Banning Ranch*, *supra*, 2 Cal.5th at 937.) Failing to discuss other regulatory and permitting regimes with authority over the project violates the information disclosure requirements of CEQA and is a prejudicial error depriving the public of a full understanding of a project. (*Banning Ranch*, *supra*, 2 Cal.5th at 942.) The coordination between lead agencies and other permitting authorities "serves the laudable purpose of minimizing the chance the [lead agency] will approve the Project, only to have later permits for the project denied . . . ." (*Cal. Native Plant Society v. City of Rancho Cordova* (2009) 172 Cal.App.4th 603, 642.)

19-37 cont.

Banning Ranch is instructive. There, the lead agency failed to identify potential environmentally sensitive habitat areas ("ESHA") and analyze the impacts of the project on those areas, which are governed by the Coastal Commission under the Coastal Act. (*Banning Ranch*, *supra*, 2 Cal.5th at 935–936.) Doing so undermined the EIR as an informational document. (*Id*. at 941–942.) The County's informational deficiency here is significantly worse than in *Banning Ranch*. When the County initially agreed to conduct planning for development in this area, staff explained:

> Development in the Natomas Basin has been met with challenges from environmental groups due to the presence of numerous threatened, endangered or special status species. Two of the species of greatest concern are the giant garter snake and the Swainson's hawk. There have been several lawsuits filed over past environmental approvals associated with the NBHCP and the MAPHCP. A final ruling by United States District Judge David F. Levi on September 7, 2005 (Attachment 8) declared the HCPs valid and cleared the way for development. . . . [W]ith respect to

the issues of potential future growth in Sacramento County, Judge Levi ruled the following:

> The NBHCP and BiOp [Biological Opinion (BiOp) utilized by the Secretary of the Interior and United States Fish and Wildlife Service] do assume that development in the basin will be limited to the 17,500 acres [15,517 acres under the NBHCP and 1,983 acres from the previously approved MAPHCP to total 17,500 acres cumulatively] in the permit areas and relies on that assumption in concluding that sufficient habitat will remain for the covered species. This assumption is based on the current land use plans of Sacramento County. The NBHCP, BiOp, and EIR/EIS also conclude that because any future development in the Basin not covered by the HCP and ITPs [Incidental Take Permit allowing for "take" of an endangered species] would likely result in injury to listed species, any future development in the Basin would require new federal approvals. Any such approvals would in turn require a new HCP and ITP for the particular project, and could also lead to revision of the existing NBHCP, were the additional development to exceed assumed limits.

19-37 cont.

Judge Levi went on to say,

> The NBHCP anticipates that development by the City and Sutter will be limited to 15,517 acres – 8,050 acres within the City [of Sacramento] and 7,467 acres in Sutter County – and provides that approval of any development beyond this limit – whether by the City and Sutter or by other entities – will trigger reevaluation and possible amendment of the plan, and could result in suspension or revocation of the City and Sutter permits.

With regard to the City/County Natomas Joint Vision, which plaintiffs claimed would fatally undermine the NBHCP, Judge Levi ruled the following:

> The Service, and the court, are entitled to assume at this point that future development will not be permitted if sufficient

> mitigation land is unavailable and the development will result in jeopardy.

The Judge footnoted the above sentence with the following:

> ***The court notes, however, that the Service and those seeking an ITP in the future will face an uphill battle if they attempt to argue that additional development in the Basin beyond 17,500 acres will not result in jeopardy***. The NBHCP, BiOp, EIR/EIS, and Findings and Recommendations are all predicated on the assumption that development in the Basin will be limited to 17,500 acres and that the remaining lands will remain in agricultural use.

Staff recognizes that any new development in the Natomas Basin above the 17,500 acres already approved and permitted by the Natomas Basin and Metro Air Park HCPs ***will require careful coordination and consideration of existing approved developments, their mitigation strategies, and the regional conservation context***.

(Exhibit 9, 2019 County Staff Report, emphasis added.)

19-37 cont.

Following County staff's express acknowledgement of the "uphill battle" that will require "careful coordination and consideration," the DEIR is now conspicuously silent regarding this history and, critically, the detrimental impact that the Project may have on the existing habitat conservations plans. The DEIR fails as an informational document by not addressing these critical interrelationships—as County staff previously promised to do at the beginning of this process.

V. THE DEIR'S TWO TRANSPORTATION ANALYSES VIOLATE CEQA AND REVEAL VIOLATIONS OF GENERAL PLAN POLICIES REQUIRING PROJECT DENIAL

A. The DEIR Violates CEQA by Not Adequately Analyzing the Project's VMT and Transportation Safety Impacts

19-38

Transportation Engineer Dan Smith reviewed the DEIR's technical transportation studies and prepared comments identifying numerous deficiencies. (Exhibit 2.) These comments are incorporated by refence and do not require repetition here.

B. The Local Transportation Analysis Reveals Violations of the County's General Plan LOS Standards

The local transportation analysis reveals that the Project would be inconsistent with the County's General Plan. Specifically, Table 12 discloses that the Project would individually result in unacceptable level of service ("LOS" F) conditions at no fewer than 13 different intersections.

> The DEIR dismisses this violation of General Plan standards by asserting: Consistent with Policy CI-9, the proposed roadway system included in the proposed UWSP would be designed in a manner that meets level of service operating standards ***with just a few exceptions***. In instances where operating standards are not met, physical improvements to increase capacity (e.g., widening El Centro Road to an eight-lane cross section) ***have been deemed by Sacramento County to be either infeasible or would be inconsistent*** with the proposed UWSP's goal of creating an environment conducive to walking and bicycling.

19-39

(DEIR, p. 18-19, emphasis added.)

The problem is that the Project's "just a few exceptions" to the County's LOS E standard for urban roadways means that the Project is not "consistent" with General Plan Policy CI-9. While it is true that Policy CI-9 allows for deviation from these standards when "it is infeasible to implement project alternatives or improvements that would achieve" the LOS standards, the DEIR does not support its assertion that specific physical improvements necessary to provide an adequate LOS for the Project already "have been deemed by Sacramento County to be either infeasible or would be inconsistent with the UWSP's goal of creating an environment conducive to walking and bicycling." The DEIR does not disclose when the County previously made this determination regarding the Project's circulation plan, much less any information documenting the feasibility determination. Further, it is unclear whether any such determination of feasibility is properly made before project approval and even release of the DEIR.

What is more, the language of CI-9 does not support violating the County's LOS standards on the basis that physical improvements "would be inconsistent with the proposed USWSP's goal of creating an environment conducive to walking and bicycling." Even if this is a proper basis for violating the County's LOS standards (the plain language of CI-9 contradicts this), the DEIR fails to provide any analysis identifying the proposed physical improvements or how they are inconsistent with the stated goal.

19-40

Finally, even if the County can credibly explain how physical improvements to existing intersections are not feasible (perhaps due to right-of-way constraints), it strains logic to suggest that the same is true regarding intersections not presently in existence. (See Table 12, intersections 61, 63, 68, 69.) The DEIR fails to explain how it is infeasible to design new intersections at a minimum LOS E. 19-41

In summary, the Project's roadway system patently violates the County's General Plan LOS standards, and the County fails to explain how it is infeasible to construct a system that meets the minimum LOS E standards. The Project's General Plan inconsistencies will increase cut-through traffic on other roadways such as along Garden Highway thereby further increasing undisclosed congestion and roadway hazards to existing residents. 19-42

C. The EIR Fails as an Informational Document Regarding the Project's Proposed Transit System, Impacts and Mitigation

The DEIR claims that the Project employs "smart growth" principles that include "Transportation Choices – Development should encourage people to walk, bike, use public transit, or carpool to their destination." Nothing could be further from the truth. In fact, the EIR fails as an informational document with respect to the Project's impact and mitigation regarding transit impacts. 19-43

As a threshold matter, buried in the DEIR's appendix is the revelation that "[U]se of transit for travel to external destinations is estimated at two percent for the purposed project." The DEIR fails to explain how this abysmal transit mode share is consistent to its claim that the Project is somehow "encouraging" transit use.[7] In fact, the Project fails to provide adequate transit facilities, and the DEIR fails to adequately disclose this to the public and decision-makers.

The DEIR notes that the Project would result in a significant transportation impact if it "[s]ubstantially increase[s] transit demand and fail[s] to provide adequate transit service." (DEIR, p. 18–16.) Although the transit mode split of 2.0 – 2.3 percent is well below the split for an infill or "smart growth" project, the mode split would still result in 3,576 daily transit trips. The DEIR fails to set forth enforceable mitigation to address this transit demand. The DEIR acknowledges this failure: 19-44

[7] The DEIR's transportation appendix indicates that its assumed transit trip generation is more than the "base" rate assumed for a "suburban" development but fails to identity the assumed "base" transit trip generation number.

> [T]he proposed UWSP would substantially increase transit ridership demand that may not be fully accommodated by the proposed transit service as described in the transit plan that has been prepared for the Specific Plan. Specifically, severe congestion along El Centro Road between West El Camino Avenue and Farm Road would cause substantial delays to bus service that would operate along this route as part of the UWSP. Additionally, the lack of planned fixed-route bus service may lead to an unmet demand for transit service.

19-44 cont.

The DEIR fails to describe the Project's transportation network. The DEIR asserts, "Plate TR-5 shows the proposed transit system included in the proposed UWSP, which would include an on-site shuttle that would operate along key roadways during peak periods." Plate TR-5, however, fails to reveal the on-site shuttle, much less provide any information regarding its operation.

19-45

Setting aside its failure to describe the proposed transit network, the DEIR proposes to mitigate the Project's failure to provide for the Project's transit demand with mitigation measure TR-1b, which requires the Project applicant to "coordinate with the County and SacRT" to provide the transit "assumed" in the DEIR's transportation analysis "or a cost-effective equivalent." However, the EIR fails to identify with any specificity the specific transit infrastructure that would be required to handle 3,576 daily external transit trips. Compounding this informational failure, funding for this uncertain transit plan would be by "annexation to County Service Area 10, formation of a transportation services district, or other secured funding mechanism."

19-46

An EIR may not simply label an impact significant without describing the severity of the significant impact and identifying all feasible mitigation measures to reduce it to less than significant. The DEIR's failure to adequately describe the transit plan, coupled with the uncertainty regarding its funding, renders the DEIR defective as an informational document with respect to transit impacts. Moreover, the DEIR's analysis and mitigation for transit impacts, including its vague transit plan, fails to support a finding that the Project "promotes . . . transit options that will encourage non-vehicular trips."

19-47

VI. THE DEIR FAILS TO INCLUDE A LAWFUL WATER SUPPLY ASSESSMENT FOR THE PROJECT

19-48

The project requires a water supply assessment ("WSA") pursuant to SB 610. No such WSA appears to have been prepared for the Project, much less attached to the EIR

as required by law. (Wat. Code, 10911, subd. (b).) Rather than the legally mandated WSA for the Project, the EIR includes a "water supply analysis" form prepared by the applicant's legal counsel. This form fails to provide the information required for a legally-adequate WSA set forth in Water Code section 10910, subdivisions (d), (e), (f), and (g). Indeed, the only information in the "water supply analysis" prepared by the applicant's counsel is information about the Project's proposed water demand. This falls well short of the information required for a WSA. As a result, the EIR fails as an informational document regarding whether an adequate water supply is available to support the Project. 19-48 cont.

While a WSA may incorporate information from a water supplier's urban water management plan ("UWMP") into a project's WSA, that was not done here. The "water supply analysis" makes no attempt to set forth information required by subdivisions (d), (e), (f) and (g), much less reference where that information is provided in the City's UWMP. 19-49

Moreover, a WSA may incorporate a water supplier's UWMP "[i]f the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan." (Wat. Code, §10910, subd. (c)(2).) The applicant's legal counsel checked a box asserting that the City's UWMP accounted for the Project's water demand. This representation is demonstrably false. Nothing in the City's UWMP indicates that the Project's demand was accounted for in the City's UWMP. (See Exhibit 10, chapters 3 and 4 of the City's UWMP.) Indeed, all evidence points to the opposite conclusion. The City's UWMP determines its demand projections based upon a combination of its retail and wholesale demands. (Exhibit 10, pp. 3-11–3-18; 4-3–4-10.) The Project site is located outside the City's retail service area, and so it is not a retail customer of the City. (Exhibit 10, Figure 3-1.) Moreover, the Project site is presently served by Natomas Central Mutual Water Company, which is not a wholesale customer of the City. (Exhibit 10, p. 3-18.) Since the Project site is neither a retail nor wholesale customer of the City, nothing from the City's UWMP demonstrates that it accounted for any water demand from the Project site, much less the 4,242 AFY set forth in the applicant's "water supply analysis." 19-50

Implicitly acknowledging that the Project's water demand is not "accounted for," the City's approval of the applicant's "water supply analysis" engages in obfuscation, asserting, "The area addressed in this WSA ***lies within an area contemplated*** by the City's 2020 Urban Water Management Plan demand forecast and within the legal boundaries of the City's water rights entitlement." (Exhibit 11, City staff report dated December 6, 2022, Consent Item 14, emphasis added.) That a project site (notably not the specific Project demand) is only somehow merely "contemplated"—whatever that 19-51

term may mean—is not the same as affirmatively "accounting for" a specific water demand. The same is true regarding the City's irrelevant finding that the Project area is "within the legal boundaries" of the City's water right. That the City may lawfully provide water to a parcel is in no way the same as demonstrating that the City affirmatively accounted for the parcel's water demand, much less and increased water demand from a proposed (and unapproved) development project. 19-51 cont.

In short, the Project's proposed demand of 4,242 AFY was not "accounted for" in the City's UWMP, and so information from the UWMP may not be incorporated into a WSA for the Project—even if one had been prepared (it has not). A reviewing court will have no difficulty disapproving the County's reliance on the false and misleading "water supply analysis" prepared by the applicant.[8] A lawful WSA will need to be prepared for the Project along with a recirculated DEIR. 19-52

VII. THE DEIR FAILS AS AN INFORMATIONAL DOCUMENT REGARDING AIR QUALITY EMISSIONS AND RESULTING HUMAN HEALTH IMPACTS

The Project would result in significant air quality emissions and human health impacts resulting from air emissions. The DEIR fails as an informational document by not adequately disclosing such impacts. Expert comments by SWAPE are attached as Exhibit 3, incorporated by reference, and do not require repetition here. 19-53

A. The DEIR Fails to Disclose All Human Health Impacts Resulting from Acknowledged Significant Toxic Air Contaminant Emissions

The DEIR discloses that operation of the Project would result in significant cancer risk to both existing residents and future occupants of the Project. (DEIR, p. 6-49.) Indeed, the cancer risk to maximally exposed residents is greater than 44 increased cancer risks, which is more than four times the relevant significance standard of ten increased cancer risks. While this human health impact to residents is itself shocking, it unfortunately comes nowhere near to telling the whole story regarding the human health implications from the Project's toxic air emissions ("TAC"). 19-54

[8] While the City purported to approve the "water supply analysis" back in 2022, a legal challenge to its adequacy is not be ripe unless and until it is relied upon by the County to approve the Project. (*California Water Impact Network v. Newhall County Water Dist.* (2008) 161 Cal.App.4th 1464.)

In addition to TAC emissions, the DEIR fails as an informational document by failing to adequately address the human health impacts associated with the Project's contribution to ultrafine particulate ("UFP") emissions.

The DEIR's local transportation analysis reveals that the Project will increase auto and heavy-truck trips along I-80 and I-5, including increased vehicle queuing and resulting vehicle braking. This will exacerbate UFP emissions. (Exhibit 12 ["Very fine and ultrafine iron, nickel, copper, and zinc were identified as vehicular, with the most probable sources being brake drums and pads and the lubrication oil additive zinc thiophosphate . . . The braking systems of cars and trucks must now be considered along with direct exhaust emissions in estimating the health impacts from traffic."].) The DEIR fails as an informational document by not adequately analyzing the human health impacts of increased UFP emissions on nearby residents, including existing residents and future occupants of the Project.

The human health impacts resulting from UFP emissions are very real, and include:

- Early heart attacks from ultra-fine metals from the upwind braking,
- Increases in cancer from diesels exhaust . . .
- High rates of childhood asthma
- Rapid and permanent loss of lung function in children from ultra-fine metals, with 18 year olds having the lung function of 70 year olds.

(Exhibits 12,13,14,15.)

These health impacts, and others, are documented in several peer-reviewed technical studies. (Exhibits 12,13,14,15.) A peer-reviewed study entitled, "Prenatal Air Pollution and Newborns' Predisposition to Accelerated Biological Aging" found that mothers "with higher residential exposure to PM2.5 . . . gave birth to newborns with significantly lower telomere length [a maker for biological aging] that could not be explained by other factors." (Exhibit 14.) Another peer-reviewed study found that health impacts, including mortality, can be correlated to UFP exposure. (Exhibit 12.)

Notwithstanding the serious health impacts resulting from UFP emissions—particularly at particulate emissions giving rise to such high cancer risks—the DEIR makes no mention whatsoever of UFP emissions, much less the resulting health risk exposure. The DEIR's failure to disclose health risk from UFP emissions violates CEQA. The California Supreme Court has held that an EIR must correlate air emissions to human health effects if it is feasible to do so. (*Sierra Club v. County of Fresno* (2018)

19-54 cont.

6 Cal.5th 502 [*Sierra Club*].) *Sierra Club* addressed a challenge to an EIR's air quality discussion that, as here, simply listed various health conditions with no attempt to correlate those impacts to air emissions. The court explained:

> The EIR's discussion of health impacts of the named pollutants provides only a general description of symptoms that are associated with exposure to the ozone, particulate matter (PM), carbon monoxide (CO), and nitrogen dioxide (NOx), and the discussion of health impacts regarding each type of pollutant ***is at most a few sentences of general information***. The disclosures of the health effects related to PM, CO, and sulfur dioxide ***fail to indicate the concentrations at which such pollutants would trigger the identified symptoms***.

19-54 cont.

(*Id.* at 519, emphasis added.)

The defect identified in *Sierra Club* applies with equal force here. The DEIR in *Sierra Club* at least disclosed potential health risks. Here, by contrast, human health impacts are ignored. A new DEIR will need to be prepared, and that new DEIR will need to disclose the Project's increased UFP emissions and correlate those UFP emissions to human health impacts if it is feasible to do so. If it is not feasible to correlate UFP emissions to health impacts, the DEIR must plainly state so and support that conclusion with substantial evidence.

B. <u>The DEIR Fails to Set Forth All Feasible Mitigation for Acknowledged Human Health Impacts</u>

As set forth above, the Project will significantly increase the risk of cancer to existing and future residents. Although exposing residents to more than four times the significance threshold for cancer risk, the DEIR purports to rely on mitigation that is ineffective rather than effective mitigation strategies.

19-55

DEIR acknowledges a significant operational health risk to existing residents located south of I-80. The only proposed mitigation is to install MERV 13 or greater air filters. The DEIR fails to explain, however, that this mitigation strategy is ineffective unless the HVAC system is actually running with all doors and windows closed. A study cited in the DEIR explains:

> In the province of Ontario, building construction and equipment is regulated by NBC and the Ontario Building Code (OBC) [4], [5]. These codes establish the limiting design factors such as minimum ventilation

> rates per person, minimum building envelope insulation values and guidance on use of filters for safety and fire protection purposes. Residential buildings adopting the building codes typically install Heat Recovery Ventilators (HRVs). Future revisions of NBC include possible reduction of PM2.5 using air cleaning devices in the HVAC system if the outdoor air pollution levels are above ambient threshold levels.
>
> In addition to the above mentioned building codes, the R-2000 standard is a voluntary standard meant to exceed building code requirements, regulating and promoting high energy efficiency and improved air quality initiatives by offering incentives on retrofit and new construction. ***Typical R-2000 houses have high-efficiency heating and ventilation systems (e.g. installation of HRV and exhaust fans certified by the Home Ventilating Institute), additional insulation, and an airtight building envelope***.

19-55 cont.

(Emphasis added.)[9]

According to the DEIR's own reference material, an "airtight building envelope" is required for the air filter to actually be effective at reducing TAC exposure inside the home. This means that all doors and windows must be closed, and the HVAC must be running. Further, and importantly, the study indicates specialized high-efficiency heating and ventilation systems are required in order to obtain any benefit, and so simply installing a MERV 13 air filter into a random gas furnace as suggested by the DEIR is not effective to reduce the cancer risk. Effective mitigation would include a program to pay the costs for high-efficiency heating and ventilation systems and airtight building envelopes.

The DEIR also proposes as mitigation to "include consideration of recommendations in land use siting found in CARB's Air Quality and Land Use Handbook: A Community Health Perspective." (Mitigation Measure AQ-4a.) This is patently ineffective and unenforceable since requiring "consideration of recommendations" provides no performance standard.

19-56

With respect to the cancer impact to on-site residents, the DEIR continues to offer ineffective mitigation. While the Project application can control design and construction, the DEIR does not require residential construction to include non-opening windows, which is required for increased air filtration to be effective. Similarly, the DEIR asserts as mitigation "Prohibit siting new sensitive land uses within 500 feet of urban roads

19-57

[9] https://www.sciencedirect.com/science/article/abs/pii/S0360132315001171

carrying 100,000 vehicles per pay," and yet the Project's site plan plainly violates this proposed mitigation measure. (See DEIR Plate PD-13, which proposes residential land uses adjacent to I-80.)

19-57 cont.

VIII. THE EIR FAILS TO ANALYZE A REASONABLE RANGE OF ALTERNATIVES

CEQA requires that lead agencies consider alternatives at two stages in the EIR process. First, a DEIR must analyze a range of reasonable alternatives to the project. (CEQA Guidelines, § 15126.6.) Later, when the agency considers whether to approve or carry out the project as proposed, it cannot do so if a feasible alternative would substantially reduce significant effects. (CEQA Guidelines, § 15092, sub. (b)(2)(A).)

To explore ways for a project to meet as many goals as possible while protecting the environment, EIRs thus must evaluate alternatives that accomplish "most" basic objectives. (CEQA Guidelines, § 15126.6 (a).) Alternatives warrant study in the EIR process if they can reduce or avoid impacts and are "potentially feasible." (CEQA Guidelines, §§ 15126.6. subds. (a), (c), (f); *Watsonville Pilots Association v City of Watsonville* (2010) 183 Cal.App.4th 1059, 1087 [*Watsonville Pilots*].) As to whether an EIR has analyzed an adequate range of reasonable alternatives, "[e]ach case must be evaluated on its facts . . . in light of the statutory purpose." (*Watsonville Pilots, supra*, 183 Cal.App.4th at 1086.) The nature and scope of the alternatives to be studied are governed by the rule of reason. (CEQA Guidelines, § 15126., subd. (a).)

19-58

Feasible alternatives are allowed to "impede to some degree the attainment of the project objectives, or . . . be more costly." (CEQA Guidelines, § 15126.6, subd. (b).) An "alternative that is potentially feasible should not be excluded from an EIR simply because it may not further all of the agency's policy objectives." (*Watsonville Pilots, supra*, 183 Cal.App.4th at 1087.) *Watsonville Pilots* found legal error when a draft EIR failed to evaluate a reduced development because it failed to meet two of twelve objectives: "The City's argument on this issue is premised on its claim that no discussion of an alternative is required if that alternative would not meet a project objective. This premise is mistaken." (*Ibid*.)

Finally, CEQA requires consideration of "alternative locations" for a project based on the answer to a "key question":

> The key question and first step in analysis is whether any of the significant effects of the project would be avoided or substantially lessened by putting the project in another location. Only locations that would avoid or

> substantially lessen any of the significant effects of the project need be considered for inclusion in the EIR.

(CEQA Guidelines, § 15126.6, subd. (f)(2)(A).)

Many of the Project's unprecedented laundry list of significant and unavoidable impacts would be avoided or substantially lessened by an alternative location, i.e., one that is within the County's USB and UPA and does not consist of productive farmland that also provide habitat for special-status species. CEQA therefore requires analysis of alternative locations. Rather than comply with its legal duty to analyze offsite locations, the DEIR instead refuses to do so based on three specious arguments: (i) any alternative location would "entail either the same or new significant environmental effects as those that would occur within the UWSP area," (ii) alternative sites that "could feasibly achieve many of the project objectives [are] not available as planning applications for those lands have already been filed with the City of Sacramento and with the County of Sacramento," and (iii) an offsite alternative would not be feasible as the project applicants do not control any other properties within Sacramento County." All of these are without merit. 19-58 cont.

A. The DEIR Fails to Support Its Assertion That All Alternative Sites Would Have the Same or New Significant Impacts

The DEIR broadly asserts that any alternative location would result in the same or new significant impacts, and then purports to support that claim with a few "examples." This applies an incorrect standard because consideration of an alternative location is required if any significant impact is reduced or lessened. Here, the DEIR acknowledges that the Project would result in an incredible 29 different significant and unavoidable impacts. CEQA requires considering an alternative if any of these 29 significant impacts would be reduced. Alternative locations not consisting of prime farmland outside of the USB have reduced impacts associated with agricultural land conversion and inducing unplanned growth. These are just the impacts that are acknowledged in the DEIR. An objective analysis of the Project would disclose significant impacts associated with biological resources and land use consistency that would also be reduced by an alternative location. 19-59

Indeed, the DEIR acknowledges there are "other large vacant properties located adjacent to the City of Sacramento that could feasibly achieve many of the project objectives." (DEIR, p. 3-4.) At minimum, the DEIR must disclose and analyze these alternative locations since the DEIR acknowledges that they are potentially feasible.

B. The Existence of Otherwise Feasible Alternative Locations Demonstrates That the No Project Alternative Is Feasible

It is very rare that a "no project alternative" is also a feasible alternative. This is one of those cases. As indicated above, the DEIR acknowledges the existence of "other large vacant properties located adjacent to the City of Sacramento that could feasibly achieve many of the project objectives." Thus, these projects satisfy the test for "potential feasibility" and must be analyzed in the DEIR. (*Watsonville Pilots, supra*, 183 Cal.App.4th at 1087.) Also, and importantly, the existence of other projects that satisfy most of the DEIR's project objectives squarely supports the "no project" alternative as a feasible alternative. To put it simply, the DEIR's concession that other projects will satisfy most of the DEIR's project objectives means that the County can deny the Project and still achieve the majority of its project objectives through other developments. 19-60

Implicitly recognizing this conclusion, the DEIR asserts that these other projects do not achieve one of the Project's objectives, but this is not the relevant standard for determining feasibility. (*Watsonville Pilots, supra*, 183 Cal.App.4th at 1087 ["alternative that is potentially feasible should not be excluded from an EIR simply because it may not further all of the agency's policy objectives"].)[10] Finally, that planning applications for these alternative locations have already been filed by developers other than Mr. Gidaro is of no consequence since CEQA does not provide guarantees to any specific developer. (*Citizens of Goleta Valley v. Board of Supervisors* (1988) 197 Cal.App.3d 1167, 1179 ["Ownership of the land used and the identity of the developer are factors of lesser significance"] [*Goleta I*].) County staff made this point with clarity in 2019 by explaining, "Initiation of the Master Plan process is only the first step and is not a guarantee of approval. The County strongly cautions that the applicants proceed at their own risk." The DEIR now unfortunately represents a dramatic departure by transparently advocating for the Project, and even relying on unlawful reasons to avoid any consideration of feasible alternatives including the no project alternative. 19-61

C. Alternative Sites May Not Lawfully Be Dismissed from Consideration Because They are Not "Controlled" by the Applicant

The DEIR's final argument for rejecting consideration of any alternative location is that they are not "controlled" by the "project applicants." As a threshold matter, the DEIR's reference to "project applicants" is false and misleading since there is only one project applicant, Upper Westside, which ones merely 1.53 percent of the Project area. 19-62

[10] This analysis sets aside that the referenced project objective is manipulated and impermissibly narrow as explained above.

The "participating properties" are not project applicants, and the DEIR provides nothing supporting its assertion that Mr. Gidaro controls these other properties for purposes of land development. That said, even if Mr. Gidaro actually controlled these "participating" properties, this would translate to merely 14 percent control over the 2,066-acre Project area.

In other words, Mr. Gidaro does not control the vast majority (either 98.47 percent or 86 percent) of the Project area. This is critical because the DEIR fails to explain how zero percent control makes a project infeasible whereas 1.53 percent (or 14 percent) control somehow makes a project feasible. In both instances the vast amount of contemplated development is wholly outside the control of the project applicant.

19-62 cont.

In any event, the DEIR's reliance on "control" to dismiss alternative locations is contrary to CEQA since it is merely one consideration out of many. Although misquoted in the DEIR, the relevant CEQA Guideline explains:

> Among the factors that may be taken into account when addressing the feasibility of alternatives are site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries (projects with a regionally significant impact should consider the regional context), and whether the proponent can reasonably acquire, control or otherwise have access to the alternative site (or the site is already owned by the proponent). Not one of these factors establishes a fixed limit on the scope of reasonable alternatives.

(CEQA Guidelines, § 15126.6, subd. (f)(1).) Further, caselaw rejects assertions of inability to acquire alternate locations to avoid consideration of alternative locations. (*Goleta I*, *supra,* 197 Cal.App.3d at 1179 ["Ownership of the land used and the identity of the developer are factors of lesser significance"].)[11]

19-63

Finally, and importantly, allowing EIRs to dismiss consideration of alternative locations under these facts would eviscerate CEQA's requirement to consider alternative

19-64

[11] While *Goleta I* was distinguished in *Save Our Residential Environment v. City of West Hollywood* (1992) 9 Cal.App.4th 1745, 1753, the court's analysis was based on its finding that "in order to meet the objectives of the General Plan, the project was required to be located within a very limited geographical area." This analysis does not apply here since the Project is admittedly inconsistent with the County's General Plan. There is no argument that the General Plan requires Mr. Gidaro's proposed urban development "within a very limited geographic area."

locations. While Mr. Gidaro is free to acquire property at a discount price (precisely because the land is unsuitable for urban develop), Mr. Gidaro is not allowed to rely on his discounted land acquisition as a shield to prevent the County's DEIR from considering whether alternate locations (i.e., locations that are more appropriately zoned for urban development and therefore commanding a higher price) would result in reduced environmental impacts. This is precisely what the DEIR's alternatives analysis purports do to, and it flagrantly violates CEQA's mandate to consider alternative locations where significant impacts are associated with the proposed project's location.

19-64 cont.

The County will need to prepare a new alternatives analysis that objectively analyzes the feasibility of the no project alternative as well as alternative locations.

19-65

IX. THE DEIR FAILS TO SATISFY THE COUNTY'S DUTY TO OBJECTIVELY ASSESS THE PROJECT, ITS IMPACTS, MITIGATION MEASURES AND PROJECT ALTERNATIVES

As the CEQA lead agency for the Project, the County has a legal duty to prepare an EIR that *objectively* analyzes the Project. (*Citizens for Ceres v. Superior Court* (2013) 217 Cal.App.4th 889, 918–919 [*Ceres*].) *Ceres* provides:

> It is this neutral role which could cause [the agency] to reject the project or certify an EIR supporting one of the project alternatives or calling for mitigation measures to which the applicant is opposed. The agency's unbiased evaluation of the environmental impacts of the applicant's proposal is the bedrock on which the rest of the CEQA process is based.
> . . .
> This means that the product of the agency's efforts in conducting environmental review must reveal the true impacts of the proposed project, no matter how unattractive. The agency must unblinkingly include all significant impacts in the EIR and consider them with an open mind when deciding on project approval.
> . . .
> The relationship between a lead agency and project applicant is unique. Before project approval, the agency must *objectively judge* whether the project as proposed is environmentally acceptable and therefore must make a decision about *whether* it will align itself with the applicant in part, in whole, or not at all.

(*Ceres*, *supra*, 217 Cal.App.4th at 918–919.)

19-66

As *Ceres* explains, an objective analysis of a Project is one that may support rejection of the Project or selection of a Project alternative. An objective analysis is not one that transparently advocates for applicant's proposed project by, as here, attempting to sweep troublesome issues under the rug or avoid consideration of feasible project alternatives.

While the law presumes the agency acts in accordance with its legal duty to be objective, the law is settled that the presumption can be overcome by evidence. Some of the DEIR's most egregious violations of CEQA described above— ignoring General Plan Policy LU-127, ignoring the Project's impact on existing habitat conservation plans, reliance on lack of applicant "control" to justify dismissing alternative locations, falsely asserting that expansion of the USB is necessary to accommodate the County's share of future population growth —strongly suggest the DEIR was not prepared to advance the County's duty to objectively analyze the Project but rather to promote the Project and avoid consideration of alternatives.

19-66 cont.

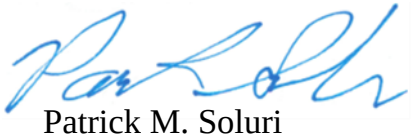
* * *

The DEIR is fundamentally flawed as an informational document. An entirely new DEIR will need to be prepared for the Project that objectively analyzes the Project's significant impacts, mitigation measures and a reasonable range of alternatives.

Thank you for the opportunity to comment.

Very truly yours,

SOLURI MESERVE
A Law Corporation

By: 
Patrick M. Soluri

Attachments:

Exhibit 1	Comments from Shawn Smallwood, PhD
Exhibit 2	Comments from Dan Smith, Smith Engineering & Management
Exhibit 3	Comments from SWAPE
Exhibit 4	Upper Westside, LLC Articles of Incorporation
Exhibit 5	Property Details for Applicant's Property

Exhibit 6	Upper Westside, LLC's Statement of Information
Exhibit 7	Secretary of State Entry Database Entry for Upper Westside, LLC
Exhibit 8	County Website regarding Natomas Joint Vision
Exhibit 9	Recommended Action of the Office of Planning and Environmental Review to the Sacramento County Board of Supervisors for the meeting agenda for February 26, 2019
Exhibit 10	City of Sacramento's Urban Water Management Plan, Chapters 3, 4
Exhibit 11	City staff report dated December 6, 2022, Consent Item 14
Exhibit 12	Cahill, T. A., Barnes, D. E., Spada, N. J., Lawton, J. A., and Cahill, T. M. (2010). Very Fine and Ultra-Fine Metals and Ischemic Heart Disease in the California Central Valley 1: 2003-2007. *Aerosol Sci. Technol*., 45:1123-1134.
Exhibit 13	Cahill, T. A., Barnes, D. E., Withycombe, E., and Watnik, M. (2010). Very Fine and Ultra-Fine Metals and Ischemic Heart Disease in the California Central Valley 2: 1-74-1991. *Aerosol Sci. Technol*., 45:1135-1142.
Exhibit 14	Martens D.S., Cox B, Janssen, B.G., Clemente, D., Gasparrini, A., Vanpoucke, C, Lefebvre, W., Roles, H.A., Plusquin, M., Nawrot, T. S. (2017). Prenatal Air Pollution and Newborns' Predisposition to Accelerated Biological Aging. *JAMA Pediatr*., 171(12):1160-1167.
Exhibit 15	Cahill, T. A., Barnes, D. E., Lawton, J.A., Miller, R., Nicholas, S., Willis, R.D., Kimbrough, S. (2016. Transition metals in coarse, fine, very fine and ultra-fine particles from an interstate highway transect near Detroit. *Atmos. Environ*., 145:158-175.

EXHIBIT 1

Shawn Smallwood, PhD
3108 Finch Street
Davis, CA 95616

Attn: Julie Newton, Environmental Coordinator
County of Sacramento
Department of Community Development
Planning and Environmental Review Division
827 7th Street, Room 225 Sacramento, California 95814

25 October 2024

RE: Upper Westside Specific Plan DEIR

Dear Ms. Newton,

Having been retained by ECOS and Friends of the Swainson's Hawk, I write to comment on potentially significant impacts to biological resources from the proposed Upper Westside Specific Plan and their analysis in the Draft Environmental Impact Report (DEIR). I understand the project would add 9,356 housing units for a predicted 25,578 people (the DEIR also predicts 25,200 residents and 25,460 residents), and >3 million square feet of commercial, retail, office buildings as well as parks and greenbelts on 1,532 acres, and on another 534 acres agricultural buffer to the Sacramento River.

My qualifications for preparing expert comments are the following. I hold a Ph.D. degree in Ecology from University of California at Davis, where I also worked as a post-graduate researcher in the Department of Agronomy and Range Sciences. My research has been on animal density and distribution, habitat selection, wildlife interactions with the anthrosphere, and conservation of rare and endangered species. I authored many papers on these and other topics. I served as Chair of the Conservation Affairs Committee for The Wildlife Society – Western Section. I am a member of The Wildlife Society and Raptor Research Foundation, and I've lectured part-time at California State University, Sacramento. I was Associate Editor of wildlife biology's premier scientific journal, The Journal of Wildlife Management, as well as of Biological Conservation, and I was on the Editorial Board of Environmental Management. I have performed wildlife surveys in California for thirty-seven years. My CV is attached.

SITE VISIT

To prepare my testimony, I visited the site to complete a reconnaissance survey to sample the wildlife community. On 23 October 2024, from 07:00 to 08:42 hours, I surveyed from San Juan Road, scanning for wildlife with use of binoculars. After 1 hour and 42 minutes, I relocated to Radio Road because a tractor-drawn disk assembly covered my survey area with dust. I surveyed at my second site until 10:50 hours. I recorded all species of vertebrate wildlife we detected, including those whose members flew over the site or we saw nearby, off the site. Animals of uncertain species identity were either omitted or, if possible, recorded to the Genus or higher taxonomic level.

19-67

Conditions were clear with no wind and temperatures of 47–66° F. Most of the site is in agriculture, which is irrigated by canals and interspersed by ditches, annual grassland and small stands of trees including willows, oaks and Fremont cottonwoods (Photos 1 through 4).

I completed my survey was too late in the season for detecting Swainson's hawks, as by October 1st the last of the local Swainson's hawks would have departed on their annual winter migration to Mexico. However, I have seen Swainson's hawks on the Specific Plan area many times before.

***Photos 1 and 2**. Western king amid a stand of willows on the project site, 14 May 2024.*

19-67 cont.

***Photos 3 and 4**. Mallards on one of the water channels on the project site, 14 May 2024.*

On the Specific Plan area, I observed two pairs of white-tailed kites and a peregrine falcon (Photos 5 and 6), California ground squirrels and sign of bobcat (Photos 7 and 8), coyotes (Photo 9), American kestrels and Anna's hummingbirds (Photos 10 and 11), California scrub-jays and yellow-rumped warblers (Photos 12 and 13), Dark-eyed juncos and house finches (Photos 14 and 15), Great egrets and northern flickers (Photos 16 and 17), song sparrows and lesser goldfinches (Photos 18 and 19), white-crowned sparrows and golden-crowned sparrows (Photos 20 and 21), Lincoln's sparrows and Nashville warbler (Photos 22 and 23), and many more species (Table 1).

19-67 cont.

Photos 5 and 6. *A pair of white-tailed kites atop an oak (top) and a peregrine falcon on the hunt (right) on the Specific Plan area, 23 October 2024.*

19-67 cont.

Photos 7 and 8. *California ground squirrel (L) and track of a bobcat (R) on the Specific Plan area, 23 October 2024.*

19-67 cont.

Photo 9. *One of four coyotes on the Specific Plan area, 23 October 2024.*


Photos 10 and 11. *American kestrel (L) and Anna's hummingbird (R) on the Specific Plan area, 23 October 2024.*


Photos 12 and 13. *California scrub-jay (L) and yellow-rumped warbler (R) on the Specific Plan area, 23 October 2024.*

19-67 cont.

19-67 cont.

Photos 14 and 15. *Dark-eyed junco and house finches on the Specific Plan area, 23 October 2024.*

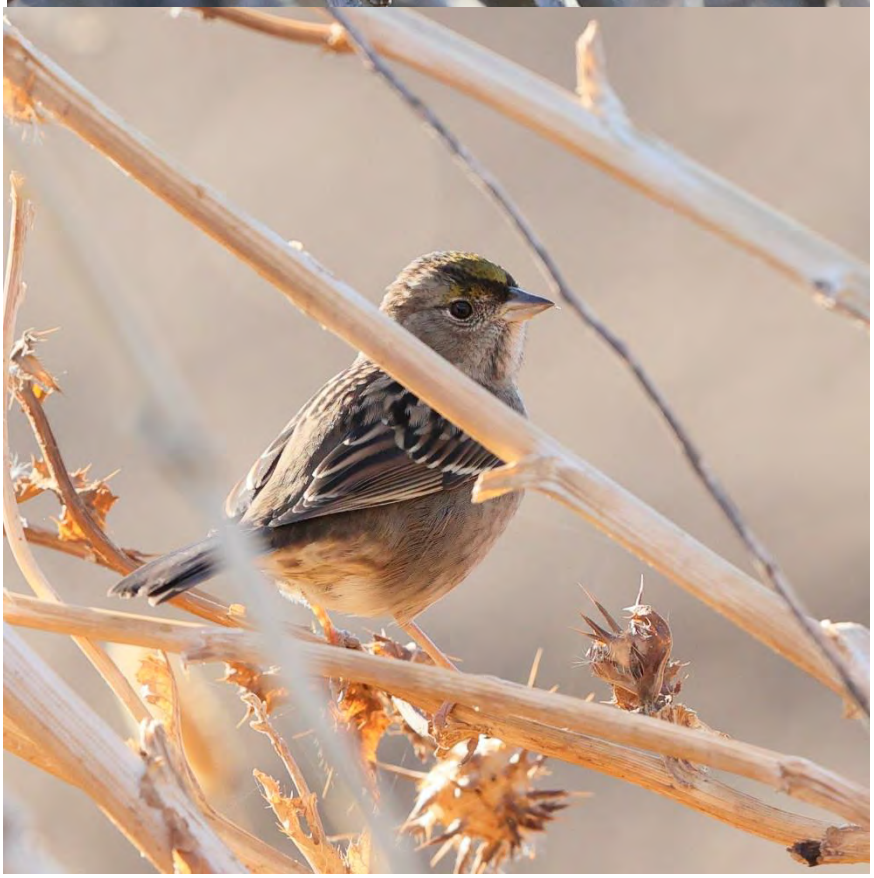
Photos 16 and 17. *Great egret and northern flicker on the Specific Plan area, 23 October 2024.*

19-67 cont.

Photos 18 and 19. *Song sparrow and lesser goldfinch on the Specific Plan area, 23 October 2024.*

19-67 cont.

Photos 20 and 21. *White-crowned sparrow and golden-crowned sparrow on the Specific Plan area, 23 October 2024.*



19-67 cont.

Photos 22 and 23. *Lincoln's sparrow (top) and Nashville warbler (bottom) on the Specific Plan area, 23 October 2024.*

19-67 cont.

Among the 73 species I detected, 17 (23%) are special-status species (Table 1), including tricolored blackbird, which is listed as Threatened under the California Endangered Species Act, white-tailed kite, which is a California Fully Protected Species. Combining my results with those of Bargas (2022) and Helix (2024), we have detected 119 species of vertebrate wildlife on the Specific Plan area, 100 of which were detected by Bargas over their 40 surveys spanning more than two years, three additional species detected by Helix and 16 more detected by myself (Table 1). Our combined 119 species include 26 special-status species, including two Threatened species under CESA.

Although I saw 73 species of vertebrate wildlife during my brief 3.83-hour survey, the species of wildlife I detected comprised only a sampling of the species that were present during our survey, as was evidenced by the Bargas and Helix surveys. Reconnaissance surveys, such as the one I completed at the project site, cannot support determinations of species' absence, but they can confirm species' presence. Such surveys can also be useful for estimating the number of species that were not detected, thereby revealing the degree to which the survey sampled the local wildlife community that was available at the time of the survey. One way to do this is to model the pattern in species detections with time into a survey. The cumulative number of species' detections increases with increasing survey time, but eventually with diminishing returns (Figure 1). In the case of my survey on the project site, the pattern in the data predicts that had I spent more time on the site, or had I help from more biologists, I would have detected 135 species of vertebrate wildlife during the morning of 23 October 2024, or 62 more species than I actually detected.

19-67 cont.

The pattern in my data also indicates that my rate of species detections at the project site far exceeded the upper bound of the 95% confidence interval I estimated from 52 surveys at other project sites that I have surveyed in the Sacramento-San Joaquin Valley since 2019 (Figure 1). In other words, wildlife species richness at the project site far exceeds the species richness my surveys indicated at other project sites in the region, despite the agricultural activities on the Specific Plan area.

The Specific Plan area supports many species of wildlife, including many more than I could detect during a brief reconnaissance survey. However, although this modeling approach is useful for more realistically representing the species richness of the site at the time of a survey, it cannot represent the species richness throughout the year or across multiple years because many species are seasonal or even multi-annual in their movement patterns and in their occupancy of habitat. I surveyed only in October, and therefore I was unlikely to see some of the species that would use the site in winter, spring or summer.

Table 1. *Species of wildlife observed by Bargas during 40 surveys from March 2019 to July 2021, by Helix on 7 and 8 March 2023, and by myself (KSS) 3.83 hours on the morning of 23 October 2024.*

Common name	***Species name***	**Status[1]**	**Bargas**	**Helix**	**KSS**	**Notes**
Western fence lizard	*Sceloporus occidentalis*		X			
Red-eared slider	*Trachemys scripta elegans*	Non-native	X	X		
Giant gartersnake	*Thamnophis gigas*	FT, CT	X[2]			
Snow goose	*Anser caerulescens*		X			
Canada goose	*Branta canadensis*		X	X	X	Low-flying flocks
Cinnamon teal	*Spatula cyanoptera*		X			
Northern shoveler	*Anas clypeata*				X	Just off site
Gadwall	*Mareca strepera*		X			
Mallard	*Anas platyrhynchos*		X	X	X	
California quail	*Callipepla californica*		X			
Wild turkey	*Meleagris gallopavo*		X			
Ring-necked pheasant	*Phaianus colchicus*	Non-native	X			
Pied-billed grebe	*Podilymbus podiceps*		X			
Rock pigeon	*Columba livia*	Non-native	X	X	X	Hundreds
Band-tailed pigeon	*Patagioenas fasciata*				X	
Eurasian collared-dove	*Streptopelia decaocto*	Non-native	X		X	
Mourning dove	*Zenaida macroura*		X	X	X	
White-throated swift	*Aeronautes saxatalis*		X			
Anna's hummingbird	*Calypte anna*		X		X	
Rufous hummingbird	*Selasphorus rufus*	BCC	X			
American coot	*Fulica americana*		X		X	
Black-necked stilt	*Himantopus mexicanus*				X	Just off site
Killdeer	*Charadrius vociferus*		X		X	
Whimbrel	*Numenius phaeopus*		X			
Greater yellowlegs	*Tringa melanoleuca*				X	Just off site
Western gull	*Larus occidentalis*	BCC			X	
Double-crested cormorant	*Nannopterum auritum*	TWL	X	X	X	
American white pelican	*Pelacanus erythrorhynchos*	SSC1	X	X		
American bittern	*Botaurus lentiginosus*		X			
Great blue heron	*Ardea herodias*		X	X	X	

19-67 cont.

Common name	*Species name*	Status[1]	Bargas	Helix	KSS	Notes
Great egret	*Ardea alba*		X	X	X	
Snowy egret	*Egretta thula*		X	X	X	
White-faced ibis	*Pledagis chihi*	TWL			X	
Turkey vulture	*Cathartes aura*	BOP	X	X	X	
Osprey	*Pandion haliaetus*	TWL, BOP	X	X		
White-tailed kite	*Elanus leucurus*	CFP, BOP	X		X	Two pairs
Northern harrier	*Circus cyaneus*	BCC, SSC3, BOP	X		X	Harassed by yellow-headed blackbirds
Cooper's hawk	*Accipiter cooperii*	TWL, BOP	X	X	X	
Red-shouldered hawk	*Buteo lineatus*	BOP	X	X		
Swainson's hawk	*Buteo swainsoni*	CT, BOP	X			
Red-tailed hawk	*Buteo jamaicensis*	BOP	X	X	X	
Rough-legged hawk	*Buteo lagopus*	BOP	X			
Great horned owl	*Bubo virginianus*	BOP	X		X	
Belted kingfisher	*Ceryle alcyon*		X			
Acorn woodpecker	*Melanerpes formicivorus*		X	X	X	
Downy woodpecker	*Dryobates pubescens*		X			
Nuttall's woodpecker	*Picoides nuttallii*	BCC	X	X	X	
Northern flicker	*Colaptes auratus*		X	X	X	
American kestrel	*Falco sparverius*	BOP	X		X	Several
Peregrine falcon	*Falco peregrinus*	BOP			X	Foraging
Prairie falcon	*Falco mexicanus*	TWL, BOP	X			
Western kingbird	*Tyrannus verticalis*		X		X	
Black phoebe	*Sayornis nigricans*		X	X	X	
Say's phoebe	*Sayornis saya*		X	X	X	
California scrub-jay	*Aphelocoma californica*		X	X	X	
Yellow-billed magpie	*Pica nuttalli*	BCC	X	X	X	
American crow	*Corvus brachyrhynchos*		X	X	X	Many
Common raven	*Corvus corax*		X	X	X	
Oak titmouse	*Baeolophus inornatus*	BCC	X	X	X	
Horned lark	*Eremophila alpestris*		X		X	Many
Tree swallow	*Tachycineta bicolor*		X	X		

19-67 cont.

Common name	*Species name*	Status[1]	Bargas	Helix	KSS	Notes
Violet-green swallow	*Tachycineta thalassina*			X		
Northern rough-winged swallow	*Stelgidopteryx serripennis*		X			
Barn swallow	*Hirundo rustica*		X			
Cliff swallow	*Petrochelidon pyrrhonota*		X			
Bushtit	*Psaltriparus minimus*		X		X	
Ruby-crowned kinglet	*Regulus calendula*		X		X	
Golden-crowned kinglet	*Regulus satrapa*		X			
Cedar waxwing	*Bombycilla cedrorum*		X		X	
Phainopepla	*Phainopepla nitens*			X		
White-breasted nuthatch	*Sitta carolinensis*		X	X	X	
Bewick's wren	*Thryomanes bewickii*		X	X		
House wren	*Troglodytes aedon*		X			
Northern mockingbird	*Mimus polyglottos*			X	X	
European starling	*Sturnus vulgaris*	Non-native	X	X	X	
Western bluebird	*Sialia mexicana*		X	X	X	
American robin	*Turdus migratorius*		X	X		
House sparrow	*Passer domesticus*	Non-native	X		X	
American pipit	*Anthus rubescens*		X		X	
House finch	*Haemorphous mexicanus*		X	X	X	
Lesser goldfinch	*Spinus psaltria*		X	X	X	
American goldfinch	*Spinus tristis*		X		X	
Lark sparrow	*Chondestes grammacus*		X			
Dark-eyed junco	*Junco hyemalis*		X		X	
White-crowned sparrow	*Zonotrichia leucophrys*		X	X	X	Many
Golden-crowned sparrow	*Zonotrichia atricapilla*		X		X	
Savannah sparrow	*Passerculus sandwichensis*		X		X	
Modesto song sparrow	*Melospiza melodia*	SSC3	X		X	
Lincoln's sparrow	*Melospiza lincolnii*		X		X	
California towhee	*Melozone crissalis*		X			
Spotted towhee	*Pipilo maculatus*		X			
Yellow-headed blackbird	*X. xanthocephalus*	SSC3	X		X	Many

19-67 cont.

Common name	*Species name*	Status[1]	Bargas	Helix	KSS	Notes
Western meadowlark	*Sturnella neglecta*		X	X	X	
Hooded oriole	*Icterus cucullatus*		X			
Bullock's oriole	*Icterus bullockii*	BCC	X			
Red-winged blackbird	*Agelaius phoeniceus*		X	X	X	
Tricolored blackbird	*Agelaius tricolor*	CT, BCC, SSC1			X	Multiple small flocks
Brown-headed cowbird	*Molothrus ater*		X			
Brewer's blackbird	*Euphagus cyanocephalus*		X	X	X	
Great-tailed grackle	*Quiscalus mexicanus*		X		X	Flock
Orange-crowned warbler	*Oreothlypis celata*				X	
Nashville warbler	*Vermivora ruficapilla*				X	
Common yellowthroat	*Geothlypis trichas*		X			
Yellow warbler	*Setophaga petechia*	SSC2	X			
Yellow-rumped warbler	*Setophaga coronata*		X	X	X	Many
Black-headed grosbeak	*Pheucticus melanocephalus*		X			
Blue grosbeak	*Passerina caerulea*		X			
Black-tailed jackrabbit	*Lepus californicus*		X	X	X	
Desert cottontail	*Sylvilagus audubonii*				X	One a roadkill
Eastern fox squirrel	*Sciurus niger*		X			
California ground squirrel	*Otospermophilus beecheyi*		X		X	
Raccoon	*Procyon lotor*				X	One a roadkill
Striped skunk	*Mephitis mephitis*				X	
American mink	*Neovison vison*		X			
River otter	*Lontra canadensis*		X			
North American beaver	*Castor canadensis*		X			
Bobcat	*Lynx rufus*				X	
Coyote	*Canis latrans*				X	
Gray fox	*Urocyon cinereoargenteus*				X	

19-67 cont.

[1] Listed as FT or FE = federal threatened or endangered, CT or CE = California threatened or endangered, CFP = California Fully Protected (CFG Code 3511), SSC = California Species of Special Concern, BCC = U.S. Fish and Wildlife Service Bird of Conservation Concern with priorities 1, 2 and 3, TWL = Taxa to Watch List (Shuford and Gardali 2008), and BOP = Birds of Prey (California Fish and Game Code 3503.5). [2] Eric Hansen detected eDNA on site.

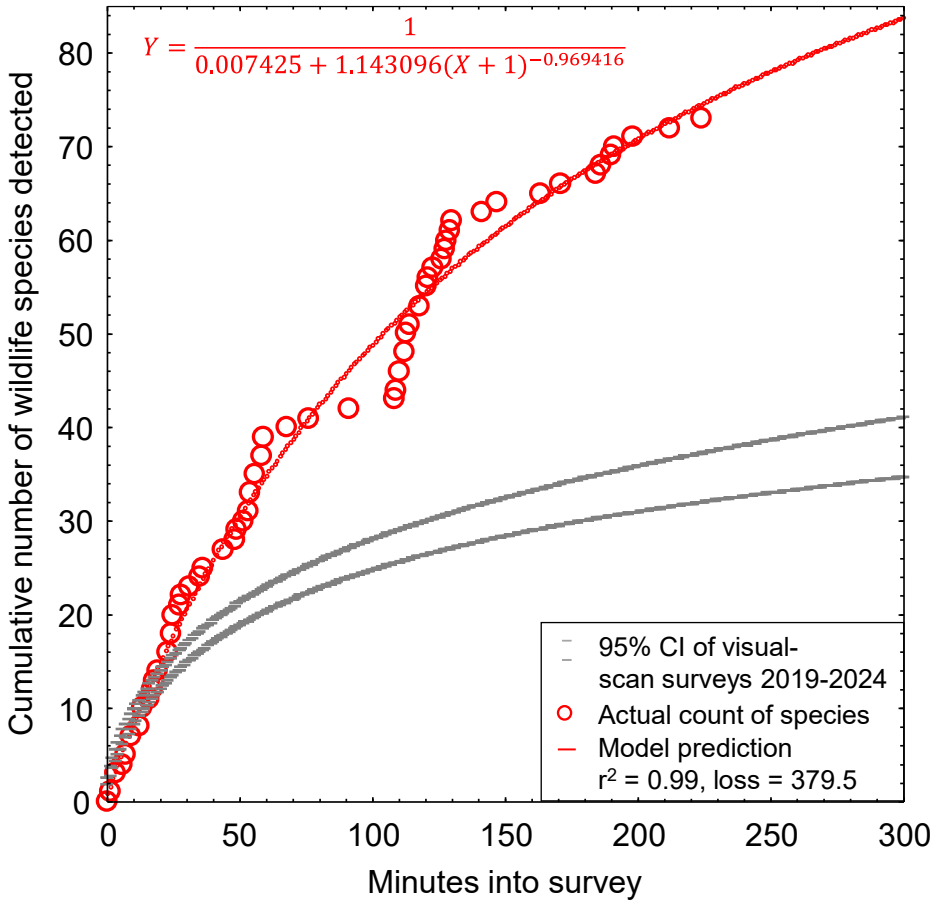


Figure 1. *Actual and predicted relationships between the number of vertebrate wildlife species detected and my elapsed survey time on 23 October 2024.*

19-67 cont.

At least a year's worth of surveys would be needed to more accurately report the number of vertebrate species that occur at the Specific Plan area, but I only my one brief diurnal survey. However, by use of an analytical bridge, a modeling effort applied to a more expansive data set from a research site can predict the number of vertebrate wildlife species that likely make use of the Upper Westside Specific Plan area over the longer term. As part of my research, I completed 41 diurnal surveys on the Kassis property in Rancho Cordova, California. I used binoculars and otherwise the methods were the same as the methods I used on the Specific Plan area. I selected the Kassis data set as the basis of an analytical bridge because the species richness I detected there in my initial survey was similar to that of the Upper Westside Specific Plan area. I tallied new species detected with each sequential survey, and then related the cumulative species detected to the hours used to accumulate my counts of species detected. I used combined quadratic and simplex methods of estimation in Statistica to estimate least-squares, best-fit nonlinear models of the number of cumulative species detected regressed on hours of survey: $\hat{R} = \frac{1}{1/a + b \times (Hours)^c}$, where $\hat{R}$ represented cumulative species richness detected. The coefficient of determination, r^2, was 0.98, indicating the model was an excellent fit to the data (Figure 2).

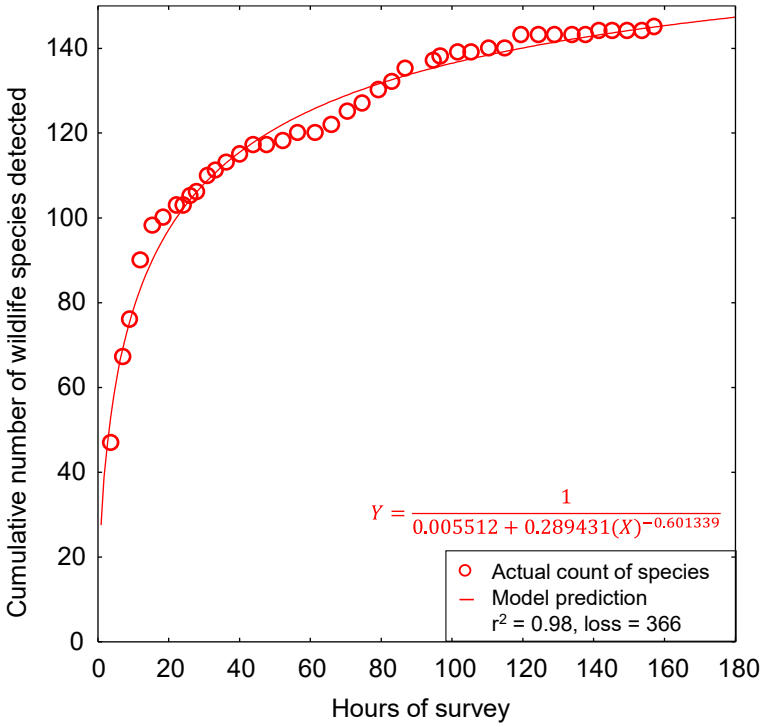


Figure 2. *Cumulative number of species of vertebrate wildlife detected with increasing number of hours of survey at the Kassis site in Rancho Cordova, California, which was surveyed 41 times from 3 December 2020 through 27 October 2023.*

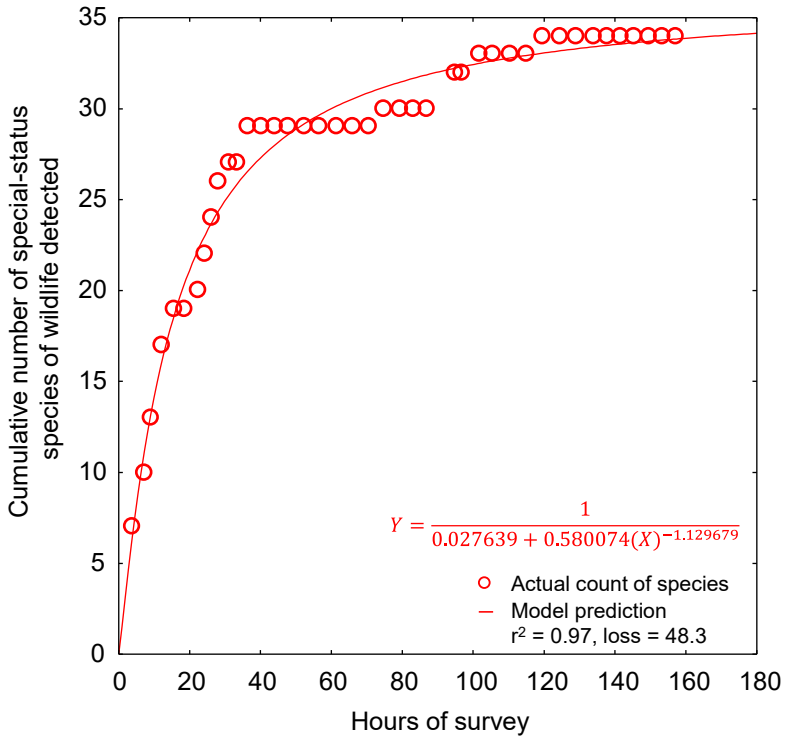
19-67 cont.

The model-predicted asymptote of species richness at the Kassis site was 180 following many more hours of visual-scan surveys than I actually completed. On average I would have detected 53.8 species over my first 3.83 hours of surveys at Kassis (3.83 hours to match the 3.83 hours I surveyed at the Upper Westside Specific Plan area during daylight), which composed 29.9% of the predicted total number of species I would detect with a much larger survey effort at Kassis. Given the example illustrated in Figure 2, the 73 species I detected after 3.83 hours of diurnal survey on the Upper Westside Specific Plan area likely represented 29.9% of the species to be detected after many more visual-scan surveys over another year or longer. With many more repeat surveys through the year, I would likely detect $^{73}/_{0.299} = 244$ species of vertebrate wildlife on the Upper Westside Specific Plan area. Assuming my ratio of special-status to non-special-status species was to hold through the detections of all 244 predicted species, then continued surveys would eventually detect 54 special-status species of vertebrate wildlife.

I applied the same analytical approach to special-status species, where at Kassis I detected 34 special-status species after 157 hours across 41 surveys. The model-predicted asymptote of special-status species richness at Kassis was 36 following many more hours of visual-scan surveys than I actually completed (Figure 3). On average I would have detected 6.45 special-status species over my first 3.83 hours of surveys at Kassis (again, the 3.83 hours used here is to match the 3.83 hours I surveyed on the Upper Westside Specific Plan area), which composed 17.9% of the predicted total number of special-status species I would detect with a much larger survey effort at Kassis. Given the example illustrated in Figure 3), the 17 special-status species I detected after 3.83 hours of survey on the Upper Westside Specific Plan area likely represented 17.9% of the special-status species to be detected after many more visual-

scan surveys over another year or longer. With many more repeat surveys through the year, I would likely detect $^{17}/_{0.179} = 95$ special-status species of vertebrate wildlife on the Upper Westside Specific Plan area.

Figure 3. *Cumulative number of special-status species of vertebrate wildlife detected with increasing number of hours of survey at the Kassis site in Rancho Cordova, California, which was surveyed 41 times from 3 December 2020 through 27 October 2023.*



19-67 cont.

Because my predictions of 244 species of vertebrate wildlife including 54 to 95 special-status species of vertebrate wildlife are derived from daytime visual-scan surveys, and would detect few nocturnal mammals such as bats, the true number of species composing the wildlife community of the Upper Westside Specific Plan area must be larger. My reconnaissance survey combined with the surveys of Bargas (2022) and Helix (2024) have so far detected fewer than half of the vertebrate wildlife species that occur on the Specific Plan area, and between a third to half the number of special-status species that occur there. The wildlife community has yet to be inventoried, and therefore has yet to be accurately characterized as part of the existing environmental setting. More surveys are needed, as the wildlife community is far richer in species than depicted in Helix (2024) and the DEIR.

Known for certain is that the project Upper Westside Specific Plan area supports Swainson's hawk and tricolored blackbird, both species of which are listed as Threatened under the California Endangered Species Act. Helix (2024) also reports the presence of the federally- and state-listed threatened giant gartersnake on the Specific Plan area. It also supports yellow warbler, which is considered by the California Department of Fish and Wildlife to be a Species of Special Concern with priority level 2. Also certainly present is Bullock's oriole, which is listed by the U.S. Fish and Wildlife Service as a Bird of Conservation Concern. Double-crested cormorants are present, as are multiple species protected under California's Birds of Prey statute. As my modeling

suggests, many additional special-status species use the site, but I just did not have the fortune to see them on the project site during my survey. 19-67 cont.

EXISTING ENVIRONMENTAL SETTING

The first step in analysis of potential project impacts to biological resources is to accurately characterize the existing environmental setting, including the biological species that use the site, their relative abundances, how they use the site, key ecological relationships, and known and ongoing threats to those species with special status. A reasonably accurate characterization of the environmental setting can provide the baseline against which to analyze potential project impacts and to formulate appropriate mitigation measures. For these reasons, characterization of the environmental setting, including the project site's regional setting, is one of CEQA's essential analytical steps. Methods to achieve this first step typically include (1) surveys of the site for biological resources, and (2) reviews of literature, databases and local experts for documented occurrences of special-status species. In the case of the proposed project, these required steps remain incomplete and misleading.

Environmental Setting Informed by Field Surveys

To CEQA's primary objective to disclose potential environmental impacts of a proposed project, the analysis should be informed of which biological species are known to occur at the project site or nearby, and which special-status species are likely to occur, as well as the limitations of the survey effort directed to the site. Analysts need this information to characterize the environmental setting as a basis for opining on, or predicting, potential project impacts to biological resources.

Bargas (2022) committed to a serious survey effort of the Specific Plan area, and documented the presence of multiple special-status species. It is unfortunate, however, that Bargas (2022) refers the reader to other reports that purportedly include the details of study methods. These other reports are not provided with the DEIR, so I am unable to assess the methods, which makes it very difficult to assess Bargas's findings.

Helix (2024) surveyed the Specific Plan area only on two consecutive days, and like Bargas, fails to report survey start times and survey duration, which are critical methodological details that the reader needs in order to assess the survey findings. Helix detected fewer than half the number of species detected by Bargas, but it is unreported exactly where Helix surveyed or for how long. Nonetheless, Helix (2024) detected three more species of wildlife that Bargas did not.

Although 102 species of vertebrate wildlife were detected by Bargas (2022) and Helix (2024), the DEIR does not summarize the survey findings into a coherent characterization of the wildlife community as part of the existing environmental setting. Most of the species that truly occur in the area are never mentioned, nor is the species richness or biological diversity of the area summarized. The result is an unfortunate insinuation that the Specific Plan area is of low overall value to wildlife. My survey

19-68

results indicate the opposite, which is that despite the annual disking of most of the acreage on the Specific Plan area, the area is inherently species-rich.

19-68 cont.

Environmental Setting Informed by Desktop Review

The purpose of literature and database review, and of consulting with local experts, is to inform the reconnaissance-level survey, to augment it, and to help determine which protocol-level detection surveys should be implemented. Analysts need this information to identify which species are known to have occurred at or near the project site, and to identify which other special-status species could conceivably occur at the site due to geographic range overlap and site conditions. This step is important because the reconnaissance surveys are not going to detect all of the species of wildlife that make use of the site. This step can identity those species yet to be detected at the site but which have been documented to occur nearby or whose available habitat associations are consistent with site conditions. Some special-status species can be ruled out of further analysis, but only if compelling evidence is available in support of such determinations.

First Bargas (2022:22) and then Helix (2024:18-19) established an initial pool of special-status species considered for inclusion in their respective analyses of occurrence based on queries of CNDDB occurrence records. It is unclear to what spatial extent the CNDDB queries were made, but regardless this screening step is flawed. CNDDB is not designed to support absence determinations or to screen out species from characterization of a site's wildlife community. As noted by CNDDB, "The CNDDB is a positive sighting database. It does not predict where something may be found. We map occurrences only where we have documentation that the species was found at the site. There are many areas of the state where no surveys have been conducted and therefore there is nothing on the map. That does not mean that there are no special status species present." And in its letter of 6 November 2020 to the County, CDFW writes, "Please note that CDFW's CNDDB is not exhaustive in terms of the data it houses, nor is it an absence database. CDFW recommends that it be used as a starting point in gathering information about the *potential presence* of species within the general area of the Project site." Bargas (2022), Helix (2024) and the DEIR misuse CNDDB.

19-69

CNDDB relies entirely on volunteer or permit reporting from biologists who were allowed access to whatever properties they report from. Many properties have never been surveyed by biologists. Many properties have been surveyed, but the survey outcomes never reported to CNDDB. Many properties have been surveyed multiple times, but not all survey outcomes reported to CNDDB. Furthermore, CNDDB is interested only in the findings of special-status species, which means that species more recently assigned special status will have been reported many fewer times to CNDDB than were species assigned special status since CNDDB's inception. The lack of CNDDB records for species only recently assigned special status would have been due to insufficient time having elapsed since the assignments. And because negative findings are not reported to CNDDB, CNDDB cannot provide the basis for estimating occurrence likelihoods, either. The DEIR's analysis of special-status species occurrence likelihoods is fundamentally flawed.

The DEIR is also internally inconsistent in its occurrence likelihood determinations (Table 2). Bargas (2022) analyzes the occurrence potential of only 22 species of vertebrate wildlife, whereas Helix (2024) does so for 30 species and the DEIR does so for 36 species. Bargas, Helix and the DEIR agree that five species are unlikely to occur, and they agree on four species known or suspected to be present, but determinations of occurrence likelihood vary among the other species considered. Bargas's determinations mostly comport with my analysis of occurrence records, although Bargas's determination of low likelihood of giant gartersnake occurrence does not comport with its own finding of eDNA evidence of the snake right in the middle of the Specific Plan area. Helix determines 15 species will not occur or are not expected, yet three of these are assigned moderate potential by Bargas and I saw two of these species on the Specific Plan area on October 23rd.

In my assessment of database review and site visit, 102 special-status species of wildlife are known to occur near enough to the Specific Plan area to be analyzed for potential to occur at one time or another (Table 2). Of these 102 species, 31 (30%) have been documented on the Specific Plan area (I confirmed 17 of these), and 23 (22.5%) have been documented in databases within 1.5 miles of the Specific Plan area ('Very close'), 20 (19.6%) within 1.5 and 4 miles ('Nearby'), and another 23 (22.5%) within 4 to 30 miles ('In region'). Three quarters (74) of the special-status species in Table 2 have been reportedly seen within 4 miles of the Specific Plan area. Therefore, the Specific Plan area supports multiple special-status species of wildlife, and likely supports many more.

19-69 cont.

POTENTIAL BIOLOGICAL IMPACTS

An impacts analysis should consider whether and how the proposed project would affect members of a species, larger demographic units of the species, the whole of a species, and ecological communities. In the following I describe three types of impacts likely to result from the project, and which need to be analyzed in a revised DEIR.

INTERFERENCE WITH EXISTING HCPs

The DEIR fails to consider the need for the Natomas Basin Habitat Conservation Plan (NBHCP) to be reevaluated and new incidental take permits (ITPs) issued with a new conservation strategy. According to the DEIR (p. 7-37), "While the UWSP area is in the Natomas Basin, the County is not a participant in either the NBHCP or the MAP HCP. Therefore, the applicant (and any future applicants for buildout of the UWSP area) is not eligible for the take coverage granted by USFWS and CDFW under the NBHCP or MAP HCP. The proposed UWSP is also outside of the planned development areas of the NBHCP and MAP HCP and potential impacts resulting from development allowed under the proposed UWSP were not considered in the NBHCP." These conclusions, however, lack the analysis of whether the Specific Plan would require a reevaluation of the NBHCP. The 2003 NBHCP Implementation Agreement states, "…prior to approval of any related rezoning or prezoning, such future urban development shall trigger a reevaluation of the Plan and Permits, a new effects analysis, potential amendments and/or revisions to the Plan and Permits, a separate conservation strategy and issuance of Incidental Take Permits to the permittee for that additional development…"

19-70

Table 2. *Occurrence likelihoods of special-status bird species at or near the proposed project site, according to eBird/iNaturalist records (https://eBird.org, https://www.inaturalist.org) and on-site survey findings, where 'Very close' indicates within 1.5 miles of the site, "nearby" indicates within 1.5 and 4 miles, and "in region" indicates within 4 and 30 miles, and 'in range' means the species' geographic range overlaps the site. Entries in Bold identify species I detected.*

Common name	***Species name***	**Status[1]**	**Occurrence potential**			
			Bargas 2022	**Helix 2024**	**DEIR**	**Data base records, Site visits**
Conservancy fairy shrimp	*Branchinecta conservatio*	FE	Absent	Won't occur	Not expected	In range
Vernal pool fairy shrimp	*Branchinecta lynchi*	FT	Low	Won't occur	Low	In region
Vernal pool tadpole shrimp	*Lepidurus packardi*	FE	Absent	Won't occur	Not expected	In region
Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	FT	Low	Not expected / Habitat present	Moderate	In region
Monarch	*Danaus plexippus*	FC		Won't occur		Very close
Crotch's bumble bee	*Bombus crotchii*	CCE		Won't occur	Not expected	In region
Northwestern pond turtle	*Emys marmorata*	SSC	High	May occur / Habitat present	Moderate	Very close
Giant gartersnake	*Thamnophis gigas*	FT, CT	Low	Present / Habitat present	High	On site
Brant	*Branta bernicla*	SSC2				In region
Cackling goose (Aleutian)	*Branta hutchinsii leucopareia*	WL	Moderate	Won't occur	Low	Nearby
Redhead	*Aythya americana*	SSC2				Nearby
Barrow's goldeneye	*Bucephala islandica*	SSC				Very close
Western grebe	*Aechmophorus occidentalis*	BCC				Nearby
Clark's grebe	*Aechmophorus clarkii*	BCC				Nearby
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	FT, CE	Absent	Won't occur	Not expected	In region
Black swift	*Cypseloides niger*	SSC3, BCC				Nearby

19-69 cont.

Common name	*Species name*	Status[1]	Occurrence potential			
			Bargas 2022	**Helix 2024**	**DEIR**	**Data base records, Site visits**
Vaux's swift	*Chaetura vauxi*	SSC2				Very close
Calliope hummingbird	*Selasphorus calliope*	BCC				Very close
Rufous hummingbird	*Selasphorus rufus*	BCC				On site
Allen's hummingbird	*Selasphorus sasin*	BCC				Nearby
Lesser sandhill crane	*Antigone canadensis canadensis*	SSC3				In region
Greater sandhill crane	*Antigone canadensis tabida*	CT, FP			Low	In region
Mountain plover	*Charadrius montanus*	SSC2, BCC		Not expected	Low	In region
Snowy plover	*Charadrius nivosus*	BCC				Nearby
Western snowy plover	*Charadrius n. nivosus*	FT, SSC	Absent	Won't occur	Not expected	In region
Long-billed curlew	*Numenius americanus*	WL				Very close
Marbled godwit	*Limosa fedoa*	BCC				Nearby
Pectoral sandpiper	*Calidris melanotos*	BCC				Nearby
Short-billed dowitcher	*Limnodromus griseus*	BCC				Very close
Lesser yellowlegs	*Tringa flavipes*	BCC				Very close
Willet	*Tringa semipalmata*	BCC				Nearby
Franklin's gull	*Leucophaeus pipixcan*	BCC				Nearby
Western gull	*Larus occidentalis*	BCC				**On site**
California gull	*Larus californicus*	BCC, WL				On site, ebird
California least tern	*Sternula antillarum browni*	FE, CE, FP				In region
Black tern	*Chlidonias niger*	SSC2, BCC				Nearby
Common loon	*Gavia immer*	SSC				Very close
Double-crested cormorant	*Phalacrocorax auritus*	WL		Won't occur	Not expected	**On site**
American white pelican	*Pelacanus erythrorhynchos*	SSC1	Present		High	On site

19-69 cont.

Common name	*Species name*	Status[1]	Occurrence potential			
			Bargas 2022	**Helix 2024**	**DEIR**	**Data base records, Site visits**
California brown pelican	*Pelecanus occidentalis californicus*	FP				In region
Least bittern	*Ixobrychus exilis*	SSC2				Very close
White-faced ibis	*Plegadis chihi*	WL	Moderate	Not expected / Habitat present	Moderate	**On site** ebird
Turkey vulture	*Cathartes aura*	BOP				**On site**
Osprey	*Pandion haliaetus*	WL, BOP		Present	Present	On site
White-tailed kite	*Elanus luecurus*	CFP, BOP	Present	High / Habitat present	High	**On site**
Golden eagle	*Aquila chrysaetos*	BGEPA, CFP, BOP, WL				Very close
Northern harrier	*Circus cyaneus*	BCC, SSC3, BOP	Present	Present	Present	**On site**
Sharp-shinned hawk	*Accipiter striatus*	WL, BOP				Very close
Cooper's hawk	*Accipiter cooperii*	WL, BOP		Present / Habitat present	Present	**On site**
Bald eagle	*Haliaeetus leucocephalus*	CE, BGEPA, BOP				Very close
Red-shouldered hawk	*Buteo lineatus*	BOP				On site
Swainson's hawk	*Buteo swainsoni*	CT, BOP	Present	High / Present	High	On site
Red-tailed hawk	*Buteo jamaicensis*	BOP				**On site**
Ferruginous hawk	*Buteo regalis*	WL, BOP		Not expected	Low	Very close
Rough-legged hawk	*Buteo lagopus*	BOP				On site
Barn owl	*Tyto alba*	BOP				On site, eBird
Western screech-owl	*Megascops kennicotti*	BOP				Very close
Great horned owl	*Bubo virginianus*	BOP				**On site**
Burrowing owl	*Athene cunicularia*	BCC, SSC2, BOP	Moderate	May occur / Habitat present	Moderate	On site

19-69 cont.

Common name	*Species name*	Status[1]	Occurrence potential			
			Bargas 2022	**Helix 2024**	**DEIR**	**Data base records, Site visits**
Long-eared owl	*Asio otus*	BCC, SSC3, BOP				In region
Short-eared owl	*Asia flammeus*	BCC, SSC3, BOP				Nearby
Northern saw-whet owl	*Aegolius acadicus*	BOP				Nearby
Lewis's woodpecker	*Melanerpes lewis*	BCC				Very close
Nuttall's woodpecker	*Picoides nuttallii*	BCC				**On site**
American kestrel	*Falco sparverius*	BOP				**On site**
Merlin	*Falco columbarius*	WL, BOP		Not expected	Low	Very close
Peregrine falcon	*Falco peregrinus*	BOP			Low	**On site**
Prairie falcon	*Falco mexicanus*	WL, BOP				On site
Olive-sided flycatcher	*Contopus cooperi*	BCC, SSC2				Very close
Willow flycatcher	*Empidonax trailii*	CE				Very close
Vermilion flycatcher	*Pyrocephalus rubinus*	SSC2				Nearby
Least Bell's vireo	*Vireo bellii pusillus*	FE, CE	Absent	Won't occur	Not expected	In region
Loggerhead shrike	*Lanius ludovicianus*	SSC2	High	High / Habitat present	High	Very close
Yellow-billed magpie	*Pica nuttalli*	BCC				**On site**
Oak titmouse	*Baeolophus inornatus*	BCC				**On site**
Bank swallow	*Riparia riparia*	CT	Moderate	Won't occur	Low	Very close
Purple martin	*Progne subis*	SSC2		May occur / Habitat present	Moderate	On site, eBird
Wrentit	*Chamaea fasciata*	BCC				Very close
California thrasher	*Toxostoma redivivum*	BCC				Nearby
Cassin's finch	*Haemorhous cassinii*	BCC				In region
Lawrence's goldfinch	*Spinus lawrencei*	BCC				Nearby
Grasshopper sparrow	*Ammodramus savannarum*	SSC2		Won't occur	Low	Nearby

19-69 cont.

Common name	*Species name*	Status[1]	Occurrence potential			
			Bargas 2022	**Helix 2024**	**DEIR**	**Data base records, Site visits**
Modesto song sparrow	*Melospiza melodia mailliardi*	SSC3		High / Habitat present	High	On site
Black-chinned sparrow	*Spizella atrogularis*	BCC				In region
Gray-headed junco	*Junco hyemalis caniceps*	WL				In region
Oregon vesper sparrow	*Pooecetes gramineus affinis*	SSC2				In range
Yellow-breasted chat	*Icteria virens*	SSC3				Very close
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*	SSC3	High	May occur / Habitat present	Moderate	**On site**
Bullock's oriole	*Icterus bullockii*	BCC				On site
Tricolored blackbird	*Agelaius tricolor*	CT, BCC, SSC1	Moderate	May occur / Habitat present	Moderate	**On site**
Virginia's warbler	*Leiothlypis virginiae*	WL, BCC				In region
Yellow warbler	*Setophaga petechia*	SSC2	High		High	On site
Summer tanager	*Piranga rubra*	SSC1				In region
Yuma myotis	*Myotis yumanensis*	WBWG:LM				In region
Small-footed myotis	*Myotis ciliolabrum*	WBWG: M				In range
Canyon bat	*Parastrellus hesperus*	WBWG:M				In region
Silver-haired bat	*Lasionycteris noctivagans*	WBWG:M			Low	Nearby
Hoary bat	*Lasiurus cinereus*	WBWG:M			Low	Nearby
Western red bat	*Lasiurus blossevillii*	SSC, WBWG:H				In region
Townsend's big-eared bat	*Corynorhinus townsendii*	SSC, WBWG:H				In range
Pallid bat	*Antrozous pallidus*	SSC, WBWG:H		May occur / Habitat present	Moderate	In region
American badger	*Taxidea taxus*	SSC		Won't occur	Not expected	In region

19-69 cont.

[1] Listed as FT or FE = federal threatened or endangered, FC = federal candidate for listing, BCC = U.S. Fish and Wildlife Service Bird of Conservation Concern, CT or CE = California threatened or endangered, CCT or CCE = Candidate California threatened or endangered, CFP = California Fully Protected (California Fish and Game Code 3511), SSC = California Species of Special Concern (not threatened with extinction, but rare, very restricted in range, declining throughout range, peripheral portion of species' range, associated with habitat that is declining in extent), SSC1, SSC2 and SSC3 = California Bird Species of Special Concern priorities 1, 2 and 3, respectively (Shuford and Gardali 2008), WL = Taxa to Watch List (Shuford and Gardali 2008), and BOP = Birds of Prey (CFG Code 3503.5), and WBWG = Western Bat Working Group with priority rankings, of low (L), moderate (M), and high (H).

19-69 cont.

The need for a reevaluation of NBHCP's conservation strategy was recognized by Leighann Moffitt, County Planning Director, in a 26 November 2019 letter to the County Supervisors regarding PLNP2018-00284. Initiation of the Upper Westside Specific Plan Process. The County's letter cites United States District Judge David F. Levi's 7 September 2005 warning that "The NBHCP anticipates that development by the City and Sutter will be limited to 15,517 acres – 8,050 acres within the City [of Sacramento] and 7,467 acres in Sutter County – and provides that approval of any development beyond this limit – whether by the City and Sutter or by other entities – will trigger reevaluation and possible amendment of the plan, and could result in suspension or revocation of the City and Sutter permits." The letter goes on to conclude that "Staff recognizes that any new development in the Natomas Basin above the 17,500 acres already approved and permitted by the Natomas Basin and Metro Air Park HCPs will require careful coordination and consideration of existing approved developments, their mitigation strategies, and the regional conservation context." Despite this recognition of the need for NBHCP reevaluation, it appears that no such reevaluation has occurred.

The need to reevaluate the NBHCP in the face of the proposed Upper Westside Specific Plan is obvious considering the frontloading of development and the holding of only 5,185.78 acres of mitigation land in the Natomas Basin as of 2023 (see the Conservancy's 2023 audit). The Upper Westside Specific Plan occurs within the Natomas Basin and it supports special-status species that are covered by the NBHCP's ITP. The land of the Upper Westside Specific Plan therefore provides candidate mitigation opportunities for the NBHCP to meet its mitigation obligations.

19-70 cont.

The NBHCP's conservation strategy was not formulated with the proposed Specific Plan in mind. There was no effects analysis inclusive of the Specific Plan when the NBHCP's conservation strategy was planned out, nor does the DEIR provide the needed effects analysis inclusive of the Specific Plan's development of 1,532 acres and the NBHCP-planned development of 17,500 acres. This is important because the Specific Plan would degrade the existing NBHCP's conservation strategy. Indeed, ICF (2023:3-21; https://natomasbasin.org/wp-content/uploads/2014/05/2004-ggs-monitoring-report.pdf) posits, "The most significant corridors spanning the Basin from north to south are the primary drainages managed by Reclamation District 1000; these include … West Drainage Canal (including Fisherman's Lake) …" It is the West Drainage Canal that abuts the northern and eastern sides of the Specific Plan area. ICF (2024) identifies giant gartersnake habitat within the Specific Plan area. The Specific Plan would eliminate land that remains available for mitigation from within the Natomas Basin, and direct and indirect takings of giant gartersnake would impair the NBHCP's conservation strategy for giant gartersnake, which according to ICF (2023) is "to create a system of reserves that contain both wetland and upland components that will support viable populations of Swainson's hawk (*Buteo swainsoni*), giant gartersnake (*Thamnophis gigas*), and other species covered under the Plan."

19-71

The requirements of the 2003 NBHCP Implementation Agreement must be taken seriously. As revealed by Biological Effectiveness Monitoring, there is no room for additional mistakes in the NBHCP's conservation strategy. The covered species given highest priority in the NBHCP – giant gartersnake and Swainson's hawk – are showing

signs of steady decline and of population stress, respectively. According to Biological Effectiveness Monitoring (ICF 2024: Figure 3-14), the probability of capture of giant gartersnakes in HCP reserves steadily declined from 2011 through 2022. Estimating a trend line through the mean probability of capture in Figure 3-14 reveals a 40% decline in only 11 years. Similarly, estimating a trend line to the mean number of monitored sites occupied by giant garter snake from 2011 through 2022 reveals a 43% decline in only 11 years (ICF 2024: Figure 3-15).[1]

Because ICF (2024: Figure 3-15) did not fit a trend line to the change in indicators of giant gartersnake abundance, I fit a linear regression model to their data, specifically to the mean number of sites occupied by giant gartersnakes in the Natomas Basin (Figure 4). A model fit to the data is useful for prediction, so long as the prediction is not made too far beyond the scope of inference of the model. In this case, the model predicts that based on its current trend, giant gartersnake will be extirpated from the Natomas Basin by the year 2045, or 8 years short of the end of its permit period. It is possible, the linear pattern of decline will change. The rate of decline might slow should conditions improve for giant gartersnakes in the Natomas Basin. Alternatively, the rate of decline might accelerate if the species' habitat is lost, degraded or further fragmented by development projects such as the proposed project.

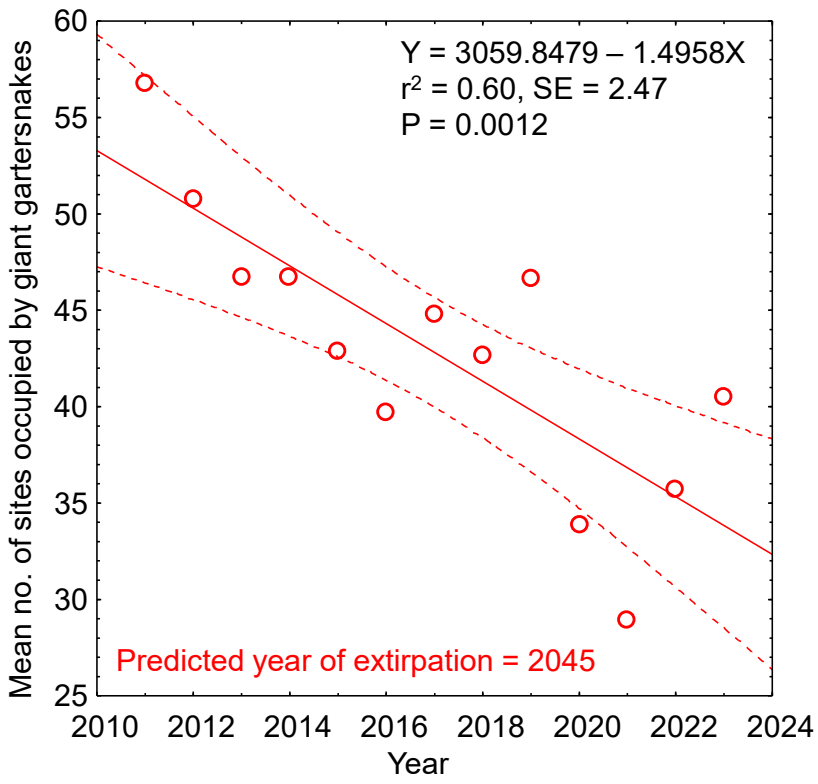


Figure 4. *Mean number of sites occupied by giant gartersnakes in the Natomas Basin by year. Data source: ICF (2024).*

19-71 cont.

[1] Examining the trend in relative abundance indicators since the start of monitoring in 2002 is not possible based on current reporting, because the metrics of abundance changed from density in 2002-2004 to capture probability and site occupancy in 2011-2022, and because no reports are posted for the years 2005 through 2010. Only use of a common metric would enable examination of the population trend of giant gartersnakes within the Natomas Basin from 2002 through the present.

According to Biological Effectiveness Monitoring (ICF 2024: Figure 4-7), the number of Swainson's hawk nest sites increased steadily from 2001 through 2022, from 46 nest sites to 68 – a 48% increase. However, over the same period, the number of Swainson's hawks fledged per successful nest declined steadily from an average of 1.79 in 1999 to 1.14 in 2022, which was a 36% decrease. These data are displayed along with a best-fit linear regression model in Figure 4-9 of ICF (2024). Projecting the linear regression model forward to 2028, the number of fledglings per successful nest is predicted to be half of what it was in 1999. According to the data, the average number of fledglings per successful nest four years from now will be only 50% of what it was 25 years ago, but nevertheless there will be more occupied territories (nest sites).

More revealing than the graphs in ICF (2024), the data collected via Biological Effectiveness Monitoring reveal an important functional relationship between Swainson's hawk productivity and the number of successful nests within the Natomas Basin (Figure 5). Because the number of fledglings per successful nest varies much less interannually than does the number of successful nests, it is the latter that contributes most to the local Swainson's hawk population. Even though the number of nest territories (nest sites) has increased through the period of monitoring (ICF 2024: Figure 4-7), the number of fledglings per nest site has not. This is because the annual number of successful nests relates negatively with the annual number of nests without success, especially after excluding data from the years 1999 and 2000, which are obvious outliers (Figure 6). (Data were likely collected using different methods in the outlier years.) Since the earliest years of the NBHCP, the annual number of nests without success have increased in the Natomas Basin, and have increased in variation between years (Figure 7). This increasing variation in the annual number of nests without success has resulted in increasingly greater variation in the annual number of successful nests and hence the annual variation in productivity.

19-72

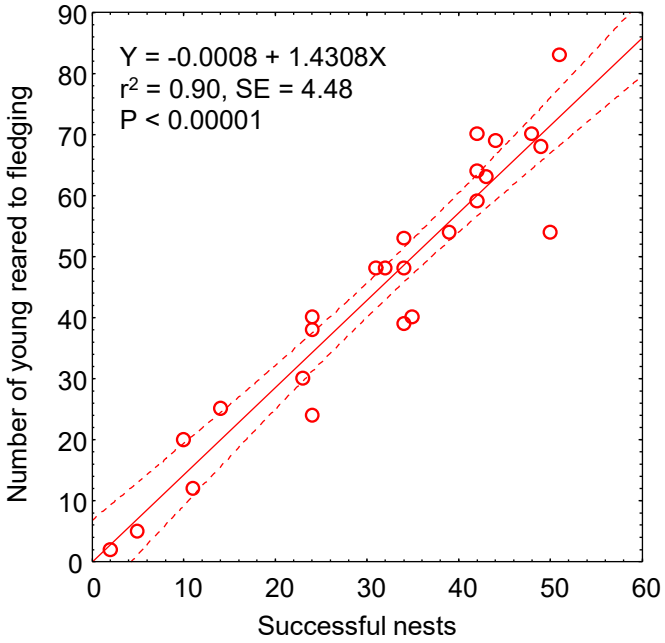


Figure 5. *Annual number of Swainson's hawk young raised to fledging regressed on the annual number of successful nests within the Natomas Basin reveals a near-constant 1.43 fledglings per successful nest. Data source: ICF (2024).*

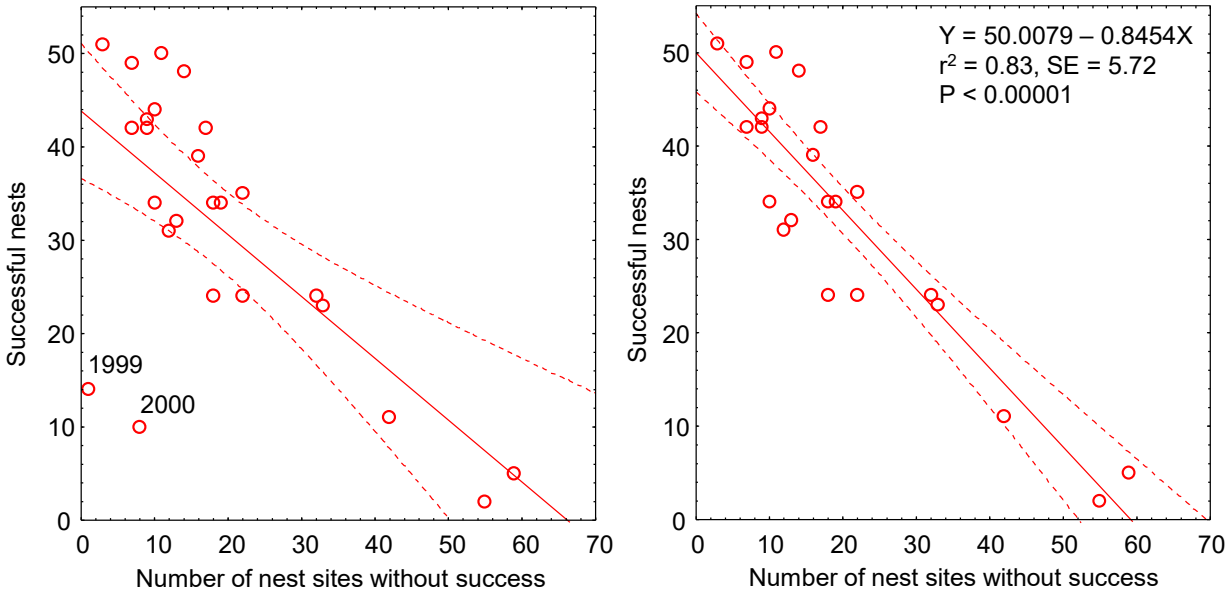
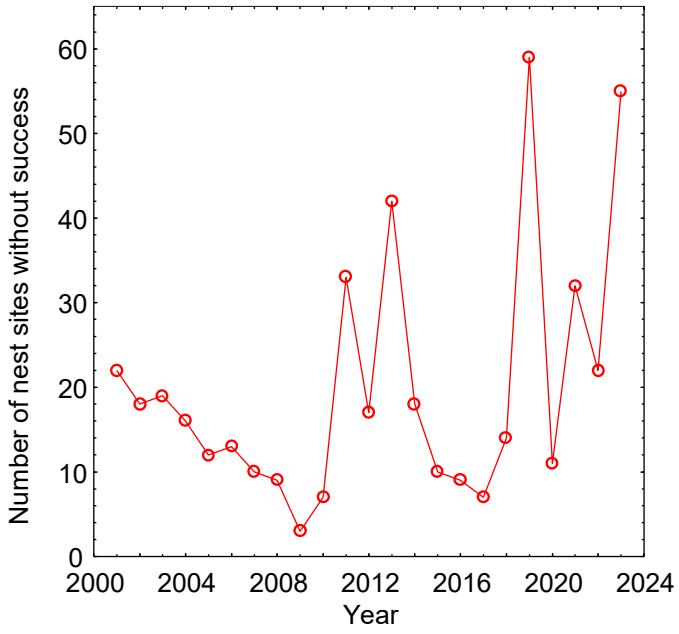


Figure 6. *Annual number of Swainson's hawk successful nests regressed on the annual number of nests without success within the Natomas Basin, including the years 1999 and 2000 (left graph) and excluding the years 1999 and 2000 (right graph). Data source: ICF (2024).*

Figure 7. *Annual number of Swainson's hawk nests without success by year. Data source: ICF (2024).*



The increased annual number of Swainson's hawk nest sites reflects well on the NBHCP, but the functional relationship between the annual number of successful nests and the annual number of nests without success, and the less-varying number of fledglings per successful nest, indicate that the productive capacity of the NBHCP reserve lands has been reached, and that the number of successful nests can be suppressed by overcrowding of Swainson's hawks of breeding age within the Natomas Basin.

19-72 cont.

Swainson's hawks maintain breeding territories, the integrity of which is more stable than is the availability of forage. In other words, even with surplus forage available on enhanced habitat, only so many breeding territories can be established within the available space to exploit the enhanced forage. With the number of breeding territories relatively fixed based on the available space, the more the number of nonbreeding adults crowded into that space, the fewer of the nest attempts will succeed because there will be a lesser share of forage to convert into fledglings. The Specific Plan would further crowd the remaining habitat in the Natomas Basin with more Swainson's hawk refugees.

I note, however, that Fleishman et al. (2016), after tracking telemetered Swainson's hawks throughout the Natomas Basin, came to a different conclusion. Fleishman et al. (2016) hypothesized that the availability of suitable nest substrate is the primary limiting factor of the Swainson's hawk population in the Natomas Basin. My argument against their hypothesis is that the number of occupied territories continued to increase since Fleishman et al. (2016) published their hypothesis, and this increase would serve to indicate there was more available nest substrate than Fleishman et al. realized, at least within the Natomas Basin. The trends in Figures 5–7 suggest to me that lands available for foraging is more limiting within the Natomas Basine, and dispersing Swainson's hawks are finding fewer opportunities for breeding outside the Natomas Basin. The Specific Plan would worsen this situation.

To more effectively conserve Swainson's hawks in the Natomas Basin, a change to the conservation strategy of the NBHCP might be warranted. Needed is more habitat within and without the Natomas Basin. Young Swainson's hawks need to be able to find breeding opportunities outside their natal areas. However, Swainson's hawks are rapidly losing breeding habitat in San Joaquin County and Yolo County, much of it to development and much of it to agricultural conversions to nut orchards and vineyards. Furthermore, changes to more intensive agricultural practices and increased efforts to poison ground squirrels are diminishing forage across large portions of the areas used by Swainson's hawks for decades.

19-72 cont.

In addition to giant gartersnake, multiple species covered by the NBHCP are showing signs of decline. According to ICF (2023), species on the decline from 2005 through 2022 include northern harrier, loggerhead shrike and burrowing owl. The trend of Pacific pond turtle is unknown because counts of turtles combine individuals of Pacific pond turtles and red-eared slider. It is also difficult to determine the trends of white-faced ibis and tricolored blackbird, partly due to inconsistent trends between metrics and partly due to lack of reported confidence intervals. I did not find any monitoring results for bank swallow, cackling goose, western spadefoot, Valley elderberry longhorn beetle, or multiple other species.

Complicating interpretation of the trends of the other covered species was the change in field methods, which shifted the seasonal weightings of survey results averaged per year. All tracts within NBHCP reserves had been surveyed once per month through 2017, but afterwards the tracts were surveyed twice per month during April through June, once per month during July and August, never more during September through November, and – but only on tracts with rice fields and wetlands – monthly during December

19-73

through February (whether surveys were completed in March is unreported). Any species more detectable in spring would have been over-represented in the years following 2017 compared to the years 2005–2017. The same was true for any species partial to rice or wetlands in winter. For example, the graphed increases in white-faced ibis and tricolored blackbird were likely due to the change in field methods (see Figures 5-8 and 5-9 in ICF 2023).

Along with the other covered species, wildlife species not covered by the NBHCP were expected to benefit from the conservation of the two umbrella species – giant gartersnake and Swainson's hawk. However, the effectiveness monitoring suggests declines of waterfowl as a group, neotropical migrants as a group, shorebirds as a group, and yellow-billed magpie. Again, without reported confidence intervals, some of the trends are difficult to ascertain. Overall, however, very little of the monitoring data indicates the NBHCP and MAPHCP are achieving their conservation objectives. The only covered species that has substantially benefitted from the mitigation measures of the NBHCP is Swainson's hawk, and this species has benefitted to the maximum degree that it can unless and until more reserve land is acquired and converted to habitat within the Natomas Basin, or more breeding substrate and foraging habitat becomes av available in the Sacramento Valley outside the Natomas Basin.

Considering the foregoing, I concur with CDFW (6 November 2020 letter to Todd Smith, Sacramento County Planning, from Kelley Barker, California Department of Fish and Wildlife), where CDFW's Kelley Barker writes "robust analysis of whether, in what way, and to what extent the Project may affect future implementation and the continued viability of the NBHCP and MAP HCP in the Natomas Basin is essential to the County's informed review of the Project." I entirely agree with Kelley Barker's recommendations that the effects analysis should include the following:

19-73 cont.

- Persistence of NBHCP and MAP HCP Covered Species in the Natomas Basin
- Impacts to established reserve land managed by the Natomas Basin Conservancy (TNBC)
- Reduction of available reserve land in the Natomas Basin under the NBHCP and MAP HCP (with appropriate buffers and setbacks as detailed in the NBHCP)
- Reduction of ability for TNBC to establish or enhance Covered Species range and habitats in the southern Natomas Basin.
- Continued viability of the land uses in the Natomas Basin as detailed in the NBHCP and MAP HCP
- Financial impacts to TNBC and feepayers under the NBHCP and MAP HCP, including the recent action by TNBC Board of Directors and the Sacramento City Council to address related ongoing financial challenges of continuing to implement the required conservation strategy in the Natomas Basin, and
- Cumulative impact of the Project, in combination with other development in the Natomas Basin approved since 2003 that is outside of the City of Sacramento and Sutter County's permitted area under the NBHCP (e.g., levee improvements by the Sacramento Area Flood Control Agency and the Greenbriar project).

I reiterate that the requirement of the 2003 NBHCP Implementation Agreement that a project such as the Upper Westside Specific Plan triggers a reevaluation of the original NBHCP's Plan and Permits.

19-73 cont.

PRODUCTIVE CAPACITY REDUCED BY HABITAT LOSS

Development of the Specific Plan Area would contribute substantially to habitat loss and to habitat fragmentation, which together pose serious problems to wildlife in the region. Habitat fragmentation and habitat loss have been recognized as the most likely leading causes of a documented 29% decline in overall bird abundance across North America over the last 48 years (Rosenberg et al. 2019). Habitat loss not only results in the immediate numerical decline of wildlife, but it also results in permanent loss of productive capacity. Habitat fragmentation multiplies the negative effects of habitat loss on the productive capacities of biological species by isolating habitat patches from recruitment and by leaving some patches too small to support functionally important demographic units (Smallwood 2001, 2015). None of these impacts, however, are adequately addressed in the DEIR.

In the case of birds, two methods exist for estimating the loss of productive capacity that would be caused by the Specific Plan. One method would involve surveys to count the number of bird nests and chicks produced. The alternative method is to infer productive capacity from estimates of total nest density elsewhere. Two study sites in grassland-wetland-woodland complexes had total bird nesting densities of 32.8 and 35.8 nests per acre (Young 1948, Yahner 1982). However, whereas these estimates might apply to portions of the Project site, they were acquired from far away. To acquire total nest densities closer to conditions in California, I surveyed two research sites through the breeding seasons of 2023 and 2024. I surveyed in grassland, woodlands, wetlands, and thickets of blackberry, elderberry, ornamentals and fig at the two sites in east Yolo County and in Rancho Cordova. I applied total nest density estimates from ground cover types in my studies that best matched the mapped ground cover types of the Specific Plan area (Table 3). Based on these acreages, I estimate the Specific Plan area supports 11,748 nest sites (Table 3).

19-74

However, the impact does not end with the immediate loss of nest sites as nest substrate is removed and foraging grounds graded in preparation for impervious surfaces. The reproductive capacity of the Upper Westside Specific Plan would be lost with the loss of nest sites. Assuming 1.39 broods per nest site, which is the average among 322 North American bird species I asked my daughter, Noriko Smallwood, to review, I predict the project would cost California 16,330 nest attempts/year.

The average number of fledglings per nest attempt in Young's (1948) study was 2.9. Assuming Young's (1948) study site typifies bird productivity, the Specific Plan would prevent the production of 47,356 fledglings per year. Assuming an average bird generation time of 5 years, the lost capacity of both breeders and annual fledgling production can be estimated from an equation in Smallwood (2022): {(nests/year × chicks/nest × number of years) + (2 adults/nest × nests/year) × (number of years ÷ years/generation)} ÷ (number of years) = 52,055 birds per year denied to California

from the build-out of the Upper Westside Specific Plan. The impact of these losses of avian productivity would be significant, but they are not considered in the DEIR.

Table 3. *Estimated numbers of nests by ground cover vegetation types on the area of the Upper Westside Specific Plan.*

Cover	Acres	Nesting density	No. of nests (rounded)	Source
Annual grassland	17.31	5.08	88	1
Deciduous orchard	4.38	14.38	63	2
Vineyard	17.23	7.19	124	3
Annual field crops	681.65	1.77	1,207	4
Grain and hay (alfalfa)	792.79	2.54	2,014	5
Pasture	17.91	3.81	68	6
Ruderal	285.5	5.08	1,450	7
Urban (rural)	258.18	21.25	5,486	8
Canals	45.08	0.00	0	9
Valley oak and Fremont cottonwood	35.66	28.79	1,027	10
Created wetlands	43.62	5.08	222	11
Total	2,199.00		11,748	

1 K. S. Smallwood 2024 unpubl. data, Grassland/wetland complex in eastern Yolo County
2 K. S. Smallwood 2023 unpubl. data, walnut orchard, Rancho Cordova
3 Best guess half the nest density of orchard (Smallwood 2023, unpublished data)
4 Assumed 25% the density as in grassland
5 Assumed 50% the density as in grassland
6 Assumed 75% the density as in grassland
7 Assumed equal density to grassland
8 K. S. Smallwood 2023 unpubl. data, shrub thickets between orchard and adjacent neighborhood, including blackberries, blue elderberry and fig, Rancho Cordova
9 Best guess
10 K. S. Smallwood 2023 unpubl. data, American River riparian, Rancho Cordova
11 Same as 1

19-74 cont.

INTERFERENCE WITH WILDLIFE MOVEMENT IN THE REGION

One of CEQA's principal concerns regarding potential project impacts is whether a proposed project would interfere with wildlife movement in the region. The DEIR devotes very little analysis to the question of whether the Specific Plan would interfere with wildlife movement in the region, limiting discussion to the Pacific Flyway's role as a migration corridor for birds, and to the roles of canals and ditches in channeling movement of several special-status species. Other than mention of the ditches and canals, missing from the analysis is any consideration of wildlife movement within the region of the Specific Plan area. Birds fly through the local aerosphere of the Specific Plan area, and mammals walk across it.

19-75

Neither Bargas (2022) nor Helix (2024) implemented any sort of program of observation capable of characterizing movement patterns or determining how and to what degrees wildlife use the Specific Plan area for movement. No methods are described of how Bargas or Helix might have assessed the site in the field for its role in wildlife movement in the region. Other than speculation, there is no analysis. And in fact, I saw plenty of wildlife movement across the project site, mostly of birds headed north or south. I saw hundreds of blackbirds flying across the project site, including red-winged blackbirds, yellow-headed blackbirds and tricolored blackbirds. I saw hundreds of horned larks and American pipits flying across the site, as well as Canada geese, double-crested cormorants and white-faced ibises. The 119 species of wildlife detected by Bargas, Helix and myself would not have been on the Specific Plan area had their members not been able to move to it. The Specific Plan area is obviously important to wildlife movement in the region, and the project would obviously interfere with wildlife movement in the region.

Whether the Specific Plan area includes or is within a wildlife movement corridor is not the only consideration when it comes to the standard CEQA Checklist question of whether the project would interfere with wildlife movement in the region. The primary phrase of the CEQA standard goes to wildlife movement regardless of whether the movement is channeled by a corridor. In fact, a site such as the Specific Plan area is critically important for wildlife movement because it composes an increasingly diminishing area of open space within a growing expanse of anthropogenic uses, forcing more species of volant wildlife to use the area for stopover and staging during migration, dispersal, and home range patrol (Warnock 2010, Taylor et al. 2011, Runge et al. 2014). The Specific Plan, due to its elimination of 1,532 acres of open space, would cut wildlife off from expansive stopover and staging opportunities in the Specific Plan area, forcing volant wildlife to travel even farther between remaining stopover sites. This impact would be significant, and as the project is currently proposed, it would be effectively unmitigated. In fact, the impact would be worse than usual should Phase 1 of the Specific Plan be sited in the middle of the Specific Plan area, or along the western edge of it. Such siting of Phase 1 would sever existing movement pathways, including of birds using the aerosphere (Photos 24 and 25) and of terrestrial animals moving along the ground (Photo 26). I saw nothing in the DEIR that would prevent this type of siting of Phase 1, resulting in habitat fragmentation.

19-75 cont.

Photos 24 and 25. *One of multiple flocks of Canada goose flying along the west side of the Specific Plan area (top), and one small portion of a one of multiple flocks of yellow-headed blackbirds flying north along the west-central aspect of the Specific Plan area (right), 23 October 2024.*

Photo 26. *Three of four members of a coyote family on the Specific Plan area, 23 October 2024. I watched these coyotes travel north for at least 0.5 miles.*

HOUSE CAT DEPREDATION

Considering national trends, it is safe to assume that house cats would be introduced to the Upper Westside Specific Plan Area by residents of the proposed residential units. This is significant because house cats serve as one of the largest sources of avian mortality in North America (Dauphiné and Cooper 2009, Blancher 2013, Loss et al. 2013, Loyd et al. 2017). Loss et al. (2013) estimated 139 million cats in the USA in 2013 (range 114 to 164 million), which killed an estimated 16.95 billion vertebrate wildlife annually (range 7.6 to 26.3 billion). In 2012 there were 0.44 house cats per human, and 122 vertebrate animals were killed per cat, free-ranging members of which killed disproportionately larger numbers of vertebrate wildlife. The DEIR predicts there would be 25,578 new residents in the Specific Plan. The above rates of cat ownership applied to this number of new residents **would predict 11,254 new cats, which would kill 1,373,027 vertebrate wildlife per year**. Many of the wildlife fatalities caused by house cats would be in neighboring open spaces.

19-76

House cats also contribute to downstream loading of *Toxoplasma gondii*. According to a UC Davis wildlife health research program, "*Toxoplasma gondii is a parasite that can infect virtually all warm-blooded animals, but the only known definitive hosts are cats – domesticated and feral house cats included. Cats catch the parasite through hunting rodents and birds and they offload it into the environment through their feces… and …rain that falls on cement creates more runoff than rain that falls on natural earth, which contributes to increased runoff that can carry fecal pathogens to the sea*" (http://www.evotis.org/ toxoplasma-gondii- sea-otters/).

Impacts to wildlife from the introduction of house cats into the environment would be highly significant, and yet these impacts are not considered in the DEIR. A fair argument can be made for the need to revise the DEIR with more meaningful review of

potential impacts to wildlife due to depredation by free-ranging house cats introduced by residents of the projects in the Specific Plan. An obvious mitigation measure would be to constrain house cat ownership such as requiring cats to remain indoors.

19-76 cont.

WINDOW COLLISION MORTALITY

The Upper Westside Specific Plan would add 9,356 residential units to open space that is currently habitat to many birds. These new residences would present glass windows to birds attempting to use an essential portion of their habitat – that portion of the gaseous atmosphere that is referred to as the aerosphere (Davy et al. 2017, Diehl et al. 2017). The aerosphere is where birds and bats and other volant animals with wings migrate, disperse, forage, perform courtship and where some of them mate. Birds are some of the many types of animals that evolved wings as a morphological adaptation to thrive by moving through the medium of the aerosphere. The aerosphere is habitat. Indeed, an entire discipline of ecology has emerged to study this essential aspect of habitat – the discipline of aeroecology (Kunz et al. 2008). Many special-status species of birds have been recorded at or near the aerosphere of the Upper Westside Specific Plan area, and I saw many birds using the aerosphere while I surveyed the site. Bird-window collision mortality is a potentially significant impact that warrants analysis.

Window collisions are often characterized as either the second or third largest source or human-caused bird mortality. The numbers behind these characterizations are often attributed to Klem's (1990) and Dunn's (1993) estimates of about 100 million to 1 billion bird fatalities in the USA, or more recently by Loss et al.'s (2014) estimate of 365-988 million bird fatalities in the USA or Calvert et al.'s (2013) and Machtans et al.'s (2013) estimates of 22.4 million and 25 million bird fatalities in Canada, respectively. The proposed Project would impose windows in the airspace normally used by birds.

19-77

Glass-façades of buildings intercept and kill many birds, but these façades are differentially hazardous to birds based on spatial extent, contiguity, orientation, and other factors. At Washington State University, Johnson and Hudson (1976) found 266 bird fatalities of 41 species within 73 months of monitoring of a three-story glass walkway (no fatality adjustments attempted). Prior to marking the windows to warn birds of the collision hazard, the collision rate was 84.7 per year. At that rate, and not attempting to adjust the fatality estimate for the proportion of fatalities not found, 4,574 birds were likely killed over the 54 years since the start of their study, and that's at a relatively small building façade. Accounting for the proportion of fatalities not found, the number of birds killed by this walkway over the last 54 years would have been about 14,270. And this is just for one 3-story, glass-sided walkway between two college campus buildings.

Klem's (1990) estimate was based on speculation that 1 to 10 birds are killed per building per year, and this speculated range was extended to the number of buildings estimated by the US Census Bureau in 1986. Klem's speculation was supported by fatality monitoring at only two houses, one in Illinois and the other in New York. Also, the basis of his fatality rate extension has changed greatly since 1986. Whereas his estimate served the need to alert the public of the possible magnitude of the bird-

window collision issue, it was highly uncertain at the time and undoubtedly outdated more than three decades hence. Indeed, by 2010 Klem (2010) characterized the upper end of his estimated range – 1 billion bird fatalities – as conservative. Furthermore, the estimate lumped species together as if all birds are the same and the loss of all birds to windows has the same level of impact.

By the time Loss et al. (2014) performed their effort to estimate annual USA bird-window fatalities, many more fatality monitoring studies had been reported or were underway. Loss et al. (2014) incorporated many more fatality rates based on scientific monitoring, and they were more careful about which fatality rates to include. However, they included estimates based on fatality monitoring by homeowners, which in one study were found to detect only 38% of the available window fatalities (Bracey et al. 2016). Loss et al. (2014) excluded all fatality records lacking a dead bird in hand, such as injured birds or feather or blood spots on windows. Loss et al.'s (2014) fatality metric was the number of fatalities per building (where in this context a building can include a house, low-rise, or high-rise structure), but they assumed that this metric was based on window collisions. Because most of the bird-window collision studies were limited to migration seasons, Loss et al. (2014) developed an admittedly assumption-laden correction factor for making annual estimates. Also, only 2 of the studies included adjustments for carcass persistence and searcher detection error, and it was unclear how and to what degree fatality rates were adjusted for these factors. Although Loss et al. (2014) attempted to account for some biases as well as for large sources of uncertainty mostly resulting from an opportunistic rather than systematic sampling data source, their estimated annual fatality rate across the USA was highly uncertain and vulnerable to multiple biases, most of which would have resulted in fatality estimates biased low.

19-77 cont.

In my review of bird-window collision monitoring, I found that the search radius around homes and buildings was very narrow, usually 2 meters. Based on my experience with bird collisions in other contexts, I would expect that a large portion of bird-window collision victims would end up farther than 2 m from the windows, especially when the windows are higher up on tall buildings. In my experience, searcher detection rates tend to be low for small birds deposited on ground with vegetation cover or woodchips or other types of organic matter. Also, vertebrate scavengers entrain on anthropogenic sources of mortality and quickly remove many of the carcasses, thereby preventing the fatality searcher from detecting these fatalities. Adjusting fatality rates for these factors – search radius bias, searcher detection error, and carcass persistence rates – would greatly increase nationwide estimates of bird-window collision fatalities.

Buildings can intercept many nocturnal migrants as well as birds flying in daylight. As mentioned above, Johnson and Hudson (1976) found 266 bird fatalities of 41 species within 73 months of monitoring of a four-story glass walkway at Washington State University (no adjustments attempted for undetected fatalities). Somerlot (2003) found 21 bird fatalities among 13 buildings on a university campus within only 61 days. Monitoring twice per week, Hager at al. (2008) found 215 bird fatalities of 48 species, or 55 birds/building/year, and at another site they found 142 bird fatalities of 37 species for 24 birds/building/year. Gelb and Delacretaz (2009) recorded 5,400 bird fatalities under buildings in New York City, based on a decade of monitoring only during

migration periods, and some of the high-rises were associated with hundreds of fatalities each. Klem et al. (2009) monitored 73 building façades in New York City during 114 days of two migratory periods, tallying 549 collision victims, nearly 5 birds per day. Borden et al. (2010) surveyed a 1.8 km route 3 times per week during 12-month period and found 271 bird fatalities of 50 species. Parkins et al. (2015) found 35 bird fatalities of 16 species within only 45 days of monitoring under 4 building façades. From 24 days of survey over a 48-day span, Porter and Huang (2015) found 47 fatalities under 8 buildings on a university campus. Sabo et al. (2016) found 27 bird fatalities over 61 days of searches under 31 windows. In San Francisco, Kahle et al. (2016) found 355 collision victims within 1,762 days under a 5-story building. Ocampo-Peñuela et al. (2016) searched the perimeters of 6 buildings on a university campus, finding 86 fatalities after 63 days of surveys. One of these buildings produced 61 of the 86 fatalities, and another building with collision-deterrent glass caused only 2 of the fatalities, thereby indicating a wide range in impacts likely influenced by various factors. There is ample evidence available to support my prediction that the proposed Upper Westside Specific Plan would result in many collision fatalities of birds.

Bird-window impact prediction

I have reviewed and processed results of bird collision monitoring at 213 buildings and façades for which bird collisions per m^2 of glass per year could be calculated and averaged (Johnson and Hudson 1976, O'Connell 2001, Somerlot 2003, Hager et al. 2008, Borden et al. 2010, Hager et al. 2013, Porter and Huang 2015, Parkins et al. 2015, Kahle et al. 2016, Ocampo-Peñuela et al. 2016, Sabo et al. 2016, Barton et al. 2017, Gomez-Moreno et al. 2018, Schneider et al. 2018, Loss et al. 2019, Brown et al. 2020, City of Portland Bureau of Environmental Services and Portland Audubon 2020, Riding et al. 2020). These study results averaged 0.073 bird deaths per m^2 of glass per year (95% CI: 0.042-0.102). This average and its 95% confidence interval provide a robust basis for predicting fatality rates at a site of a proposed new project.

19-77 cont.

I found no information on the extent of glass windows on the proposed new residential units. I therefore relied on another source for estimating the extent of glass windows in the Upper Westside Specific Plan. I have maintained a database of the extent of glass windows relative to the extents of floor space among other projects for which I have prepared expert testimony. For 25 recently proposed California residential projects, the ratio of m^2 of windows to ft^2 of floor space was 0.017 (95% CI: 0.0088–0.0253). Assuming 2,000 sf per residential unit, the 9,356 residential units anticipated in the Upper Westside Specific Plan would total 18,712,000 sf, which multiplied against the ratio reported above would predict 318,104 m^2 (95% CI: 164,666–473,414 m^2). Applying the mean fatality rate (above) to my estimate of 318,104 m^2 of glass in the Upper Westside Specific Plan, **I predict annual bird deaths of 23,253 (95% CI: 13,806–32,701)**. I could update this prediction if I was to see more details about the Specific Plan. With or without more details, however, a bird-window collision mortality of this predicted magnitude would by highly significant. My analysis, updated or not, reveals that the impacts of bird-window collision mortality would be highly significant in the Upper Westside Specific Plan. This impact is not considered in the DEIR. The DEIR

needs to be revised with a more meaningful review of potential impacts to wildlife due to collisions with windows. 19-77 cont.

ROAD COLLISION MORTALITY

The DEIR fails to consider impacts on wildlife from road collision mortality. Project-generated traffic would endanger wildlife that must, for various reasons, cross roads used by the project-generated traffic (Photos 27—30), including along roads far from the villages. Vehicle collisions have accounted for the deaths of many thousands of amphibian, reptile, mammal, bird, and arthropod fauna, and the impacts have often been found to be significant at the population level (Forman et al. 2003). Across North America traffic impacts have taken devastating tolls on wildlife (Forman et al. 2003). In Canada, 3,562 birds were estimated killed per 100 km of road per year (Bishop and Brogan 2013), and the US estimate of avian mortality on roads is 2,200 to 8,405 deaths per 100 km per year, or 89 million to 340 million total per year (Loss et al. 2014). Local impacts can be more intense than nationally. 19-78

Photo 27. *A coyote uses the crosswalk to cross a street and was fortunate that one driver showed the good grace to stop for it, 2 February 2023. Not all drivers stop, nor do all animals use the crosswalk. Too often, animals are injured or killed when they attempt to cross roads. Increased traffic volume increases collision risk to wildlife.*

Photo 28. *A Gambel's quail dashes across a road* on *3 April 2021. Such road crossings are usually successful, but too often prove fatal to the animal. Photo by Noriko Smallwood.*

Photo 29. *Mourning dove killed by vehicle on a California road. Photo by Noriko Smallwood, 21 June 2020.*

Photo 30. *Raccoon killed on Road 31 just east of Highway 505 in Solano County. Photo taken on 10 November 2018.*

19-78 cont.

The nearest study of traffic-caused wildlife mortality was performed along a 2.5-mile stretch of Vasco Road in Contra Costa County, California. Fatality searches in this study found 1,275 carcasses of 49 species of mammals, birds, amphibians and reptiles over 15 months of searches (Mendelsohn et al. 2009). This fatality number needs to be adjusted for the proportion of fatalities that were not found due to scavenger removal and searcher error. This adjustment is typically made by placing carcasses for searchers to find (or not find) during their routine periodic fatality searches. This step was not taken at Vasco Road (Mendelsohn et al. 2009), but it was taken as part of another study next to Vasco Road (Brown et al. 2016). Brown et al.'s (2016) adjustment factors for carcass persistence resembled those of Santos et al. (2011). Also applying searcher detection rates from Brown et al. (2016), the adjusted total number of fatalities was estimated at 12,187 animals killed by traffic on the road. This fatality number over 1.25 years and 2.5 miles of road translates to 3,900 wild animals per mile per year. In terms comparable to the national estimates, the estimates from the Mendelsohn et al. (2009) study would translate to 243,740 animals killed per 100 km of road per year, or 29 times that of Loss et al.'s (2014) upper bound estimate and 68 times the Canadian estimate. An analysis is

needed of whether increased traffic generated by the project would similarly result in local impacts on wildlife.

For wildlife vulnerable to front-end collisions and crushing under tires, road mortality can be predicted from the study of Mendelsohn et al. (2009) as a basis, although it would be helpful to have the availability of more studies like that of Mendelsohn et al. (2009) at additional locations. My analysis of the Mendelsohn et al. (2009) data resulted in an estimated 3,900 animals killed per mile along a county road in Contra Costa County. Two percent of the estimated number of fatalities were birds, and the balance was composed of 34% mammals (many mice and pocket mice, but also ground squirrels, desert cottontails, striped skunks, American badgers, raccoons, and others), 52.3% amphibians (large numbers of California tiger salamanders and California red-legged frogs, but also Sierran treefrogs, western toads, arboreal salamanders, slender salamanders and others), and 11.7% reptiles (many western fence lizards, but also skinks, alligator lizards, and snakes of various species). VMT is useful for predicting wildlife mortality because I was able to quantify miles traveled along the studied reach of Vasco Road during the time period of the Mendelsohn et al. (2009), hence enabling a rate of fatalities per VMT that can be projected to other sites, assuming similar collision fatality rates.

19-78 cont.

Animal-vehicle collision mortality prediction

The DEIR does not directly predict annual VMT, but at p. 23-8 it predicts 7,575 non-resident employees and 25,460 residents, and earlier it predicted daily VMT of 15.31 per employee and 14.34 per resident. Extended over the period of a year, these predictions would predict 175,590,422 annual VMT resulting from the project. During the Mendelsohn et al. (2009) study, 19,500 cars traveled Vasco Road daily, so the vehicle miles that contributed to my estimate of non-volant fatalities was 19,500 cars and trucks × 2.5 miles × 365 days/year × 1.25 years = 22,242,187.5 vehicle miles per 12,187 wildlife fatalities, or 1,825 vehicle miles per fatality. This rate divided into the above-predicted annual VMT would predict 96,214 vertebrate wildlife fatalities per year. Even if the mortality is half this rate, it would be highly significant. Even if the mortality is a tenth of this rate, it would be highly significant.

Based on my analysis, the project-generated traffic from and within the Upper Westside Specific Plan project area would cause substantial, significant impacts to wildlife. Given the predicted level of traffic-caused mortality, and the lack of any proposed mitigation, it is my opinion that the proposed project would result in potentially significant adverse biological impacts. However, these impacts are not considered in the DEIR.

CUMULATIVE IMPACTS

The DEIR asserts that the Specific Plan, as well as all the other development projects within the DEIR's defined geographic scope of cumulative impacts analysis, must meet the mitigation requirements of the Sacramento County 2030 General Plan, the Endangered Species Act, and other existing regulations, permits, and requirements. The DEIR concludes that the permanent loss of habitats to various special-status species of

19-79

wildlife would be potentially significant, but implies that compliance with existing regulations would minimize cumulative impacts. Because I had seen this same argument made in CEQA reviews prepared by many of California's Cities and Counties, I decided to test it (Smallwood and Smallwood 2023).

To measure the impacts of habitat loss to wildlife caused by development projects, and to measure cumulative impacts of development, Noriko Smallwood and I revisited 80 sites of proposed projects that we had originally surveyed in support of comments on CEQA review documents (Smallwood and Smallwood 2023). We revisited the sites to repeat the survey methods at the same time of year, the same start time in the day, and the same methods and survey duration in order to measure the effects of mitigated development on wildlife. We structured the experiment in a before-after, control-impact experimental design, as some of the sites had been developed since our initial survey and some had remained undeveloped. All of the developed sites had included mitigation measures to avoid, minimize or compensate for impacts to wildlife. Nevertheless, we found that mitigated development resulted in a 66% loss of species on site, and 48% loss of species in the project area. Counts of vertebrate animals declined 90%. We reported that "Development impacts measured by the mean number of species detected per survey were greatest for amphibians (-100%), followed by mammals (-86%), grassland birds (-75%), raptors (-53%), special-status species (-49%), all birds as a group (-48%), non-native birds (-44%), and synanthropic birds (-28%). Our results indicated that urban development substantially reduced vertebrate species richness and numerical abundance, even after richness and abundance had likely already been depleted by the cumulative effects of loss, fragmentation, and degradation of habitat in the urbanizing environment," and despite all of the mitigation measures and existing policies and regulations. 19-79 cont.

The DEIR's implication that existing regulations would minimize cumulative impacts is also largely inconsistent with the CEQA. According to the CEQA Guidelines §15064(h)(3), "When relying on a plan, regulation or program, the lead agency should explain how implementing the particular requirements in the plan, regulation or program ensure that the project's incremental contribution to the cumulative effect is not cumulatively considerable." The DEIR does not explain how any of its cited laws or regulations would minimize the Specific Plan's contributions to cumulative impacts.

The DEIR does cite its own mitigation measures as they might relate to cumulative impacts. However, a Worker Environmental Awareness Program, weed surveys, and preconstruction surveys for wildlife are not going to prevent or even minimize the Specific Plan's contributions to cumulative impacts. The DEIR includes no specific mitigation measure to avoid, minimize or compensate for the Specific Plan's contributions to cumulative impacts.

MITIGATION

BR-1 Pre-construction Baseline Biological Resources Report *Before the construction phase–specific development applications are deemed complete by the County, a qualified biologist shall prepare a Baseline Biological Resources Report* 19-80

documenting current land cover, land use, plant and wildlife habitat, and the locations of potential jurisdictional aquatic resources, native and non-native trees, and any other biological resources needed to reach a conclusion regarding which of the following mitigation measures are required for the specific project phase.

The baseline biological resources report is the characterization of the biological portion of the existing environmental setting that is required by the CEQA. This measure is flawed, however, by shifting the timing of the characterization of the existing environmental setting from before the public circulation of the DEIR to after FEIR certification. The CEQA never intended the characterization of the existing environmental setting to be completed by preconstruction surveys. The methods and results of preconstruction surveys would not undergo public review, as even the formulation of the survey methods are deferred until after FEIR certificaiton. Furthermore, preconstruction surveys do not carry anywhere close to the same probabilities of detections of plant and wildlife species as do surveys designed to characterize the environmental setting for the purpose of informing the public and decision-makers in an EIR. This measure is inconsistent with the CEQA's primary objectives.

19-80 cont.

BR-2a Worker Environmental Awareness Program *All project personnel involved in ground-disturbing activities will receive a comprehensive Worker Environmental Awareness Program (WEAP) presentation on the first day on a site prior to the initiation of construction provided by a qualified biologist. …*

I concur with the measure should the project go forward, but I must point out that its conservation benefits are far outweighed by the project's potential impacts to wildlife. BR-2a would do very little to avoid direct impacts, and would do nothing to avoid, minimize or compensate for losses of the productive capacity of the Specific Plan area to wildlife.

19-81

BR-2b Weed Control Plan *Prior to the issuance of a grading permit, the applicant for each phase of the UWSP area development shall prepare a weed control plan for review and approval by the Environmental Coordinator. … shall only apply to UWSP properties that are within 100 feet of NBHCP and SAFCA reserve areas (e.g., the Alleghany Reserve and the Cummings Reserve) and the levee for the West Drainage Canal (Witter Canal) toe drain …*

I concur with the measure should the project go forward, but I must point out that its conservation benefits are far outweighed by the project's potential impacts to plants and wildlife. BR-2b would do very little to avoid, minimize or compensate for weed invasions of the areas targeted for protection, which are themselves very small relative to the extent of the Specific Plan area.

19-82

BR-2c Avoid and Minimize Impacts on Rare Plant Species *Adequate measures shall be taken to avoid inadvertent take of Sanford's arrowhead (Sagittaria sanfordii) and other special-status plants by … conduct[ing] a properly timed special-status plant survey … [that] follow the CDFW Protocols for Surveying and Evaluating*

19-83

Impacts to Special Status Plan Populations and Sensitive Natural Communities (CDFW 2018) …

Measure BR-2c misrepresents the CDFW (2018) rare plant survey guidelines as a form of preconstruction survey. Preconstruction surveys are take-avoidance surveys, and as such they are a form of mitigation. The CDFW (2018) survey guidelines are intended to guide reconnaissance surveys for rare plants, and as such they are intended to support the characterization of the existing environmental setting as part of CEQA review. The DEIR misappropriates CDFW (2018).

19-83 cont.

BR-3 Avoid, Minimize, and Compensate for Impacts on Giant Garter Snake
Project applicants shall obtain authorization for take of giant garter snake from USFWS and CDFW and implement all measures required therein to avoid, minimize, and compensate for impacts to giant garter snake. In addition, … where construction activities will be conducted within 200 feet of aquatic giant garter snake habitat, project applicants shall: • [Implement] BR-2a, "Worker Environmental Awareness Program"); • Restrict construction activities to the giant garter snake active season; • Conduct pre-construction habitat surveys; • Dewater aquatic habitat prior to construction; • Conduct pre-construction surveys for giant garter snake presence; • Minimize vegetation clearing and avoid retained habitat; • Monitor ground-disturbing construction activities; and/or • Remove temporary fill and construction debris. To compensate for unavoidable permanent loss of aquatic giant garter snake habitat, project applicants shall either: (i) create, restore, or enhance, and preserve and manage suitable aquatic and associated upland habitat to provide giant garter snake habitat at a 1:1 or greater ratio (mitigation acreage to impact acreage), (ii) preserve and manage rice fields as habitat for giant garter snake at a 2:1 or greater ratio, and/or (iii) provide compensatory giant garter snake habitat of equal or greater ecological value as established in separate authorizations or permits by the USFWS and CDFW. Mitigation to compensate for losses of giant garter snake habitat may be fulfilled through a combination of these options, assuming minimum ratios are met. These mitigation measures are described further below. • Secure Authorization from the USFWS and CDFW for the Incidental Take of Giant Garter Snake …

19-84

Unless take authorizations from CDFW or USFWS require compensatory mitigation of equal or greater ecological value to giant garter snake, compensatory mitigation shall be as follows. ♣ Compensatory mitigation shall be provided through creation, preservation, and management of suitable aquatic and associated upland habitat for giant garter snake; and/or preservation and management of rice fields or other suitable aquatic habitat, as habitat for giant garter snake. ♣ Mitigation sites shall be located outside of the Natomas Basin and in the American Basin Recovery Unit as defined in the Recovery Plan for the Giant Garter Snake (Thamnophis gigas) (USFWS 2017a. This mitigation may be provided through: • Purchase of credits from a CDFW- and USFWS-approved conservation bank; • Payment to an existing in-lieu fee program; • Creation, restoration, or enhancement, and preservation and management of suitable aquatic and associated upland habitat for giant garter snake; or • Preservation and management of existing giant garter snake habitat through

acquisition of fee-title or a conservation easement and funding for long-term management of giant garter snake habitat at a site. … • The selection of mitigation site(s) shall be approved by the County in coordination with CDFW and USFWS. • The form and content of the easement, and the amount of the endowment for long-term management, shall be acceptable to the County, CDFW, and USFWS, and the easement shall prohibit any activity that substantially impairs or diminishes the land's capacity as suitable giant garter snake habitat and protect any existing water rights necessary to maintain giant garter snake habitat, in accordance with then-current water allocations and in coordination with USFWS. … For mitigation that creates, restores, or enhances suitable aquatic and associated upland giant garter snake habitat, a restoration plan shall be developed, approved by the USFWS, CDFW, and the County. …

19-84 cont.

The NBHCP effectiveness monitoring (ICF 2024) shows that the measures of BR-3 are not working to conserve giant gartersnakes in the Natomas Basin. The giant gartersnake is disappearing from NBHCP Reserves, and at the present rate the species will be extirpated from the Natomas Basin by 2014. Given the current trend, it is unlikely the USFWS is going to approve the Specific Plan's BR-3. BR-3 therefore presents only a speculative disposition of mitigation measures in lieu of any reevaluation of the NBHCP's conservation strategy directed to giant gartersnake.

BR-4 Avoid and Minimize Impacts on Northwestern Pond Turtle *As recommended in the Natomas Basin Habitat Conservation Plan or NBHCP, take of the northwestern pond turtle as a result of habitat destruction during construction activities, including the removal of irrigation ditches and drains, and during ditch and drain maintenance, will be minimized by the dewatering requirement described under BR-3. In addition: • For sites that contain northwestern pond turtle habitat, no more than 24 hours prior to start of construction activities (site preparation and/or grading), the project area shall be surveyed for the presence of northwestern pond turtle. … • Clearing shall be confined to the minimal area necessary to facilitate construction activities. …. If a live northwestern pond turtle is found during construction activities, the biological monitor shall immediately notify USFWS and CDFW. … The biological monitor shall also report any northwestern pond turtle mortality within one working day to USFWS. Any project-related activity that results in northwestern pond turtle mortality shall cease so that this activity can be modified to the extent practicable to avoid future mortality. …*

19-85

Should the project go forward, this measure should be implemented. However, it does not avoid the reduction productive capacity of northwestern pond turtles that would result from habitat loss. Northwestern pond turtles require upland areas for nesting.

BR-5 Avoid and Minimize Impacts on Nesting Birds *Mitigation Measure BR-5 applies to projects that include removal of trees or vegetation, tree trimming, or use of heavy equipment (e.g., earthwork, demolition).*

19-86

Some bird species, including special-status species of some birds, are ground-nesters. Examples include northern harrier and western snowy plover. BR-5 ignores these species.

19-86 cont.

BR-5 Avoid and Minimize Impacts on Nesting Birds *A qualified wildlife biologist shall conduct pre-construction nesting surveys during the avian nesting breeding season (approximately February 1 to August 31) within 7 days prior to construction. … If bird nests are found, an adequate no-disturbance buffer shall be established around the nest location and construction activities shall be restricted within the buffer until the qualified biologist has confirmed that any young birds have fledged and are able to leave the construction area. Required setback distances for the no-disturbance zone shall be established by the qualified biologist and may vary depending on species, line of sight between the nest and the construction activity, and the birds' sensitivity to disturbance. …*

This mitigation language allows a single individual to make a subjective decision, outside the public's view, to determine the buffer area for any given species. This measure lacks objective criteria, and is unenforceable.

19-87

BR-5 Avoid and Minimize Impacts on Nesting Birds *Any birds that begin nesting within the project area and survey buffers amid construction activities shall be assumed to be habituated to construction-related or similar noise and disturbance levels and no disturbance zones shall not be established around active nests in these cases; however, should birds nesting within the project area and survey buffers amid construction activities begin to show disturbance associated with construction activities, no-disturbance buffers shall be established as determined by the qualified wildlife biologist.*

The more realistic assumption to apply to birds that begin nesting after construction activities begin is that the breeding birds are demonstrating strong nest site fidelity, which is common. This assumption can be supported by ample scientific evidence, whereas the DEIR's assumption is merely convenient to the developer and the lead agency.

19-88

BR-5 Avoid and Minimize Impacts on Nesting Birds *Any work that must occur within established no-disturbance buffers around active nests shall be monitored by a qualified biologist. If adverse effects in response to project work within the buffer are observed and the biologist determines the activities are likely to compromise the nest's success, work within the no-disturbance buffer shall halt until the nest occupants have fledged. If the qualified biologist determines that the activities are unlikely to compromise the nest's success, work can continue.*

This mitigation language allows a single individual to make a subjective decision, outside the public's view, to determine the buffer area for any given species. This measure lacks objective criteria, and is unenforceable.

19-89

BR-6 Avoid and Minimize Impacts on Western Burrowing Owl *… A qualified biologist shall conduct focused burrowing owl surveys in suitable habitat in the area … in accordance … Appendix D of CDFW's Staff Report on Burrowing Owl Mitigation (Staff Report), published March 7, 2012. … If nest sites are found, CDFW shall be contacted regarding suitable mitigation measures, which may include on-site avoidance … or implementation of a relocation effort …Take avoidance surveys may also be conducted. … Where on-site avoidance is not possible, disturbance and/or destruction of occupied burrows shall be offset through development of suitable habitat on upland reserves. Such habitat shall include creation of new burrows with adequate foraging area (a minimum of 6.5 acres) or 300 feet radii around the newly created burrows. Additional habitat design and mitigation measures are described in the Staff Report.*

19-90

The DEIR inaccurately characterizes breeding season detection surveys as a mitigation measure. CEFW (2012) clearly intends for these surveys to be completed in support of the preparation of the environmental review document, and not as a mitigation measure.

I must also point out that CDFW (2012) warns that burrowing owl relocations can be interpreted as a form of take. Furthermore, the DEIR identifies no candidate locations to where burrowing owls might be relocated.

Finally, following a unanimous vote of the California Fish and Game Commission, the burrowing owl is now a candidate species for listing under the California Endangered Species Act. Burrowing owls have sharply declined in the Sacramento region, and are near extirpation (Miller 2024). It is imperative that the surveys be implemented as CDFW (2012) recommends, which is prior to the circulation of the DEIR.

BR-7a Avoid and Minimize Impacts on Nesting Swainson's Hawk *Project applicants for each construction phase shall avoid, minimize, and compensate for impacts on Swainson's hawk … If construction activities will begin during the Swainson's hawk nesting season …, a qualified biologist shall conduct surveys in accordance with … Swainson's Hawk Technical Advisory Committee 2000 … If an active Swainson's hawk nest is found on or within 0.5 mile of the project footprint, a survey report shall be submitted to the County and CDFW, and an avoidance and minimization plan shall be developed and implemented …*

19-91

Should the Specific Plan go forward, I concur with BR-7a. However, BR-7a would not prevent the permanent loss of productive capacity caused by Swainson's hawk habitat destruction. Nor would BR-7a shift the need to reevaluate the NBHCP conservation strategy. With the number of unsuccessful nests increasing in the Natomas Basin (Figure 7), the Upper Westside Specific Plan must trigger the reevaluation of the NBHCP conservation strategy.

BR-7b Compensate for Permanent Impacts on Swainson's Hawk Foraging Habitat *Compensation for the permanent loss of foraging habitat shall be determined for each development phase. … project applicants … shall compensate for permanent*

19-92

loss of foraging habitat through the preservation of foraging habitat … at a ratio of at least 1:1 … Mitigation sites shall be located outside, and within 10 miles of, the Natomas Basin … through purchase of credits from a CDFW-approved conservation bank, or through protection of habitat, including acquisition of a conservation easement and funding long-term administration, monitoring, and enforcement of the easement. ….

A 1:1 mitigation ratio assures a 50% net loss of Swainson's hawk habitat and of Swainson's hawks. Additionally, BR-7b is flawed for not identifying where Swainson's hawk habitat can be found and protected within 10 miles of the Natomas Basin. Failing to show where Swainson's hawk habitat can be protected within 10 miles of the Natomas Basin calls into question whether 1,538 acres of Swainson's hawk habitat can be found and protected.

19-92 cont.

BR-8 Avoid and Minimize Impacts on Pallid Bat *A qualified biologist who is experienced with bat surveying techniques (including auditory sampling methods), behavior, roosting habitat, and identification of local bat species shall be consulted prior to building or bridge demolition, building relocation activities, or tree work to conduct a pre-construction habitat assessment of the project area (focusing on buildings to be demolished or relocated) to characterize potential bat habitat and identify potentially active roost sites. … The following measures shall be implemented should potential roosting habitat or potentially active bat roosts be identified …: … initial bridge or building demolition, relocation, and any tree work (trimming or removal) shall occur when bats are active … to the extent feasible. … If seasonal avoidance of potential roosting habitat is infeasible, the qualified biologist shall conduct pre-construction surveys of potential bat roost sites identified during the initial habitat assessment no more than 14 days prior to bridge or building demolition or relocation, or any tree trimming or removal. …*

There was no reason not to survey for bat activity and bat roost sites prior to the public circulation of the DEIR. Instead, the DEIR defers the surveys until after EIR certification, which is after the time when the public and decision-makers needed an accurate characterization of the wildlife community, disclosure of potential project impacts to bats, and the survey-informed formulation of mitigation measures.

Moreover, the measure fails to avoid or compensate for reduced productive capacity of bats that would result from habitat destruction.

19-93

BR-9a Avoid and Minimize Impacts on Valley Elderberry Longhorn Beetle *A pre-construction survey will be conducted by a qualified biologist prior to construction-related ground disturbance. If such a survey determines that valley elderberry longhorn beetle habitat is present, … the County shall require … to avoid and minimize take of individuals: … a 100-foot wide avoidance buffer … Compensatory mitigation for adverse effects may include the transplanting of elderberry shrubs during the dormant season … to an area protected in perpetuity as well as required additional elderberry and associated native plantings as approved by the USFWS. … If elderberry plants cannot be avoided, or if project activities will result*

19-94

in the death of stems or the entire shrub, they shall be transplanted during the dormant season … to an area protected in perpetuity and approved by the USFWS. … Replacement seedling plants will be provided at a ratio of 2 to 1 to 5 to 1 depending on the extent of valley elderberry longhorn beetle utilization of the plants moved or lost. An 1,800-square-foot area will be provided for each transplanted elderberry shrub or every five elderberry seedling plants.

In my experience, translocations of VELB-inhabited elderberry shrubs tend to fail to provide habitat to VELB (Morrison et al. 2002). The measure translocations and plants new elderberry shrubs, but not necessarily where they can support VELB. The measure also includes no monitoring of the outcome directly related to VELB, and there are no consequences for failures of translocated or planted elderberry shrubs to support VELB.

Wildlife Movement: The following measures are listed as supposed mitigation of potential project impacts to wildlife movement in the region:

19-94 cont.

BR-2a Worker Environmental Awareness Program – See Impact BR-2: Special Status Plant Species.

BR-3 Compensate for Permanent Impacts to Giant Garter Snake Habitat – See Impact BR-3: Giant Garter Snake.

BR-5 Avoid and Minimize Impacts on Nesting Birds – See Impact BR-5: Special Status Bird Species (Other Than Burrowing Owl and Swainson's Hawk), Birds Protected by the Migratory Bird Treaty Act, and Nesting Raptors.

None of these measures would avoid, minimize or compensate for project impacts to wildlife movement in the region. None of these measures nor any other measures can mitigate such impacts without there first being some understanding of how wildlife move within and beyond the Specific Plan area.

BR-14 Conflict with Natomas Basin Hcp and Metro Air Park HCP *Mitigation Measures BR-1 and BR-10a through BR-10c … would contribute to protection of species covered under the NBHCP and MAP HCP.*

As I commented on most of these mitigation measures above, BR-1 through BR-10 cannot eliminate the interference of the Specific Plan with the NBHCP. The geographic scope of the NBHCP's conservation strategy is the entire Natomas Basin. As County Staff (Todd Smith) wrote to Scott Johnson, Senior Planner, City of Sacramento on 4 April 2022, "In the Natomas Basin, any future development not covered by an existing Habitat Conservation Plan (HCP) must obtain take authorization under the Endangered Species Act (ESA). The NBHCP along with the MAP HCP require that a total of 8,750 acres of mitigation be located within Natomas Basin and the mitigation must adhere to specific requirements of the HCP. The HCPs provide a conservation strategy for the protection of 22 covered species, and their implementation has been underway for over 20 years." (Airport South Industrial Project Notice of Preparation of Environmental Impact Report (Project P21-017).) The County must know that BR-14 is inadequate.

19-95

RECOMMENDED MEASURES

Construction Phasing: Should the Specific Plan go forward, construction phasing should begin with land nearest existing residential or commercial uses, and it should proceed sequentially from there. The way I read the DEIR, the developer can decide at any time prior to initial construction to construct Phase 1 anywhere within the Specific Plan area. Siting Phase 1 in the middle of the Specific Plan area, or farthest to the west toward the River would disrupt wildlife movement across the Specific Plan area, and if another economic crisis was to arrive, Phase 1 could be stranded for many years or even permanently. Siting Phase 1 far from existing development would also increase wildlife-automobile collision mortality as residents drive rural roads between their homes and the City, intersecting wildlife attempting to travel across roads on the only open spaces that remain. Already, there exists considerable commuter traffic on San Juan Road, as commuters seek shortcuts around the crowded arterial roads and highways. And already there are animals dead on the road – I found a road-killed desert cottontail and raccoon on the Specific Plan area. 19-96

Preconstruction Surveys: Following the completion of protocol-level detection surveys to inform a revised DEIR, take-avoidance surveys should be performed for special-status species and breeding birds prior to construction. For the most part, these surveys are already required by the DEIR, but they need to follow properly implemented detection surveys for the purpose of informing the DEIR. Whereas Bargas (2022) performed detection surveys for giant gartersnake and Swainson's hawk, its surveys are up to five years old, and therefore are outdated and should be repeated. Lastly, a report of preconstruction surveys and their outcomes should be prepared and made available to the public. 19-97

Habitat Loss: If the Specific Plan goes forward, compensatory mitigation is warranted for the acres of habitat that would be lost. At minimum, an equal area of open space should be protected in perpetuity close to any new developments.

Substantial upland buffers are needed to protect wetland areas. I recommended at least 600 feet of clearance between the wetland features and the nearest impervious surface. Buffered areas should be restored to natural vegetation cover appropriate to the area. 19-98

Pest Control: The Specific Plan should commit to no use of rodenticides and avicides. It should commit to no placement of poison bait stations outside commercial buildings and residential units. 19-99

House Cats: If the Specific Plan goes forward, homeowners should not be allowed to let their cats range free. A fund should be established for long-term management of house cats in the Specific Plan. Management could include public education about the environmental effects of outdoor and free-ranging cats. It could also include a program to spade and neuter cats, especially free-ranging cats. It could also involve some removals of feral cats. 19-100

Minimize Bird-Window Collision Mortality: If the Project goes forward, it should adhere to available Bird-Safe Guidelines, such as those prepared by American Bird Conservancy and New York and San Francisco. The American Bird Conservancy (ABC) produced an excellent set of guidelines recommending actions to: (1) Minimize use of glass; (2) Placing glass behind some type of screening (grilles, shutters, exterior shades); (3) Using glass with inherent properties to reduce collisions, such as patterns, window films, decals or tape; and (4) Turning off lights during migration seasons (Sheppard and Phillips 2015). The City of San Francisco (San Francisco Planning Department 2011) also has a set of building design guidelines, based on the excellent guidelines produced by the New York City Audubon Society (Orff et al. 2007). The ABC document and both the New York and San Francisco documents provide excellent alerting of potential bird-collision hazards as well as many visual examples.

New research results inform of the efficacy of marking windows. Whereas Klem (1990) found no deterrent effect from decals on windows, Johnson and Hudson (1976) reported a fatality reduction of about 69% after placing decals on windows. In an experiment of opportunity, Ocampo-Peñuela et al. (2016) found only 2 of 86 fatalities at one of 6 buildings – the only building with windows treated with a bird deterrent film. At the building with fritted glass, bird collisions were 82% lower than at other buildings with untreated windows. Kahle et al. (2016) added external window shades to some windowed façades to reduce fatalities 82% and 95%. Brown et al. (2020) reported an 84% lower collision probability among fritted glass windows and windows treated with ORNILUX R UV. City of Portland Bureau of Environmental Services and Portland Audubon (2020) reduced bird collision fatalities 94% by affixing marked Solyx window film to existing glass panels of Portland's Columbia Building. Many external and internal glass markers have been tested experimentally, some showing no effect and some showing strong deterrent effects (Klem 1989, 1990, 2009, 2011; Klem and Saenger 2013; Rössler et al. 2015). For example, Feather Friendly® circular adhesive markers applied in a grid pattern across all windows reduced bird-window collision mortality by 95% in one study (Riggs et al. 2023) and by 95% in another (de Groot et al. 2021). Another study tested the efficacy of two filmshades to be applied exteriorly to windows prior to installations: BirdShades increased bird-window avoidance by 47% and Haverkamp increased avoidance by 39% (Swaddle et al. 2023). 19-101

Monitoring and the use of compensatory mitigation should be incorporated at any new building project because the measures recommended in the available guidelines remain of uncertain efficacy, and even if these measures are effective, they will not reduce collision mortality to zero. The only way to assess mitigation efficacy and to quantify post-construction fatalities is to monitor newly constructed buildings or homes for fatalities.

Road Mortality: Compensatory mitigation is needed for the increased wildlife mortality that would be caused by regional road traffic generated by the Specific Plan. I suggest that this mitigation be directed toward funding research to identify fatality patterns and effective impact reduction measures such as reduced speed limits and wildlife under-crossings or overcrossings of particularly dangerous road segments. 19-102

Compensatory mitigation can also be provided in the form of donations to wildlife rehabilitation facilities (see below). 19-102 cont.

Fund Wildlife Rehabilitation Facilities: Compensatory mitigation ought also to include funding contributions to wildlife rehabilitation facilities to cover the costs of injured animals that will be delivered to these facilities for care. Many animals would likely be injured by collisions with automobiles and windows and by depredation attempts by house cats and dogs. 19-103

Landscaping: If the Project goes forward, California native plant landscaping (i.e., grassland and locally appropriate scrub plants) should be considered to be used as opposed to landscaping with lawn and exotic shrubs and trees. Native plants offer more structure, cover, food resources, and nesting substrate for wildlife than landscaping with lawn and ornamental trees. Native plant landscaping has been shown to increase the abundance of arthropods which act as importance sources of food for wildlife and are crucial for pollination and plant reproduction (Narango et al. 2017, Adams et al. 2020, Smallwood and Wood 2022.). Further, many endangered and threated insects require native host plants for reproduction and migration, e.g., monarch butterfly. Around the world, landscaping with native plants over exotic plants increases the abundance and diversity of birds, and is particularly valuable to native birds (Lerman and Warren 2011, Burghardt et al. 2008, Berthon et al. 2021, Smallwood and Wood 2022). Landscaping with native plants is a way to maintain or to bring back some of the natural habitat and lessen the footprint of urbanization by acting as interconnected patches of habitat for wildlife (Goddard et al. 2009, Tallamy 2020). Lastly, not only does native plant landscaping benefit wildlife, it requires less water and maintenance than traditional landscaping with lawn and hedges. 19-104

Thank you for your consideration,

_____

Shawn Smallwood, Ph.D.

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EXHIBIT 2

SMITH ENGINEERING & MANAGEMENT

October 25, 2024

Mr. Patrick Soluri, Esq.
Soluri Meserve
510 Eighth Street
Sacramento, CA 95814

Subject: Upper Westside Specific Plan DEIR

P24005

Dear Mr. Soluri:

Per your request, I reviewed the Draft Environmental Impact Report (the "DEIR") for the Upper Westside Specific Plan Project (the "Project") in the County of Sacramento (the "County"). My review is with respect to transportation and circulation considerations.

My qualifications to perform this review include registration as a Civil and Traffic Engineer in California, over 50 years professional consulting practice in these fields and both preparation and review of the traffic and transportation components of numerous environmental documents prepared under the California Environmental Quality Act ("CEQA"). My professional resume is attached hereto.

My comments follow.

The DEIR Identifies Significant Safety Issues Related To Excessive Freeway Off and On Ramp Queues At Several Interchanges In the Project Vicinity. Because Of Serious Nature Of the Issues Involved The Project Should Not Be Approved For Construction Until There Is Clear Agreement Among The Agencies Having Jurisdiction As To What The Actual Mitigation Plans Are, How Full Funding Will Be Accomplished And When Construction Will Take Place.

19-105

The DEIR discloses that the Project would have direct significant impacts on excessive queuing and related safety on the I-80 eastbound and westbound off

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ramps to West El Camino Avenue. It would have direct impact as well as, in the AM peak the southbound I-5 0ff ramp to J Street. In addition, it discloses that the Project would have cumulatively significant impacts related to unsafe off ramp queue buildups at the interchanges of I-5 with Del Paso Road and with Garden Highway (ramps in both northbound and southbound directions at both interchanges) and at I-5 with Arena Boulevard (northbound off ramp only).

At the I-80 / West El Camino interchange, the Project proposes to reconstruct the iinterchange, widening West El Camino from 2 to 4 lanes extending extend the queue storage capacity to 1500 feet on each of the impacted ramps. This it finds mitigate the Existing + Project condition and, with minor signal timing modifications, would mitigate the Cumulative + Project condition. However, as a bicycle/pedestrian network connectivity and safety measure, the interchange reconstruction mitigation proposal includes construction of a two-way bike/pedestrian path paralleling the westbound side of El Camino Avenue and extending from El Centro Road easterly through the interchange to Orchard Lane in the City of Sacramento and suggests abandonment of the eastbound on-street bike lane on the other side. These proposed changes are features the safety aspects of which both Caltrans and the City may view with askance.

19-105 cont.

What, if anything, the Project would do to mitigate its direct significant impact on the I-5 southbound off ramp queue at J Street is unexplained, a key flaw in the document.

19-106

At the I-5 interchanges with Arena Boulevard, Del Paso Road and Garden Highway, the DEIR concludes that the excessive off ramp queuing is caused by backups from adjacent cross-street intersections that impair movements from the exit ramps. The DEIR proposes at DEIR page 22-68 to pay fair share funds toward improvements to the intersections of Arena with El Centro and Arena with East Commerce Way which, according to the analysis, would allow the off ramps to operate without hazardous queue spill-backs onto the I-5 mainline.

The text on DEIR page 22-68 continues as follows:

> "With respect to the off-ramp queues at the two remaining study interchanges (I-5/Arena Boulevard[1] and I-5/Garden Highway) a variety of potential surface street improvements were tested along the roadways leading to this [sic] facility. This involved collaboration with staff from the City of Sacramento regarding the viability of certain improvements. Improvements such as lane restriping, adding lanes or modifying signal phasing were either found to not to be effective or could also cause the need for additional right-of –way. At both interchanges the following conclusions were reached. First, there are no known improvements

19-107

[1] We think the authors meant to say I-5/Del Paso Road here.

> planned at either interchange. Second, the feasibility of any surface street improvements that could reduce off-ramp queuing is not known."

What this says is that the preparers were not considering all feasible improvements as CEQA requires. Such feasible improvements could involve widening or lengthening the off ramps to provide sufficient queue storage without hazardous back-ups onto the freeway main lines. The preparers are evidently only considering cheap improvements that don't require significant construction or right-of-way acquisition (which may not be necessary to lengthen or multi-lane the ramps).

19-107 cont.

The DEIR also discloses that the project would have significant direct and cumulative safety impacts related to excessive on ramp queues at the I-5 southbound loop on ramp from Garden Highway[2] and the diagonal on ramp to southbound I-5 from Del Paso Road. This latter impact is not evident in the representation on Appendix TR-1, Table 17 that shows the queue in the subject on ramp from Del Paso to be 1950 feet in the cumulative condition and only 200 feet in the cumulative plus project condition. The confusion is because, contrary to the representations at other on ramp locations analyzed in the subject table, in the case of the on ramp from Del Paso the added on ramp lane provided for in what is described as Mitigation TR-8 in Appendix TR-1 and as Mitigation Measure C-TR-3 in the DEIR itself is assumed to be in place in the case of the southbound on ramp from Del Paso but similar added lanes provided for under the same mitigation measure are not assumed in place in the analysis of southbound loop on ramp from Garden Highway or the southbound diagonal ramp from West El Camino.

19-108

Because mitigation of all of the impacts above include modifications to State highway facilities and sometimes to facilities under jurisdiction of the City of Sacramento and because some mitigations may require the participation of other fair share payers neither the Applicant nor the County can guarantee the full funding, approvals and implementation of those mitigations. Therefore, the DEIR has characterized these impacts as significant and unavoidable.

There is a tendency to be dismissive of impacts categorized as significant and unavoidable based on jurisdictional issues and funding uncertainties. It is common to regard provision of housing and fostering economic growth as overriding considerations to impacts categorized significant and unavoidable due to what is perceived as mere administrative nuisance. However, the severity of the impacts involved must be considered. Take for example the freeway off ramp deficiencies at the I-5/Del Paso interchange. In the northbound direction during the PM peak hour, the Cumulative No Project queue would be 4200 feet; the Cumulative With Project would be 5025 feet. The ramp is only 1300 feet to

[2] Queues on the diagonal ramp from Garden Highway to I-5 northbound also exceed capacity in the existing and cumulative conditions but the Project is not projected to add any traffic to this movement.

the gore point. So the With Project queue will extend back south on the main line 3725 feet beyond the gore point. Del Paso Road is separated from the next interchange south, Arena Boulevard, along the Alignment of I-5 by slightly less than one mile. However, the distance from the gore point at the northbound exit to Del Paso to the merge point of the northbound on ramp from Arena is only about 2640 feet. So the exit queue will extend south past the merge point from the on ramp. This situation will lead to abrupt merges and lane changes sure to produce frequent collisions. 19-108 cont.

A similar situation will exist on the southbound I-5 off ramp to Del Paso. The projected PM peak queue is 4500 feet in the Cumulative No Project condition, 4525 feet in the Cumulative Plus Project condition. The ramp queue storage length is1300 feet so the exit queues will extend 3200 and 3225 feet north on the main line beyond the ramp gore point. However, the merge point of the ramp from State Routes 70/99 to I-5 southbound is only about 1500 feet north of the Del Paso exit gore. So queued exiting traffic will overlap the entry point from 70/99. Again, this situation will cause abrupt merge and lane change maneuvers that will surely cause frequent collisions. 19-109

Both of the deficiencies at the Del Paso interchange appear to be capable of mitigation by adding additional exit ramp lanes since the existing right-of-way appears sufficient for this purpose although the DEIR fails to disclose that as an option. However, to the point of the serious safety related nature of the impacts, the County (as well as the City in its northern development areas) should condition that building permits for various portions or stages of this and other projects be tied to implementation of an explicit item by item list of successful mitigation measures where transportation-related safety impacts have been categorized as significant and unavoidable for jurisdictional and funding reasons. 19-110

The DEIR Finds the Project Would Have Cumulatively Significant Traffic Safety Impact On Garden Highway, Requiring Lane Widening and Paved Shoulder Improvements and Also Requiring Lane Additions To Project Intersections With Garden Highway. It Indicates a Plan By Others To Add A 12 Foot Wide Bike/Pedestrian Facility Alongside the Roadway. How All This Can Fit Within the Apparent 40 Foot Right-Of-Way or Why the Residents and Property Owners Along Garden Highway Should Experience Property Takings to Allow Improvements For a Project From Which They Do Not Benefit, Why the Residential Properties Are Not Evaluated For Residential Traffic Impacts Or Why The DEIR Does Not Identify the Project As Impactful for Precluding The Development of the Bike/Pedestrian Trail. 19-111

Garden Highway is a two-lane road with lanes of approximately 10 feet width, no paved shoulders except where residents have paved streetside areas for residential parking purposes, and in most cases open drainage with an apparent

right-of-way of only 40 feet. This is below County standards for roadways carrying more than 6000 ADT. The DEIR indicates that in the Cumulative + Project condition Garden Highway would carry more than 6000 ADT and the Project would add more than 600 vehicles to the total. Hence, it exceeds the criterion for upgrading the roadway to minimum County standards of 12 foot lane widths and 6 foot paved shoulders. In addition, it indicates that additional turn lanes would be required at Project intersections with Garden Highway. The DEIR states that the Project would make fair share contribution to the lane widenings and shoulder improvements on the roadway segments and pay for the intersection improvements. Also, DEIR Plate PD 15 Bikeway Master Plan indicates development of a 12 foot wide Class 1 Bikeway within the roadway right-of-way by others (the County?). Please explain how the 24 feet of traffic lanes, 12 feet of shoulders and 12 feet of Class 1 Bike lanes and extra feet of adding lanes at intersections can be fit in the 40 feet of right-of-way, and where the takings of right-of-way would be, who would be responsible for the cost, why the Project is not identified as potentially interfering with a planned bikeway development and why the Project is not identified in having neighborhood impacts on the residential development on the west side of Garden Highway. These are deficiencies in the DEIR. In addition, as an alternative to the proposed mitigation measures, the DEIR is deficient in failing to consider leaving the connections from the developed areas of the Project through the improperly titled Agricultural Buffer[3] to Garden Highway as the gated private roads that currently exist, thereby avoiding the need for widening at intersections and perhaps the upgrading of Garden Highway to current County minimum standards.

19-111 cont.

It also seems likely that, given the congestion forecast along I-5 and at surface street locations, significant numbers of knowledgeable travelers would choose a calming drive in the pleasant, scenic surroundings of Garden Highway, even though a tense drive on the congested routes would remain faster. This product of human preference could result in considerably more impactful traffic on Garden Highway than predicted in transportation models that tend to assign traffic to the fastest routes.

19-112

The DEIR Underestimates the Project's External Trip Generation In Numerous Ways. Consequently It Underestimates the Project's VMT Per Capita, Its Contribution To Safety Related Hazardous Queue Problems on

19-113

[3] The characterization of lands at the west side of the Project area as Agricultural Buffer is improper. This land so described is Agricultural. A buffer is a significant open space between urban/suburban development and agricultural use. This is necessary to avoid overspill of impacts of agricultural operations including pesticide spraying, dust and noise of cultivation and lighting and noise of nighttime harvesting and other night agricultural work impacting residential areas. The only buffer between agricultural and residential use in the proposed plan is a proposed 30 to 50 foot wide open space corridor between the residential uses and the agricultural use at the west side of the Development Area, an open space too narrow to effectively buffer between the residential and agricultural uses.

Freeway Ramps Discussed In Sections Above and Its Contribution To Issues Discussed In DEIR Appendix T-2, the Local Transportation Analysis.

First, the DEIR presents no statistical evidence that it offers a greater mix of land uses, greater overall density, greater walkability, bikeability and transit accessibility that would make it likely to have more internal and fewer external motor vehicle trips than recently developed, comparably sized areas to the north and east of the Project site. Assertions to this effect are merely flowery statements of urban planner rhetoric and ideals.

19-113 cont.

In furtherance of this notion, the DEIR's transportation analysts adjusted initial trip generation estimates for the Project based on data from the Institute of Transportation Engineers formerly authoritative publication *Trip Generation Manual, 10th Edition*,[4] by applying a procedure called MXD+ that is purported to account for the special qualities of travel in mixed use developments.

As is explained in Final Technical Appendix to DEIR Appendix TR-1, the current version of MXD+ was calibrated to 2019 data from 12 mixed use sites. Per Table 1 of the Technical Appendix, the 12 calibration sites ranged in size from 4 acres to 221 acres, averaged 50 acres and had a median size of 19 acres. They had a range of dwelling units of 8 to 1841, an average of 563 units and a median of 414 units. By footnote it is indicated that over 95 percent of the units are multi-family and that the site with only 8 units also included a 315 person student dormitory. The sites retail component ranged from 0 to 753,000 square feet of retail with an average of 168,000 square feet and a median of 38,000 square feet. The sites office components ranged from 0 to 1,084,000 square feet with an average of 212,000 square feet and a median of 41,000 square feet. By contrast, the UWSP project encompasses 2,066 gross acres and 1,532 Development Acres, 9,356 dwelling units and over 3,000,000 square feet of commercial, retail and office development. Obviously, it dwarfs all of the mixed use sites whose data the MXD+ procedure was calibrated to. Also, the residential component is much more evenly split between single family detached units (4367 du) and multi-family units (4989 du) in contrast to the over 95 percent multi-family units in the calibration sites. There is every reason to believe that the MXD+ process is biased toward the travel characteristics of much smaller mixed use projects with predominantly multi-family housing as opposed to the scale and balance of housing types in the subject UWSP Project.

19-114

The Technical Appendix to DEIR Appendix T-1 also describes validation of the MXD+ process to 4 additional mixed use developments. The validation sites ranged in size from 4 acres to 3,000 acres with 3 of the 4 sites being less than 80 acres. The residential components at these sites ranged from 120 dwelling units

[4] We say 'formerly authoritative' because in September, 2021 the Institute released *Trip Generation Manual, 11th Edition* that supercedes the 10th Edition.

to 7,704 with the total at the largest site being over 88 percent single family detached while the 3 smaller site had predominantly multi-family residential. At the largest site, the office component totaled only 80,000 square feet, the general retail component only 387,000 square feet, 15,000 square feet of restaurant, and 54,000 square feet of supermarket so this site is more like a typical suburban neighborhood than a truly mixed use community. The Technical Report claims that the recalibrated MXD+ procedure was reasonably validated at all four sites, but in the case of the largest this is dependent on certain assumptions about other traffic at the gateways. 19-114 cont.

The DEIR indicates at page 18-30, Table TR-2, that when the UWSP project data is processed through the SACOG SACSIM19 regional transportation model, the results indicate that 15.4 percent of the Projects residential trips would be internal to the Project. If processed through the MXD+ process, the result is 22.9 percent internal trips. The DEIR's transportation analysts arbitrarily choose to interpret the more favorable to the Project MXD+ results rather than those of the highly refined SACSIM tour-based model. This causes a critical understatement of the Project's VMT per capita analysis. If the more conservative and likely more reliable SACSIM19 output is relied upon, the resultant VMT per capita for the Project would be 15.41 miles per capita instead of 14.34. Since 15.41 is above the significance threshold of 14.83 miles per capita, the Project would be found to have significant VMT impact and require mitigation. 19-115

Another way the DEIR understates Project external trip generation is by assuming that trip deductions for attracting traffic already passing by retail, restaurant and similar uses are allowable at percentages suggested by the Institution of Transportation Engineers' publication *Trip Generation Handbook.* There are two problems with this. Most of the roadways internal to the Project have zero or close to zero existing traffic. Hence, there is no existing traffic to sustain those attracted passerby percentages assumed. Ergo, attracted passers-by would have to come from traffic generated within the Project itself. However, the DEIR analysis has already deducted for hefty estimates of internal trips. So discounting for attracted passers-by is in essence double discounting of the same trips. This double discounting amounts to about 5.7 percent of the DEIR's Table TR-1 estimate of Project external trips. 19-116

Another problem with the DEIR's analysis is the fact it relies on *Trip Generation Manual, 10th Edition*. As noted in a footnote above, the 10th Edition was superseded by the 11th Edition in September, 2021, in plenty of time for the DEIR analysts to have relied on it for the UWSP work. One of the primary advantages of the newer editions of *Trip Generation Manual* is that they have been successively improved by getting rid of very old data and adding in more current data, providing data on new land use categories, and disaggregating data from dense urban sites from general urban/suburban sites. One of the problems that 19-117

professionals noted of the 10th Edition and those that preceded it is that Category 820, Shopping Center, included data from tiny retail establishments of a few thousand square feet to regional shopping centers over a million square feet. The disparity of the trip characteristics from the very small to very large caused problems with the representative of weighted averages and fitted curves at the opposite ends of the size scale. The 11th Edition solved this by splitting the smaller sized retail into two new use categories and reserving the 820 shopping center category for retail centers over 150,000 square feet. The implication for the DEIR is this. The DEIR is relying on the wrong data set and is relying on a version of MXD+ calibrated to adjust the wrong data set.

19-118

19-119

Conclusion

Given the above, the DEIR's transportation section is inadequate and must be revised and recirculated in draft status.

Sincerely,

Smith Engineering & Management
A California Corporation

Daniel T. Smith Jr., P.E.
President

SMITH ENGINEERING & MANAGEMENT

DANIEL T. SMITH, Jr.
President

EDUCATION

Bachelor of Science, Engineering and Applied Science, Yale University, 1967
Master of Science, Transportation Planning, University of California, Berkeley, 1968

PROFESSIONAL REGISTRATION

California No. 21913 (Civil)
California No. 938 (Traffic)
Nevada No. 7969 (Civil)
Arizona No. 22131 (Civil)
Washington No. 29337 (Civil)

PROFESSIONAL EXPERIENCE

Smith Engineering & Management, 1993 to present. President.
DKS Associates, 1979 to 1993. Founder, Vice President, Principal Transportation Engineer.
De Leuw, Cather & Company, 1968 to 1979. Senior Transportation Planner.
Personal specialties and project experience include:

Litigation Consulting. Provides consultation, investigations and expert witness testimony in highway design, transit design and traffic engineering matters including condemnations involving transportation access issues; traffic accidents involving highway design or traffic engineering factors; land use and development matters involving access and transportation impacts; parking and other traffic and transportation matters.

Urban Corridor Studies/Alternatives Analysis. Principal-in-charge for State Route (SR) 102 Feasibility Study, a 35-mile freeway alignment study north of Sacramento. Consultant on I-280 Interstate Transfer Concept Program, San Francisco, an AA/EIS for completion of I-280, demolition of Embarcadero freeway, substitute light rail and commuter rail projects. Principal-in-charge, SR 238 corridor freeway/expressway design/environmental study, Hayward (Calif.) Project manager, Sacramento Northeast Area multi-modal transportation corridor study. Transportation planner for I-80N West Terminal Study, and Harbor Drive Traffic Study, Portland, Oregon. Project manager for design of surface segment of Woodward Corridor LRT, Detroit, Michigan. Directed staff on I-80 National Strategic Corridor Study (Sacramento-San Francisco), US 101-Sonoma freeway operations study, SR 92 freeway operations study, I-880 freeway operations study, SR 152 alignment studies, Sacramento RTD light rail systems study, Tasman Corridor LRT AA/EIS, Fremont-Warm Springs BART extension plan/EIR, SRs 70/99 freeway alternatives study, and Richmond Parkway (SR 93) design study.

Area Transportation Plans. Principal-in charge for transportation element of City of Los Angeles General Plan Framework, shaping nations largest city two decades into 21'st century. Project manager for the transportation element of 300-acre Mission Bay development in downtown San Francisco. Mission Bay involves 7 million gsf office/commercial space, 8,500 dwelling units, and community facilities. Transportation features include relocation of commuter rail station; extension of MUNI-Metro LRT; a multi-modal terminal for LRT, commuter rail and local bus; removal of a quarter mile elevated freeway; replacement by new ramps and a boulevard; an internal roadway network overcoming constraints imposed by an internal tidal basin; freeway structures and rail facilities; and concept plans for 20,000 structured parking spaces. Principal-in-charge for circulation plan to accommodate 9 million gsf of office/commercial growth in downtown Bellevue (Wash.). Principal-in-charge for 64 acre, 2 million gsf multi-use complex for FMC adjacent to San Jose International Airport. Project manager for transportation element of Sacramento Capitol Area Plan for the state governmental complex, and for Downtown Sacramento Redevelopment Plan. Project manager for Napa (Calif.) General Plan Circulation Element and Downtown Riverfront Redevelopment Plan, on parking program for downtown Walnut Creek, on downtown transportation plan for San Mateo and redevelopment plan for downtown Mountain View (Calif.), for traffic circulation and safety plans for California cities of Davis, Pleasant Hill and Hayward, and for Salem, Oregon.

Transportation Centers. Project manager for Daly City Intermodal Study which developed a $7 million surface bus terminal, traffic access, parking and pedestrian circulation improvements at the Daly City BART station plus development of functional plans for a new BART station at Colma. Project manager for design of multi-modal terminal (commuter rail, light rail, bus) at Mission Bay, San Francisco. In Santa Clarita Long Range Transit Development Program, responsible for plan to relocate system's existing timed-transfer hub and development of three satellite transfer hubs. Performed airport ground transportation system evaluations for San Francisco International, Oakland International, Sea-Tac International, Oakland International, Los Angeles International, and San Diego Lindberg.

Campus Transportation. Campus transportation planning assignments for UC Davis, UC Berkeley, UC Santa Cruz and UC San Francisco Medical Center campuses; San Francisco State University; University of San Francisco; and the University of Alaska and others. Also developed master plans for institutional campuses including medical centers, headquarters complexes and research & development facilities.

Special Event Facilities. Evaluations and design studies for football/baseball stadiums, indoor sports arenas, horse and motor racing facilities, theme parks, fairgrounds and convention centers, ski complexes and destination resorts throughout western United States.

Parking. Parking programs and facilities for large area plans and individual sites including downtowns, special event facilities, university and institutional campuses and other large site developments; numerous parking feasibility and operations studies for parking structures and surface facilities; also, resident preferential parking .

Transportation System Management & Traffic Restraint. Project manager on FHWA program to develop techniques and guidelines for neighborhood street traffic limitation. Project manager for Berkeley, (Calif.), Neighborhood Traffic Study, pioneered application of traffic restraint techniques in the U.S. Developed residential traffic plans for Menlo Park, Santa Monica, Santa Cruz, Mill Valley, Oakland, Palo Alto, Piedmont, San Mateo County, Pasadena, Santa Ana and others. Participated in development of photo/radar speed enforcement device and experimented with speed humps. Co-author of Institute of Transportation Engineers reference publication on neighborhood traffic control.

Bicycle Facilities. Project manager to develop an FHWA manual for bicycle facility design and planning, on bikeway plans for Del Mar, (Calif.), the UC Davis and the City of Davis. Consultant to bikeway plans for Eugene, Oregon, Washington, D.C., Buffalo, New York, and Skokie, Illinois. Consultant to U.S. Bureau of Reclamation for development of hydraulically efficient, bicycle safe drainage inlets. Consultant on FHWA research on effective retrofits of undercrossing and overcrossing structures for bicyclists, pedestrians, and handicapped.

MEMBERSHIPS

Institute of Transportation Engineers Transportation Research Board

PUBLICATIONS AND AWARDS

Residential Street Design and Traffic Control, with W. Homburger *et al*. Prentice Hall, 1989.

Co-recipient, Progressive Architecture Citation, *Mission Bay Master Plan*, with I.M. Pei WRT Associated, 1984.

Residential Traffic Management, State of the Art Report, U.S. Department of Transportation, 1979.

Improving The Residential Street Environment, with Donald Appleyard et al., U.S. Department of Transportation, 1979.

Strategic Concepts in Residential Neighborhood Traffic Control, International Symposium on Traffic Control Systems, Berkeley, California, 1979.

Planning and Design of Bicycle Facilities: Pitfalls and New Directions, Transportation Research Board, Research Record 570, 1976.

Co-recipient, Progressive Architecture Award, *Livable Urban Streets, San Francisco Bay Area and London*, with Donald Appleyard, 1979.

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EXHIBIT 3

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

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October 25, 2024

Patrick Soluri
Soluri Meserve Law
510 8th St
Sacramento, CA 95814

Subject: Comments on the Sacramento Upper Westside Specific Plan (SCH No. 2020100069)

Dear Mr. Soluri,

We have reviewed the August 2024 Draft Environmental Impact Report ("DEIR") for the Upper Westside Specific Plan ("Specific Plan") located in the City of Sacramento ("City"). The Specific Plan allows for the future development of 9,356 housing units and over 3,000,000-square-feet ("SF") of commercial, retail, and office uses on the 2,066-acre site.

Our review concludes that the DEIR fails to adequately evaluate the Specific Plan's air quality impacts. As a result, emissions and health risk impacts associated with operation of future projects under the proposed Specific Plan may be underestimated and inadequately addressed. A revised Environmental Impact Report ("EIR") should be prepared to adequately assess and mitigate the potential air quality impacts that the future projects may have on the environment. 19-120

Air Quality

Failure to Implement All Feasible Mitigation to Reduce Emissions

The DEIR estimates that the Specific Plan's operational reactive organic gas ("ROG"), nitrogen oxides ("NO_X"), particulate matter 10 ("PM_{10}"), and particulate matter 2.5 ("$PM_{2.5}$") emissions would exceed the applicable Sacramento Metropolitan Air Quality Management District thresholds (see excerpt below) (p. 6-42, Table AQ-9). 19-121

Table AQ-9: Unmitigated Maximum Project Operation Emissions[1]

	ROG (lbs/day)	NO_X (lbs/day)	PM_{10} (lbs/day)	$PM_{2.5}$ (lbs/day)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)
Existing Conditions (2045)	21	11	10	3	1.8	0.5
Proposed UWSP (2045)[2]	631	241	443	125	77.7	21.9
Net change in Emissions[3]	**610**	**230**	**432**	**122**	**75.8**	**21.4**
SMAQMD Thresholds[4]	65	65	80	82	14.6	15
Significant (Yes or No)?	Yes	Yes	Yes	Yes	Yes	Yes

NOTES:

lbs/day = pounds per day; NO_X = nitrogen oxides; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; PM_{10} = particulate matter 10 microns or less in diameter; ROG = reactive organic gases; SMAQMD = Sacramento Metropolitan Air Quality Management District; tpy = tons per year; UWSP = Upper Westside Specific Plan.

1 Project operational emissions estimates were made using the California Emissions Estimator Model (CalEEMod) version 2020.4.0. See Appendix AQ-1 for model outputs and more detailed assumptions.
2 Emissions have been adjusted using off-model calculations to account for the project not including natural gas hook-ups to single-family residential land uses (ESA 2024).
3 Values in **bold** are more than the applicable SMAQMD significance threshold.
4 SMAQMD's non-zero emissions thresholds for PM_{10} and $PM_{2.5}$ are used to assess the significance of the Project's emissions.

SOURCE: Raney 2024, ESA 2024.

19-121 cont.

The DEIR implements mitigation measure ("MM") AQ-1b, which "require[s] that the project applicant comply with the provisions of the AQMP, and provides a list of all feasible measures that the proposed UWSP can implement to reduce operational emissions" (p. 6-34).

Even with the inclusion of MM AQ-1b, however, the DEIR concludes that impacts associated with the operation of future projects would be significant-and-unavoidable. Specifically, the DEIR states:

> "Although the mobile sources that would be associated with the proposed UWSP are not specifically delineated from the other proposed UWSP sources in Tables AQ-9 and AQ-9, implementation of Mitigation Measure AQ-1b would achieve the 35 percent reduction in NOX and ROG mobile-source emissions feasibility goal relative to unmitigated emissions (see Appendix AQ-1 model outputs). However, as shown in Table AQ-10, emission levels would still exceed the applicable thresholds of significance relative to all criteria pollutants and precursors evaluated, and therefore, the impact would remain significant and unavoidable" (p. 6-44).

19-122

According to California Environmental Quality Act ("CEQA") Guidelines § 15096(g)(2):

> "When an updated EIR has been prepared for a project, the Responsible Agency shall not approve the project as proposed if the agency finds any feasible alternative or feasible

mitigation measures within its powers that would substantially lessen or avoid any significant effect the project would have on the environment."[1]

The DEIR is required under CEQA to implement all feasible mitigation to reduce impacts to the greatest extent viable. While the DEIR implements MM AQ-1b, the DEIR fails to implement all feasible mitigation. The DEIR's conclusion that Specific Plan's air quality emissions would be significant-and-unavoidable may therefore be unsubstantiated.

To reduce future projects' air quality impacts to the maximum extent possible, additional feasible mitigation measures should be incorporated, such as those suggested in the section of this letter below titled "Feasible Mitigation Measures Available to Reduce Emissions." The Specific Plan should not be approved until a revised EIR is prepared, incorporating all feasible mitigation to reduce emissions to the greatest extent possible.

Mitigation

Feasible Mitigation Measures Available to Reduce Emissions

19-122 cont.

The DEIR is required under CEQA to implement all feasible mitigation to reduce the future projects' potential impacts, as referenced above. As the Specific Plan would result in potentially significant operational air quality impacts, we propose additional mitigation measures for the DEIR to consider.

First, to reduce ROG emissions associated with the operation of future projects, we recommend the DEIR consider incorporating the following mitigation used by other land use development projects to address maintenance-related volatile organic compounds ("VOC")/ROG emissions:[2]

- Recycle leftover paint. Take any leftover paint to a household hazardous waste center; do not mix leftover water-based and oil-based paints.
- Keep lids closed on all paint containers when not in use to prevent VOC emissions and excessive odors.
- For water-based paints, clean up with water only. Whenever possible, do not rinse the cleanup water down the drain or pour it directly into the ground or the storm drain
- Use compliant low-VOC cleaning solvents to clean paint application equipment.
- Keep all paint- and solvent-laden rags in sealed containers to prevent VOC emissions.
- Use high-pressure/low-volume paint applicators with a minimum transfer efficiency of at least 50 percent or other application techniques with equivalent or higher transfer efficiency.

[1] "Cal. Code Regs. tit. 14 § 15096." California Legislature, *available at:* https://casetext.com/regulation/california-code-of-regulations/title-14-natural-resources/division-6-resources-agency/chapter-3-guidelines-for-implementation-of-the-california-environmental-quality-act/article-7-eir-process/section-15096-process-for-a-responsible-agency.

[2] "Banning Commerce Center Project." Kimley-Horn and Associates, Inc., June 2024, *available at*: https://ceqanet.opr.ca.gov/2022090102/2; Draft Environmental Impact Report, p. 1-7.

Second, the Environmental Protection Agency explains that NO_x emissions originate from "motor vehicle internal combustion engines and fossil fuel-fired electric utility and industrial boilers" and sources of $PM_{10}/PM_{2.5}$ emissions include "combustion of gasoline, oil, [and] diesel fuel."[3,4] To reduce the NO_x, PM_{10}, $PM_{2.5}$ emissions associated with the operation of future projects, we recommend the DEIR consider incorporating several mitigation measures (see list below).

The California Air Resources Board ("CARB") recommends the following:[5]

- Require tenants to use the cleanest technologies available, and to provide the necessary infrastructure to support zero-emission vehicles and equipment that will be operating on site.
- Requiring all service equipment (e.g., yard hostlers, yard equipment, forklifts, and pallet jacks) used within the project site to be zero-emission. This equipment is widely available and can be purchased using incentive funding from CARB's Clean Off-Road Equipment Voucher Incentive Project (CORE).
- Require future tenants to exclusively use zero-emission light and medium-duty delivery trucks and vans.
- Require all heavy-duty trucks entering or on the project site to be zero-emission vehicles, and be fully zero-emission. A list of commercially available zero-emission trucks can be obtained from the Hybrid and Zero-emission Truck and Bus Voucher Incentive Project (HVIP). Additional incentive funds can be obtained from the Carl Moyer Program and Voucher Incentive Program.
- Require the installation of vegetative walls or other effective barriers that separate loading docks and people living or working nearby.

19-123

In addition to recommending similar mitigation as the above-mentioned measures from CARB, the California Department of Justice ("CA DOJ") suggests:[6]

- Constructing zero-emission truck charging/fueling stations proportional to the number of dock doors at the project.
- Running conduit to designated locations for future electric truck charging stations.
- Oversizing electrical rooms by 25 percent or providing a secondary electrical room to accommodate future expansion of electric vehicle charging capability.

19-124

[3] "Proposed Revisions to the National Ambient Air Quality Standards for Nitrogen Dioxide." EPA, July 2009, *available at*: https://www.gpo.gov/fdsys/pkg/FR-2009-07-15/pdf/E9-15944.pdf.
[4] "Inhalable Particulate Matter and Health (PM2.5 and PM10)." CARB, *available at*: https://ww2.arb.ca.gov/resources/inhalable-particulate-matter-and-health#:~:text=Emissions%20from%20combustion%20of%20gasoline,a%20significant%20proportion%20of%20PM10.
[5] "Recommended Air Pollution Emission Reduction Measures for Warehouses and Distribution Centers." CARB, August 2023, *available at*: https://ww2.arb.ca.gov/sites/default/files/2023-08/CARB%20Comments%20-%20NOP%20for%20the%20%20Oak%20Valley%20North%20Project%20DEIR.pdf; Attachment A, p. 5 – 8.
[6] "Warehouse Projects: Best Practices and Mitigation Measures to Comply with the California Environmental Quality Act." State of California Department of Justice, September 2022, *available at*: https://oag.ca.gov/system/files/media/warehouse-best-practices.pdf, p. 8 – 10.

- Constructing and maintaining electric light-duty vehicle charging stations proportional to the number of employee parking spaces (for example, requiring at least 10% of all employee parking spaces to be equipped with electric vehicle charging stations of at least Level 2 charging performance).
- Running conduit to an additional proportion of employee parking spaces for a future increase in the number of electric light-duty charging stations.
- Sequent future projects under the Proposed Specific Plan shall install Level 2 EV charging stations in 15% of all parking spaces for multi-family developments and pre-wiring to allow for a Level 2 EV charging stations in all single-family residential garages.

19-124 cont.

Additionally, the Specific Plan allows plans for future development of restaurants on the proposed site. South Coast Air Quality Management District ("SCAQMD") Rule 1138 outlines the following requirements for projects that include fast-food charbroilers: [7]

- No person shall operate a new or existing chain-driven charbroiler unless it is equipped and operated with a catalytic oxidizer control device, and the combination charbroiler/catalyst has been tested and certified by the Executive Officer.
- Catalytic oxidizers or other control devices shall be maintained in good working order to minimize visible emissions to the atmosphere, an operated, cleaned, and maintained in accordance with the manufacturer's specifications in a maintenance manual or other written materials supplied by the manufacturer or distributor of the catalyst or other control device, or chain-driven charbroiler.

19-125

Note that while the Specific Plan is not located within the jurisdiction of the SCAQMD, compliance with Rule 1138 would nonetheless decrease future projects' emissions.

We have provided several mitigation measures that would reduce the Specific Plan's ROG, NO_x, $PM_{10,}$ and $PM_{2.5}$ emissions, gathering from sources including CARB, the CA DOJ and others. These measures offer a cost-effective, feasible way to incorporate lower-emitting design features into future projects.

A revised EIR should be prepared that includes all feasible mitigation measures, as well as an updated air quality analysis to ensure that the necessary mitigation measures are implemented.

19-126

Disclaimer

SWAPE has received limited discovery regarding this project. Additional information may become available in the future; thus, we retain the right to revise or amend this report when additional information becomes available. Our professional services have been performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable environmental consultants practicing in this or similar localities at the time of service. No other warranty, expressed or implied, is made as to the scope of work, work methodologies and protocols, site conditions, analytical testing results, and findings presented. This report reflects efforts which were limited to information that was

[7] "Rule 1138. Control Of Emissions from Restaurant Operations." SCAQMD, November 1997, *available at*: https://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1138.pdf, p. 2 – 3.

reasonably accessible at the time of the work, and may contain informational gaps, inconsistencies, or otherwise be incomplete due to the unavailability or uncertainty of information obtained or provided by third parties.

19-126 cont.

Sincerely,

Matt Hagemann, P.G., C.Hg.

Paul E. Rosenfeld, Ph.D.

Attachment A: Matt Hagemann CV
Attachment B: Paul Rosenfeld CV

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

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Geologic and Hydrogeologic Characterization
Investigation and Remediation Strategies
Litigation Support and Testifying Expert
Industrial Stormwater Compliance
CEQA Review

Education:

M.S. Degree, Geology, California State University Los Angeles, Los Angeles, CA, 1984.
B.A. Degree, Geology, Humboldt State University, Arcata, CA, 1982.

Professional Certifications:

California Professional Geologist
California Certified Hydrogeologist
Qualified SWPPP Developer and Practitioner

Professional Experience:

Matt has 30 years of experience in environmental policy, contaminant assessment and remediation, stormwater compliance, and CEQA review. He spent nine years with the U.S. EPA in the RCRA and Superfund programs and served as EPA's Senior Science Policy Advisor in the Western Regional Office where he identified emerging threats to groundwater from perchlorate and MTBE. While with EPA, Matt also served as a Senior Hydrogeologist in the oversight of the assessment of seven major military facilities undergoing base closure. He led numerous enforcement actions under provisions of the Resource Conservation and Recovery Act (RCRA) and directed efforts to improve hydrogeologic characterization and water quality monitoring. For the past 15 years, as a founding partner with SWAPE, Matt has developed extensive client relationships and has managed complex projects that include consultation as an expert witness and a regulatory specialist, and a manager of projects ranging from industrial stormwater compliance to CEQA review of impacts from hazardous waste, air quality and greenhouse gas emissions.

Positions Matt has held include:

- Founding Partner, Soil/Water/Air Protection Enterprise (SWAPE) (2003 – present);
- Geology Instructor, Golden West College, 2010 – 2104, 2017;
- Senior Environmental Analyst, Komex H2O Science, Inc. (2000 -- 2003);

- Executive Director, Orange Coast Watch (2001 – 2004);
- Senior Science Policy Advisor and Hydrogeologist, U.S. Environmental Protection Agency (1989–1998);
- Hydrogeologist, National Park Service, Water Resources Division (1998 – 2000);
- Adjunct Faculty Member, San Francisco State University, Department of Geosciences (1993 – 1998);
- Instructor, College of Marin, Department of Science (1990 – 1995);
- Geologist, U.S. Forest Service (1986 – 1998); and
- Geologist, Dames & Moore (1984 – 1986).

Senior Regulatory and Litigation Support Analyst:

With SWAPE, Matt's responsibilities have included:

- Lead analyst and testifying expert in the review of over 300 environmental impact reports and negative declarations since 2003 under CEQA that identify significant issues with regard to hazardous waste, water resources, water quality, air quality, greenhouse gas emissions, and geologic hazards. Make recommendations for additional mitigation measures to lead agencies at the local and county level to include additional characterization of health risks and implementation of protective measures to reduce worker exposure to hazards from toxins and Valley Fever.
- Stormwater analysis, sampling and best management practice evaluation at more than 100 industrial facilities.
- Expert witness on numerous cases including, for example, perfluorooctanoic acid (PFOA) contamination of groundwater, MTBE litigation, air toxins at hazards at a school, CERCLA compliance in assessment and remediation, and industrial stormwater contamination.
- Technical assistance and litigation support for vapor intrusion concerns.
- Lead analyst and testifying expert in the review of environmental issues in license applications for large solar power plants before the California Energy Commission.
- Manager of a project to evaluate numerous formerly used military sites in the western U.S.
- Manager of a comprehensive evaluation of potential sources of perchlorate contamination in Southern California drinking water wells.
- Manager and designated expert for litigation support under provisions of Proposition 65 in the review of releases of gasoline to sources drinking water at major refineries and hundreds of gas stations throughout California.

With Komex H2O Science Inc., Matt's duties included the following:

- Senior author of a report on the extent of perchlorate contamination that was used in testimony by the former U.S. EPA Administrator and General Counsel.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of MTBE use, research, and regulation.
- Senior researcher in the development of a comprehensive, electronically interactive chronology of perchlorate use, research, and regulation.
- Senior researcher in a study that estimates nationwide costs for MTBE remediation and drinking water treatment, results of which were published in newspapers nationwide and in testimony against provisions of an energy bill that would limit liability for oil companies.
- Research to support litigation to restore drinking water supplies that have been contaminated by MTBE in California and New York.

- Expert witness testimony in a case of oil production-related contamination in Mississippi.
- Lead author for a multi-volume remedial investigation report for an operating school in Los Angeles that met strict regulatory requirements and rigorous deadlines.
- Development of strategic approaches for cleanup of contaminated sites in consultation with clients and regulators.

Executive Director:

As Executive Director with Orange Coast Watch, Matt led efforts to restore water quality at Orange County beaches from multiple sources of contamination including urban runoff and the discharge of wastewater. In reporting to a Board of Directors that included representatives from leading Orange County universities and businesses, Matt prepared issue papers in the areas of treatment and disinfection of wastewater and control of the discharge of grease to sewer systems. Matt actively participated in the development of countywide water quality permits for the control of urban runoff and permits for the discharge of wastewater. Matt worked with other nonprofits to protect and restore water quality, including Surfrider, Natural Resources Defense Council and Orange County CoastKeeper as well as with business institutions including the Orange County Business Council.

Hydrogeology:

As a Senior Hydrogeologist with the U.S. Environmental Protection Agency, Matt led investigations to characterize and cleanup closing military bases, including Mare Island Naval Shipyard, Hunters Point Naval Shipyard, Treasure Island Naval Station, Alameda Naval Station, Moffett Field, Mather Army Airfield, and Sacramento Army Depot. Specific activities were as follows:

- Led efforts to model groundwater flow and contaminant transport, ensured adequacy of monitoring networks, and assessed cleanup alternatives for contaminated sediment, soil, and groundwater.
- Initiated a regional program for evaluation of groundwater sampling practices and laboratory analysis at military bases.
- Identified emerging issues, wrote technical guidance, and assisted in policy and regulation development through work on four national U.S. EPA workgroups, including the Superfund Groundwater Technical Forum and the Federal Facilities Forum.

At the request of the State of Hawaii, Matt developed a methodology to determine the vulnerability of groundwater to contamination on the islands of Maui and Oahu. He used analytical models and a GIS to show zones of vulnerability, and the results were adopted and published by the State of Hawaii and County of Maui.

As a hydrogeologist with the EPA Groundwater Protection Section, Matt worked with provisions of the Safe Drinking Water Act and NEPA to prevent drinking water contamination. Specific activities included the following:

- Received an EPA Bronze Medal for his contribution to the development of national guidance for the protection of drinking water.
- Managed the Sole Source Aquifer Program and protected the drinking water of two communities through designation under the Safe Drinking Water Act. He prepared geologic reports, conducted

public hearings, and responded to public comments from residents who were very concerned about the impact of designation.

- Reviewed a number of Environmental Impact Statements for planned major developments, including large hazardous and solid waste disposal facilities, mine reclamation, and water transfer.

Matt served as a hydrogeologist with the RCRA Hazardous Waste program. Duties were as follows:

- Supervised the hydrogeologic investigation of hazardous waste sites to determine compliance with Subtitle C requirements.
- Reviewed and wrote "part B" permits for the disposal of hazardous waste.
- Conducted RCRA Corrective Action investigations of waste sites and led inspections that formed the basis for significant enforcement actions that were developed in close coordination with U.S. EPA legal counsel.
- Wrote contract specifications and supervised contractor's investigations of waste sites.

With the National Park Service, Matt directed service-wide investigations of contaminant sources to prevent degradation of water quality, including the following tasks:

- Applied pertinent laws and regulations including CERCLA, RCRA, NEPA, NRDA, and the Clean Water Act to control military, mining, and landfill contaminants.
- Conducted watershed-scale investigations of contaminants at parks, including Yellowstone and Olympic National Park.
- Identified high-levels of perchlorate in soil adjacent to a national park in New Mexico and advised park superintendent on appropriate response actions under CERCLA.
- Served as a Park Service representative on the Interagency Perchlorate Steering Committee, a national workgroup.
- Developed a program to conduct environmental compliance audits of all National Parks while serving on a national workgroup.
- Co-authored two papers on the potential for water contamination from the operation of personal watercraft and snowmobiles, these papers serving as the basis for the development of nation-wide policy on the use of these vehicles in National Parks.
- Contributed to the Federal Multi-Agency Source Water Agreement under the Clean Water Action Plan.

Policy:

Served senior management as the Senior Science Policy Advisor with the U.S. Environmental Protection Agency, Region 9.

Activities included the following:

- Advised the Regional Administrator and senior management on emerging issues such as the potential for the gasoline additive MTBE and ammonium perchlorate to contaminate drinking water supplies.
- Shaped EPA's national response to these threats by serving on workgroups and by contributing to guidance, including the Office of Research and Development publication, Oxygenates in Water: Critical Information and Research Needs.
- Improved the technical training of EPA's scientific and engineering staff.
- Earned an EPA Bronze Medal for representing the region's 300 scientists and engineers in negotiations with the Administrator and senior management to better integrate scientific

principles into the policy-making process.
- Established national protocol for the peer review of scientific documents.

Geology:

With the U.S. Forest Service, Matt led investigations to determine hillslope stability of areas proposed for timber harvest in the central Oregon Coast Range. Specific activities were as follows:

- Mapped geology in the field, and used aerial photographic interpretation and mathematical models to determine slope stability.
- Coordinated his research with community members who were concerned with natural resource protection.
- Characterized the geology of an aquifer that serves as the sole source of drinking water for the city of Medford, Oregon.

As a consultant with Dames and Moore, Matt led geologic investigations of two contaminated sites (later listed on the Superfund NPL) in the Portland, Oregon, area and a large hazardous waste site in eastern Oregon. Duties included the following:

- Supervised year-long effort for soil and groundwater sampling.
- Conducted aquifer tests.
- Investigated active faults beneath sites proposed for hazardous waste disposal.

Teaching:

From 1990 to 1998, Matt taught at least one course per semester at the community college and university levels:

- At San Francisco State University, held an adjunct faculty position and taught courses in environmental geology, oceanography (lab and lecture), hydrogeology, and groundwater contamination.
- Served as a committee member for graduate and undergraduate students.
- Taught courses in environmental geology and oceanography at the College of Marin.

Matt is currently a part time geology instructor at Golden West College in Huntington Beach, California where he taught from 2010 to 2014 and in 2017.

Invited Testimony, Reports, Papers and Presentations:

Hagemann, M.F., 2008. Disclosure of Hazardous Waste Issues under CEQA. Presentation to the Public Environmental Law Conference, Eugene, Oregon.

Hagemann, M.F., 2008. Disclosure of Hazardous Waste Issues under CEQA. Invited presentation to U.S. EPA Region 9, San Francisco, California.

Hagemann, M.F., 2005. Use of Electronic Databases in Environmental Regulation, Policy Making and Public Participation. Brownfields 2005, Denver, Coloradao.

Hagemann, M.F., 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Nevada and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Las Vegas, NV (served on conference organizing committee).

Hagemann, M.F., 2004. Invited testimony to a California Senate committee hearing on air toxins at schools in Southern California, Los Angeles.

Brown, A., Farrow, J., Gray, A. and **Hagemann, M.**, 2004. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to the Ground Water and Environmental Law Conference, National Groundwater Association.

Hagemann, M.F., 2004. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in Arizona and the Southwestern U.S. Presentation to a meeting of the American Groundwater Trust, Phoenix, AZ (served on conference organizing committee).

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River and Impacts to Drinking Water in the Southwestern U.S. Invited presentation to a special committee meeting of the National Academy of Sciences, Irvine, CA.

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a tribal EPA meeting, Pechanga, CA.

Hagemann, M.F., 2003. Perchlorate Contamination of the Colorado River. Invited presentation to a meeting of tribal repesentatives, Parker, AZ.

Hagemann, M.F., 2003. Impact of Perchlorate on the Colorado River and Associated Drinking Water Supplies. Invited presentation to the Inter-Tribal Meeting, Torres Martinez Tribe.

Hagemann, M.F., 2003. The Emergence of Perchlorate as a Widespread Drinking Water Contaminant. Invited presentation to the U.S. EPA Region 9.

Hagemann, M.F., 2003. A Deductive Approach to the Assessment of Perchlorate Contamination. Invited presentation to the California Assembly Natural Resources Committee.

Hagemann, M.F., 2003. Perchlorate: A Cold War Legacy in Drinking Water. Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. From Tank to Tap: A Chronology of MTBE in Groundwater. Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. A Chronology of MTBE in Groundwater and an Estimate of Costs to Address Impacts to Groundwater. Presentation to the annual meeting of the Society of Environmental Journalists.

Hagemann, M.F., 2002. An Estimate of the Cost to Address MTBE Contamination in Groundwater (and Who Will Pay). Presentation to a meeting of the National Groundwater Association.

Hagemann, M.F., 2002. An Estimate of Costs to Address MTBE Releases from Underground Storage Tanks and the Resulting Impact to Drinking Water Wells. Presentation to a meeting of the U.S. EPA and State Underground Storage Tank Program managers.

Hagemann, M.F., 2001. From Tank to Tap: A Chronology of MTBE in Groundwater. Unpublished report.

Hagemann, M.F., 2001. Estimated Cleanup Cost for MTBE in Groundwater Used as Drinking Water. Unpublished report.

Hagemann, M.F., 2001. Estimated Costs to Address MTBE Releases from Leaking Underground Storage Tanks. Unpublished report.

Hagemann, M.F., and VanMouwerik, M., 1999. Potential Water Quality Concerns Related to Snowmobile Usage. Water Resources Division, National Park Service, Technical Report.

VanMouwerik, M. and **Hagemann, M.F**. 1999, Water Quality Concerns Related to Personal Watercraft Usage. Water Resources Division, National Park Service, Technical Report.

Hagemann, M.F., 1999, Is Dilution the Solution to Pollution in National Parks? The George Wright Society Biannual Meeting, Asheville, North Carolina.

Hagemann, M.F., 1997, The Potential for MTBE to Contaminate Groundwater. U.S. EPA Superfund Groundwater Technical Forum Annual Meeting, Las Vegas, Nevada.

Hagemann, M.F., and Gill, M., 1996, Impediments to Intrinsic Remediation, Moffett Field Naval Air Station, Conference on Intrinsic Remediation of Chlorinated Hydrocarbons, Salt Lake City.

Hagemann, M.F., Fukunaga, G.L., 1996, The Vulnerability of Groundwater to Anthropogenic Contaminants on the Island of Maui, Hawaii. Hawaii Water Works Association Annual Meeting, Maui, October 1996.

Hagemann, M. F., Fukanaga, G. L., 1996, Ranking Groundwater Vulnerability in Central Oahu, Hawaii. Proceedings, Geographic Information Systems in Environmental Resources Management, Air and Waste Management Association Publication VIP-61.

Hagemann, M.F., 1994. Groundwater Characterization and Cleanup at Closing Military Bases in California. Proceedings, California Groundwater Resources Association Meeting.

Hagemann, M.F. and Sabol, M.A., 1993. Role of the U.S. EPA in the High Plains States Groundwater Recharge Demonstration Program. Proceedings, Sixth Biennial Symposium on the Artificial Recharge of Groundwater.

Hagemann, M.F., 1993. U.S. EPA Policy on the Technical Impracticability of the Cleanup of DNAPL-contaminated Groundwater. California Groundwater Resources Association Meeting.

Hagemann, M.F., 1992. Dense Nonaqueous Phase Liquid Contamination of Groundwater: An Ounce of Prevention... Proceedings, Association of Engineering Geologists Annual Meeting, v. 35.

Other Experience:

Selected as subject matter expert for the California Professional Geologist licensing examinations, 2009-2011.

SWAPE Technical Consultation, Data Analysis and Litigation Support for the Environment

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2656 29th Street, Suite 201
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Paul Rosenfeld, Ph.D.

Chemical Fate and Transport & Air Dispersion Modeling

Principal Environmental Chemist

Risk Assessment & Remediation Specialist

Education

Ph.D. Soil Chemistry, University of Washington, 1999. Dissertation on volatile organic compound filtration.

M.S. Environmental Science, U.C. Berkeley, 1995. Thesis on organic waste economics.

B.A. Environmental Studies, U.C. Santa Barbara, 1991. Focus on wastewater treatment.

Professional Experience

Dr. Rosenfeld has over 25 years of experience conducting environmental investigations and risk assessments for evaluating impacts to human health, property, and ecological receptors. His expertise focuses on the fate and transport of environmental contaminants, human health risk, exposure assessment, and ecological restoration. Dr. Rosenfeld has evaluated and modeled emissions from oil spills, landfills, boilers and incinerators, process stacks, storage tanks, confined animal feeding operations, industrial, military and agricultural sources, unconventional oil drilling operations, and locomotive and construction engines. His project experience ranges from monitoring and modeling of pollution sources to evaluating impacts of pollution on workers at industrial facilities and residents in surrounding communities. Dr. Rosenfeld has also successfully modeled exposure to contaminants distributed by water systems and via vapor intrusion.

Dr. Rosenfeld has investigated and designed remediation programs and risk assessments for contaminated sites containing lead, heavy metals, mold, bacteria, particulate matter, petroleum hydrocarbons, chlorinated solvents, pesticides, radioactive waste, dioxins and furans, semi- and volatile organic compounds, PCBs, PAHs, creosote, perchlorate, asbestos, per- and poly-fluoroalkyl substances (PFOA/PFOS), unusual polymers, fuel oxygenates (MTBE), among other pollutants. Dr. Rosenfeld also has experience evaluating greenhouse gas emissions from various projects and is an expert on the assessment of odors from industrial and agricultural sites, as well as the evaluation of odor nuisance impacts and technologies for abatement of odorous emissions. As a principal scientist at SWAPE, Dr. Rosenfeld directs air dispersion modeling and exposure assessments. He has served as an expert witness and testified about pollution sources causing nuisance and/or personal injury at sites and has testified as an expert witness on numerous cases involving exposure to soil, water and air contaminants from industrial, railroad, agricultural, and military sources.

Professional History:

Soil Water Air Protection Enterprise (SWAPE); 2003 to present; Principal and Founding Partner
UCLA School of Public Health; 2007 to 2011; Lecturer (Assistant Researcher)
UCLA School of Public Health; 2003 to 2006; Adjunct Professor
UCLA Environmental Science and Engineering Program; 2002-2004; Doctoral Intern Coordinator
UCLA Institute of the Environment, 2001-2002; Research Associate
Komex H_2O Science, 2001 to 2003; Senior Remediation Scientist
National Groundwater Association, 2002-2004; Lecturer
San Diego State University, 1999-2001; Adjunct Professor
Anteon Corp., San Diego, 2000-2001; Remediation Project Manager
Ogden (now Amec), San Diego, 2000-2000; Remediation Project Manager
Bechtel, San Diego, California, 1999 – 2000; Risk Assessor
King County, Seattle, 1996 – 1999; Scientist
James River Corp., Washington, 1995-96; Scientist
Big Creek Lumber, Davenport, California, 1995; Scientist
Plumas Corp., California and USFS, Tahoe 1993-1995; Scientist
Peace Corps and World Wildlife Fund, St. Kitts, West Indies, 1991-1993; Scientist

Publications:

Rosenfeld P. E., Spaeth K., Hallman R., Bressler R., Smith, G., (2022) Cancer Risk and Diesel Exhaust Exposure Among Railroad Workers. *Water Air Soil Pollution.* **233,** 171.

Remy, L.L., Clay T., Byers, V., **Rosenfeld P. E.** (2019) Hospital, Health, and Community Burden After Oil Refinery Fires, Richmond, California 2007 and 2012. *Environmental Health.* 18:48

Simons, R.A., Seo, Y. **Rosenfeld, P**., (2015) Modeling the Effect of Refinery Emission On Residential Property Value. Journal of Real Estate Research. 27(3):321-342

Chen, J. A, Zapata A. R., Sutherland A. J., Molmen, D.R., Chow, B. S., Wu, L. E., **Rosenfeld, P. E.,** Hesse, R. C., (2012) Sulfur Dioxide and Volatile Organic Compound Exposure To A Community In Texas City Texas Evaluated Using Aermod and Empirical Data. *American Journal of Environmental Science*, 8(6), 622-632.

Rosenfeld, P.E. & Feng, L. (2011). *The Risks of Hazardous Waste.* Amsterdam: Elsevier Publishing.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2011). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Agrochemical Industry*, Amsterdam: Elsevier Publishing.

Gonzalez, J., Feng, L., Sutherland, A., Waller, C., Sok, H., Hesse, R., **Rosenfeld, P.** (2010). PCBs and Dioxins/Furans in Attic Dust Collected Near Former PCB Production and Secondary Copper Facilities in Sauget, IL. *Procedia Environmental Sciences*. 113–125.

Feng, L., Wu, C., Tam, L., Sutherland, A.J., Clark, J.J., **Rosenfeld, P.E.** (2010). Dioxin and Furan Blood Lipid and Attic Dust Concentrations in Populations Living Near Four Wood Treatment Facilities in the United States. *Journal of Environmental Health*. 73(6), 34-46.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2010). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Wood and Paper Industries.* Amsterdam: Elsevier Publishing.

Cheremisinoff, N.P., & **Rosenfeld, P.E.** (2009). *Handbook of Pollution Prevention and Cleaner Production: Best Practices in the Petroleum Industry*. Amsterdam: Elsevier Publishing.

Wu, C., Tam, L., Clark, J., **Rosenfeld, P**. (2009). Dioxin and furan blood lipid concentrations in populations living near four wood treatment facilities in the United States. *WIT Transactions on Ecology and the Environment, Air Pollution,* 123 (17), 319-327.

Tam L. K.., Wu C. D., Clark J. J. and **Rosenfeld, P.E.** (2008). A Statistical Analysis Of Attic Dust And Blood Lipid Concentrations Of Tetrachloro-p-Dibenzodioxin (TCDD) Toxicity Equivalency Quotients (TEQ) In Two Populations Near Wood Treatment Facilities. *Organohalogen Compounds*, 70, 002252-002255.

Tam L. K.., Wu C. D., Clark J. J. and **Rosenfeld, P.E.** (2008). Methods For Collect Samples For Assessing Dioxins And Other Environmental Contaminants In Attic Dust: A Review. *Organohalogen Compounds*, 70, 000527-000530.

Hensley, A.R. A. Scott, J. J. J. Clark, **Rosenfeld, P.E.** (2007). Attic Dust and Human Blood Samples Collected near a Former Wood Treatment Facility. *Environmental Research*. 105, 194-197.

Rosenfeld, P.E., J. J. J. Clark, A. R. Hensley, M. Suffet. (2007). The Use of an Odor Wheel Classification for Evaluation of Human Health Risk Criteria for Compost Facilities. *Water Science & Technology* 55(5), 345-357.

Rosenfeld, P. E., M. Suffet. (2007). The Anatomy Of Odour Wheels For Odours Of Drinking Water, Wastewater, Compost And The Urban Environment. *Water Science & Technology* 55(5), 335-344.

Sullivan, P. J. Clark, J.J.J., Agardy, F. J., **Rosenfeld, P.E.** (2007). *Toxic Legacy, Synthetic Toxins in the Food, Water, and Air in American Cities.* Boston Massachusetts: Elsevier Publishing

Rosenfeld, P.E., and Suffet I.H. (2004). Control of Compost Odor Using High Carbon Wood Ash. *Water Science and Technology*. 49(9),171-178.

Rosenfeld P. E., J.J. Clark, I.H. (Mel) Suffet (2004). The Value of An Odor-Quality-Wheel Classification Scheme For The Urban Environment. *Water Environment Federation's Technical Exhibition and Conference (WEFTEC) 2004.* New Orleans, October 2-6, 2004.

Rosenfeld, P.E., and Suffet, I.H. (2004). Understanding Odorants Associated With Compost, Biomass Facilities, and the Land Application of Biosolids. *Water Science and Technology*. 49(9), 193-199.

Rosenfeld, P.E., and Suffet I.H. (2004). Control of Compost Odor Using High Carbon Wood Ash, *Water Science and Technology*, 49(9), 171-178.

Rosenfeld, P. E., Grey, M. A., Sellew, P. (2004). Measurement of Biosolids Odor and Odorant Emissions from Windrows, Static Pile and Biofilter. *Water Environment Research*. 76(4), 310-315.

Rosenfeld, P.E., Grey, M and Suffet, M. (2002). Compost Demonstration Project, Sacramento California Using High-Carbon Wood Ash to Control Odor at a Green Materials Composting Facility. *Integrated Waste Management Board Public Affairs Office*, Publications Clearinghouse (MS–6), Sacramento, CA Publication #442-02-008.

Rosenfeld, P.E., and C.L. Henry. (2001). Characterization of odor emissions from three different biosolids. *Water Soil and Air Pollution*. 127(1-4), 173-191.

Rosenfeld, P.E., and Henry C. L., (2000). Wood ash control of odor emissions from biosolids application. *Journal of Environmental Quality.* 29, 1662-1668.

Rosenfeld, P.E., C.L. Henry and D. Bennett. (2001). Wastewater dewatering polymer affect on biosolids odor emissions and microbial activity. *Water Environment Research*. 73(4), 363-367.

Rosenfeld, P.E., and C.L. Henry. (2001). Activated Carbon and Wood Ash Sorption of Wastewater, Compost, and Biosolids Odorants. *Water Environment Research*, 73, 388-393.

Rosenfeld, P.E., and Henry C. L., (2001). High carbon wood ash effect on biosolids microbial activity and odor. *Water Environment Research*. 131(1-4), 247-262.

Chollack, T. and **P. Rosenfeld. (**1998). Compost Amendment Handbook For Landscaping. Prepared for and distributed by the City of Redmond, Washington State.

Rosenfeld, P. E. (1992). The Mount Liamuiga Crater Trail. *Heritage Magazine of St. Kitts*, 3(2).

Rosenfeld, P. E. (1993). High School Biogas Project to Prevent Deforestation On St. Kitts. *Biomass Users Network*, 7(1).

Rosenfeld, P. E. (1998). Characterization, Quantification, and Control of Odor Emissions From Biosolids Application To Forest Soil. Doctoral Thesis. University of Washington College of Forest Resources.

Rosenfeld, P. E. (1994). Potential Utilization of Small Diameter Trees on Sierra County Public Land. Masters thesis reprinted by the Sierra County Economic Council. Sierra County, California.

Rosenfeld, P. E. (1991). How to Build a Small Rural Anaerobic Digester & Uses Of Biogas In The First And Third World. Bachelors Thesis. University of California.

Presentations:

Rosenfeld, P.E., "The science for Perfluorinated Chemicals (PFAS): What makes remediation so hard?" Law Seminars International, (May 9-10, 2018) 800 Fifth Avenue, Suite 101 Seattle, WA.

Rosenfeld, P.E., Sutherland, A; Hesse, R.; Zapata, A. (October 3-6, 2013). Air dispersion modeling of volatile organic emissions from multiple natural gas wells in Decatur, TX. *44th Western Regional Meeting, American Chemical Society.* Lecture conducted from Santa Clara, CA.

Sok, H.L.; Waller, C.C.; Feng, L.; Gonzalez, J.; Sutherland, A.J.; Wisdom-Stack, T.; Sahai, R.K.; Hesse, R.C.; **Rosenfeld, P.E.** (June 20-23, 2010). Atrazine: A Persistent Pesticide in Urban Drinking Water. *Urban Environmental Pollution*. Lecture conducted from Boston, MA.

Feng, L.; Gonzalez, J.; Sok, H.L.; Sutherland, A.J.; Waller, C.C.; Wisdom-Stack, T.; Sahai, R.K.; La, M.; Hesse, R.C.; **Rosenfeld, P.E.** (June 20-23, 2010). Bringing Environmental Justice to East St. Louis, Illinois. *Urban Environmental Pollution.* Lecture conducted from Boston, MA.

Rosenfeld, P.E. (April 19-23, 2009). Perfluoroctanoic Acid (PFOA) and Perfluoroactane Sulfonate (PFOS) Contamination in Drinking Water From the Use of Aqueous Film Forming Foams (AFFF) at Airports in the United States. *2009 Ground Water Summit and 2009 Ground Water Protection Council Spring Meeting*, Lecture conducted from Tuscon, AZ.

Rosenfeld, P.E. (April 19-23, 2009). Cost to Filter Atrazine Contamination from Drinking Water in the United States" Contamination in Drinking Water From the Use of Aqueous Film Forming Foams (AFFF) at Airports in the United States. *2009 Ground Water Summit and 2009 Ground Water Protection Council Spring Meeting*. Lecture conducted from Tuscon, AZ.

Wu, C., Tam, L., Clark, J., **Rosenfeld, P**. (20-22 July, 2009). Dioxin and furan blood lipid concentrations in populations living near four wood treatment facilities in the United States. Brebbia, C.A. and Popov, V., eds., *Air Pollution XVII: Proceedings of the Seventeenth International Conference on Modeling, Monitoring and Management of Air Pollution*. Lecture conducted from Tallinn, Estonia.

Rosenfeld, P. E. (October 15-18, 2007). Moss Point Community Exposure To Contaminants From A Releasing Facility. *The 23rd Annual International Conferences on Soils Sediment and Water.* Platform lecture conducted from University of Massachusetts, Amherst MA.

Rosenfeld, P. E. (October 15-18, 2007). The Repeated Trespass of Tritium-Contaminated Water Into A Surrounding Community Form Repeated Waste Spills From A Nuclear Power Plant. *The 23rd Annual International Conferences on Soils Sediment and Water*. Platform lecture conducted from University of Massachusetts, Amherst MA.

Rosenfeld, P. E. (October 15-18, 2007). Somerville Community Exposure To Contaminants From Wood Treatment Facility Emissions. The *23rd Annual International Conferences on Soils Sediment and Water*. Lecture conducted from University of Massachusetts, Amherst MA.

Rosenfeld P. E. (March 2007). Production, Chemical Properties, Toxicology, & Treatment Case Studies of 1,2,3-Trichloropropane (TCP). *The Association for Environmental Health and Sciences (AEHS) Annual Meeting*. Lecture conducted from San Diego, CA.

Rosenfeld P. E. (March 2007). Blood and Attic Sampling for Dioxin/Furan, PAH, and Metal Exposure in Florala, Alabama. *The AEHS Annual Meeting.* Lecture conducted from San Diego, CA.

Hensley A.R., Scott, A., **Rosenfeld P.E.,** Clark, J.J.J. (August 21 – 25, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *The 26th International Symposium on Halogenated Persistent Organic Pollutants – DIOXIN2006*. Lecture conducted from Radisson SAS Scandinavia Hotel in Oslo Norway.

Hensley A.R., Scott, A., **Rosenfeld P.E.,** Clark, J.J.J. (November 4-8, 2006). Dioxin Containing Attic Dust And Human Blood Samples Collected Near A Former Wood Treatment Facility. *APHA 134 Annual Meeting & Exposition.* Lecture conducted from Boston Massachusetts.

Paul Rosenfeld Ph.D. (October 24-25, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. Mealey's C8/PFOA. *Science, Risk & Litigation Conference.* Lecture conducted from The Rittenhouse Hotel, Philadelphia, PA.

Paul Rosenfeld Ph.D. (September 19, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, *Toxicology and Remediation PEMA Emerging Contaminant Conference*. Lecture conducted from Hilton Hotel, Irvine California.

Paul Rosenfeld Ph.D. (September 19, 2005). Fate, Transport, Toxicity, And Persistence of 1,2,3-TCP. *PEMA Emerging Contaminant Conference.* Lecture conducted from Hilton Hotel in Irvine, California.

Paul Rosenfeld Ph.D. (September 26-27, 2005). Fate, Transport and Persistence of PDBEs. *Mealey's Groundwater Conference.* Lecture conducted from Ritz Carlton Hotel, Marina Del Ray, California.

Paul Rosenfeld Ph.D. (June 7-8, 2005). Fate, Transport and Persistence of PFOA and Related Chemicals. *International Society of Environmental Forensics: Focus On Emerging Contaminants*. Lecture conducted from Sheraton Oceanfront Hotel, Virginia Beach, Virginia.

Paul Rosenfeld Ph.D. (July 21-22, 2005). Fate Transport, Persistence and Toxicology of PFOA and Related Perfluorochemicals. *2005 National Groundwater Association Ground Water And Environmental Law Conference*. Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

Paul Rosenfeld Ph.D. (July 21-22, 2005). Brominated Flame Retardants in Groundwater: Pathways to Human Ingestion, Toxicology and Remediation. *2005 National Groundwater Association Ground Water and Environmental Law Conference.* Lecture conducted from Wyndham Baltimore Inner Harbor, Baltimore Maryland.

Paul Rosenfeld, Ph.D. and James Clark Ph.D. and Rob Hesse R.G. (May 5-6, 2004). Tert-butyl Alcohol Liability and Toxicology, A National Problem and Unquantified Liability. *National Groundwater Association. Environmental Law Conference*. Lecture conducted from Congress Plaza Hotel, Chicago Illinois.

Paul Rosenfeld, Ph.D. (March 2004). Perchlorate Toxicology. *Meeting of the American Groundwater Trust*. Lecture conducted from Phoenix Arizona.

Hagemann, M.F., **Paul Rosenfeld, Ph.D.** and Rob Hesse (2004). Perchlorate Contamination of the Colorado River. *Meeting of tribal representatives*. Lecture conducted from Parker, AZ.

Paul Rosenfeld, Ph.D. (April 7, 2004). A National Damage Assessment Model For PCE and Dry Cleaners. *Drycleaner Symposium. California Ground Water Association*. Lecture conducted from Radison Hotel, Sacramento, California.

Rosenfeld, P. E., Grey, M., (June 2003) Two stage biofilter for biosolids composting odor control. *Seventh International In Situ And On Site Bioremediation Symposium Battelle Conference* Orlando, FL.

Paul Rosenfeld, Ph.D. and James Clark Ph.D. (February 20-21, 2003) Understanding Historical Use, Chemical Properties, Toxicity and Regulatory Guidance of 1,4 Dioxane. *National Groundwater Association. Southwest Focus Conference. Water Supply and Emerging Contaminants*.. Lecture conducted from Hyatt Regency Phoenix Arizona.

Paul Rosenfeld, Ph.D. (February 6-7, 2003). Underground Storage Tank Litigation and Remediation. *California CUPA Forum*. Lecture conducted from Marriott Hotel, Anaheim California.

Paul Rosenfeld, Ph.D. (October 23, 2002) Underground Storage Tank Litigation and Remediation. *EPA Underground Storage Tank Roundtable*. Lecture conducted from Sacramento California.

Rosenfeld, P.E. and Suffet, M. (October 7- 10, 2002). Understanding Odor from Compost, *Wastewater and Industrial Processes. Sixth Annual Symposium On Off Flavors in the Aquatic Environment. International Water Association*. Lecture conducted from Barcelona Spain.

Rosenfeld, P.E. and Suffet, M. (October 7- 10, 2002). Using High Carbon Wood Ash to Control Compost Odor. *Sixth Annual Symposium On Off Flavors in the Aquatic Environment. International Water Association*. Lecture conducted from Barcelona Spain.

Rosenfeld, P.E. and Grey, M. A. (September 22-24, 2002). Biocycle Composting For Coastal Sage Restoration. *Northwest Biosolids Management Association*. Lecture conducted from Vancouver Washington..

Rosenfeld, P.E. and Grey, M. A. (November 11-14, 2002). Using High-Carbon Wood Ash to Control Odor at a Green Materials Composting Facility. *Soil Science Society Annual Conferenc*e. Lecture conducted from Indianapolis, Maryland.

Rosenfeld. P.E. (September 16, 2000). Two stage biofilter for biosolids composting odor control. *Water Environment Federation.* Lecture conducted from Anaheim California.

Rosenfeld. P.E. (October 16, 2000). Wood ash and biofilter control of compost odor. *Biofest.* Lecture conducted from Ocean Shores, California.

Rosenfeld, P.E. (2000). Bioremediation Using Organic Soil Amendments. *California Resource Recovery Association*. Lecture conducted from Sacramento California.

Rosenfeld, P.E., C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation With High-Carbon Wood-Ash. *Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings*. Lecture conducted from Bellevue Washington.

Rosenfeld, P.E., and C.L. Henry. (1999). An evaluation of ash incorporation with biosolids for odor reduction. *Soil Science Society of America*. Lecture conducted from Salt Lake City Utah.

Rosenfeld, P.E., C.L. Henry, R. Harrison. (1998). Comparison of Microbial Activity and Odor Emissions from Three Different Biosolids Applied to Forest Soil. *Brown and Caldwell.* Lecture conducted from Seattle Washington.

Rosenfeld, P.E., C.L. Henry. (1998). Characterization, Quantification, and Control of Odor Emissions from Biosolids Application To Forest Soil. *Biofest.* Lecture conducted from Lake Chelan, Washington.

Rosenfeld, P.E, C.L. Henry, R. Harrison. (1998). Oat and Grass Seed Germination and Nitrogen and Sulfur Emissions Following Biosolids Incorporation With High-Carbon Wood-Ash. Water Environment Federation 12th Annual Residuals and Biosolids Management Conference Proceedings. Lecture conducted from Bellevue Washington.

Rosenfeld, P.E., C.L. Henry, R. B. Harrison, and R. Dills. (1997). Comparison of Odor Emissions From Three Different Biosolids Applied to Forest Soil. *Soil Science Society of America*. Lecture conducted from Anaheim California.

Teaching Experience:

UCLA Department of Environmental Health (Summer 2003 through 20010) Taught Environmental Health Science 100 to students, including undergrad, medical doctors, public health professionals and nurses. Course focused on the health effects of environmental contaminants.

National Ground Water Association, Successful Remediation Technologies. Custom Course in Sante Fe, New Mexico. May 21, 2002. Focused on fate and transport of fuel contaminants associated with underground storage tanks.

National Ground Water Association; Successful Remediation Technologies Course in Chicago Illinois. April 1, 2002. Focused on fate and transport of contaminants associated with Superfund and RCRA sites.

California Integrated Waste Management Board, April and May, 2001. Alternative Landfill Caps Seminar in San Diego, Ventura, and San Francisco. Focused on both prescriptive and innovative landfill cover design.

UCLA Department of Environmental Engineering, February 5, 2002. Seminar on Successful Remediation Technologies focusing on Groundwater Remediation.

University Of Washington, Soil Science Program, Teaching Assistant for several courses including: Soil Chemistry, Organic Soil Amendments, and Soil Stability.

U.C. Berkeley, Environmental Science Program Teaching Assistant for Environmental Science 10.

Academic Grants Awarded:

California Integrated Waste Management Board. $41,000 grant awarded to UCLA Institute of the Environment. Goal: To investigate effect of high carbon wood ash on volatile organic emissions from compost. 2001.

Synagro Technologies, Corona California: $10,000 grant awarded to San Diego State University.
Goal: investigate effect of biosolids for restoration and remediation of degraded coastal sage soils. 2000.

King County, Department of Research and Technology, Washington State. $100,000 grant awarded to University of Washington: Goal: To investigate odor emissions from biosolids application and the effect of polymers and ash on VOC emissions. 1998.

Northwest Biosolids Management Association, Washington State. $20,000 grant awarded to investigate effect of polymers and ash on VOC emissions from biosolids. 1997.

James River Corporation, Oregon: $10,000 grant was awarded to investigate the success of genetically engineered Poplar trees with resistance to round-up. 1996.

United State Forest Service, Tahoe National Forest: $15,000 grant was awarded to investigating fire ecology of the Tahoe National Forest. 1995.

Kellogg Foundation, Washington D.C. $500 grant was awarded to construct a large anaerobic digester on St. Kitts in West Indies. 1993

Deposition and/or Trial Testimony:

In the Superior Court of the State of California, County of San Bernardino
Billy Wildrick, Plaintiff vs. BNSF Railway Company
Case No. CIVDS1711810
Rosenfeld Deposition 10-17-2022

In the State Court of Bibb County, State of Georgia
Richard Hutcherson, Plaintiff vs Norfolk Southern Railway Company
Case No. 10-SCCV-092007
Rosenfeld Deposition 10-6-2022

In the Civil District Court of the Parish of Orleans, State of Louisiana
Millard Clark, Plaintiff vs. Dixie Carriers, Inc. et al.
Case No. 2020-03891
Rosenfeld Deposition 9-15-2022

In The Circuit Court of Livingston County, State of Missouri, Circuit Civil Division
Shirley Ralls, Plaintiff vs. Canadian Pacific Railway and Soo Line Railroad
Case No. 18-LV-CC0020
Rosenfeld Deposition 9-7-2022

In The Circuit Court of the 13th Judicial Circuit Court, Hillsborough County, Florida Civil Division
Jonny C. Daniels, Plaintiff vs. CSX Transportation Inc.
Case No. 20-CA-5502
Rosenfeld Deposition 9-1-2022

In The Circuit Court of St. Louis County, State of Missouri
Kieth Luke et. al. Plaintiff vs. Monsanto Company et. al.
Case No. 19SL-CC03191
Rosenfeld Deposition 8-25-2022

In The Circuit Court of the 13th Judicial Circuit Court, Hillsborough County, Florida Civil Division
Jeffery S. Lamotte, Plaintiff vs. CSX Transportation Inc.
Case No. NO. 20-CA-0049
Rosenfeld Deposition 8-22-2022

In State of Minnesota District Court, County of St. Louis Sixth Judicial District
Greg Bean, Plaintiff vs. Soo Line Railroad Company
Case No. 69-DU-CV-21-760
Rosenfeld Deposition 8-17-2022

In United States District Court Western District of Washington at Tacoma, Washington
John D. Fitzgerald Plaintiff vs. BNSF
Case No. 3:21-cv-05288-RJB
Rosenfeld Deposition 8-11-2022

In Circuit Court of the Sixth Judicial Circuit, Macon Illinois
Rocky Bennyhoff Plaintiff vs. Norfolk Southern
Case No. 20-L-56
Rosenfeld Deposition 8-3-2022

In Court of Common Pleas, Hamilton County Ohio
Joe Briggins Plaintiff vs. CSX
Case No. A2004464
Rosenfeld Deposition 6-17-2022

In the Superior Court of the State of California, County of Kern
George LaFazia vs. BNSF Railway Company.
Case No. BCV-19-103087
Rosenfeld Deposition 5-17-2022

In the Circuit Court of Cook County Illinois
Bobby Earles vs. Penn Central et. al.
Case No. 2020-L-000550
Rosenfeld Deposition 4-16-2022

In United States District Court Easter District of Florida
Albert Hartman Plaintiff vs. Illinois Central
Case No. 2:20-cv-1633
Rosenfeld Deposition 4-4-2022

In the Circuit Court of the 4th Judicial Circuit, in and For Duval County, Florida
Barbara Steele vs. CSX Transportation
Case No.16-219-Ca-008796
Rosenfeld Deposition 3-15-2022

In United States District Court Easter District of New York
Romano et al. vs. Northrup Grumman Corporation
Case No. 16-cv-5760
Rosenfeld Deposition 3-10-2022

In the Circuit Court of Cook County Illinois
Linda Benjamin vs. Illinois Central
Case No. No. 2019 L 007599
Rosenfeld Deposition 1-26-2022

In the Circuit Court of Cook County Illinois
Donald Smith vs. Illinois Central
Case No. No. 2019 L 003426
Rosenfeld Deposition 1-24-2022

In the Circuit Court of Cook County Illinois
Jan Holeman vs. BNSF
Case No. 2019 L 000675
Rosenfeld Deposition 1-18-2022

In the State Court of Bibb County State of Georgia
Dwayne B. Garrett vs. Norfolk Southern
Case No. 20-SCCV-091232
Rosenfeld Deposition 11-10-2021

In the Circuit Court of Cook County Illinois
Joseph Ruepke vs. BNSF
Case No. 2019 L 007730
Rosenfeld Deposition 11-5-2021

In the United States District Court For the District of Nebraska
Steven Gillett vs. BNSF
Case No. 4:20-cv-03120
Rosenfeld Deposition 10-28-2021

In the Montana Thirteenth District Court of Yellowstone County
James Eadus vs. Soo Line Railroad and BNSF
Case No. DV 19-1056
Rosenfeld Deposition 10-21-2021

In the Circuit Court Of The Twentieth Judicial Circuit, St Clair County, Illinois
Martha Custer et al.cvs. Cerro Flow Products, Inc.
Case No. 0i9-L-2295
Rosenfeld Deposition 5-14-2021
Trial October 8-4-2021

In the Circuit Court of Cook County Illinois
Joseph Rafferty vs. Consolidated Rail Corporation and National Railroad Passenger Corporation d/b/a AMTRAK,
Case No. 18-L-6845
Rosenfeld Deposition 6-28-2021

In the United States District Court For the Northern District of Illinois
Theresa Romcoe vs. Northeast Illinois Regional Commuter Railroad Corporation d/b/a METRA Rail
Case No. 17-cv-8517
Rosenfeld Deposition 5-25-2021

In the Superior Court of the State of Arizona In and For the Cunty of Maricopa
Mary Tryon et al. vs. The City of Pheonix v. Cox Cactus Farm, L.L.C., Utah Shelter Systems, Inc.
Case No. CV20127-094749
Rosenfeld Deposition 5-7-2021

In the United States District Court for the Eastern District of Texas Beaumont Division
Robinson, Jeremy et al vs. CNA Insurance Company et al.
Case No. 1:17-cv-000508
Rosenfeld Deposition 3-25-2021

In the Superior Court of the State of California, County of San Bernardino
Gary Garner, Personal Representative for the Estate of Melvin Garner vs. BNSF Railway Company.
Case No. 1720288
Rosenfeld Deposition 2-23-2021

In the Superior Court of the State of California, County of Los Angeles, Spring Street Courthouse
Benny M Rodriguez vs. Union Pacific Railroad, A Corporation, et al.
Case No. 18STCV01162
Rosenfeld Deposition 12-23-2020

In the Circuit Court of Jackson County, Missouri
Karen Cornwell, Plaintiff, vs. Marathon Petroleum, LP, Defendant.
Case No. 1716-CV10006
Rosenfeld Deposition 8-30-2019

In the United States District Court For The District of New Jersey
Duarte et al, Plaintiffs, vs. United States Metals Refining Company et. al. Defendant.
Case No. 2:17-cv-01624-ES-SCM
Rosenfeld Deposition 6-7-2019

In the United States District Court of Southern District of Texas Galveston Division
M/T Carla Maersk vs. Conti 168., Schiffahrts-GMBH & Co. Bulker KG MS "Conti Perdido" Defendant.
Case No. 3:15-CV-00106 consolidated with 3:15-CV-00237
Rosenfeld Deposition 5-9-2019

In The Superior Court of the State of California In And For The County Of Los Angeles – Santa Monica
Carole-Taddeo-Bates et al., vs. Ifran Khan et al., Defendants
Case No. BC615636
Rosenfeld Deposition 1-26-2019

In The Superior Court of the State of California In And For The County Of Los Angeles – Santa Monica
The San Gabriel Valley Council of Governments et al. vs El Adobe Apts. Inc. et al., Defendants
Case No. BC646857
Rosenfeld Deposition 10-6-2018; Trial 3-7-19

In United States District Court For The District of Colorado
Bells et al. Plaintiffs vs. The 3M Company et al., Defendants
Case No. 1:16-cv-02531-RBJ
Rosenfeld Deposition 3-15-2018 and 4-3-2018

In The District Court Of Regan County, Texas, 112th Judicial District
Phillip Bales et al., Plaintiff vs. Dow Agrosciences, LLC, et al., Defendants
Cause No. 1923
Rosenfeld Deposition 11-17-2017

In The Superior Court of the State of California In And For The County Of Contra Costa
Simons et al., Plaintifs vs. Chevron Corporation, et al., Defendants
Cause No. C12-01481
Rosenfeld Deposition 11-20-2017

In The Circuit Court Of The Twentieth Judicial Circuit, St Clair County, Illinois
Martha Custer et al., Plaintiff vs. Cerro Flow Products, Inc., Defendants
Case No.: No. 0i9-L-2295
Rosenfeld Deposition 8-23-2017

In United States District Court For The Southern District of Mississippi
Guy Manuel vs. The BP Exploration et al., Defendants
Case No. 1:19-cv-00315-RHW
Rosenfeld Deposition 4-22-2020

In The Superior Court of the State of California, For The County of Los Angeles
Warrn Gilbert and Penny Gilber, Plaintiff vs. BMW of North America LLC
Case No. LC102019 (c/w BC582154)
Rosenfeld Deposition 8-16-2017, Trail 8-28-2018

In the Northern District Court of Mississippi, Greenville Division
Brenda J. Cooper, et al., Plaintiffs, vs. Meritor Inc., et al., Defendants
Case No. 4:16-cv-52-DMB-JVM
Rosenfeld Deposition July 2017

In The Superior Court of the State of Washington, County of Snohomish
Michael Davis and Julie Davis et al., Plaintiff vs. Cedar Grove Composting Inc., Defendants
Case No. 13-2-03987-5
Rosenfeld Deposition, February 2017
Trial March 2017

In The Superior Court of the State of California, County of Alameda
Charles Spain., Plaintiff vs. Thermo Fisher Scientific, et al., Defendants
Case No. RG14711115
Rosenfeld Deposition September 2015

In The Iowa District Court In And For Poweshiek County
Russell D. Winburn, et al., Plaintiffs vs. Doug Hoksbergen, et al., Defendants
Case No. LALA002187
Rosenfeld Deposition August 2015

In The Circuit Court of Ohio County, West Virginia
Robert Andrews, et al. v. Antero, et al.
Civil Action No. 14-C-30000
Rosenfeld Deposition June 2015

In The Iowa District Court for Muscatine County
Laurie Freeman et. al. Plaintiffs vs. Grain Processing Corporation, Defendant
Case No. 4980
Rosenfeld Deposition May 2015

In the Circuit Court of the 17th Judicial Circuit, in and For Broward County, Florida
Walter Hinton, et. al. Plaintiff, vs. City of Fort Lauderdale, Florida, a Municipality, Defendant.
Case No. CACE07030358 (26)
Rosenfeld Deposition December 2014

In the County Court of Dallas County Texas
Lisa Parr et al, Plaintiff, vs. Aruba et al, Defendant.
Case No. cc-11-01650-E
Rosenfeld Deposition: March and September 2013
Rosenfeld Trial April 2014

In the Court of Common Pleas of Tuscarawas County Ohio
John Michael Abicht, et al., Plaintiffs, vs. Republic Services, Inc., et al., Defendants
Case No. 2008 CT 10 0741 (Cons. w/ 2009 CV 10 0987)
Rosenfeld Deposition October 2012

In the United States District Court for the Middle District of Alabama, Northern Division
James K. Benefield, et al., Plaintiffs, vs. International Paper Company, Defendant.
Civil Action No. 2:09-cv-232-WHA-TFM
Rosenfeld Deposition July 2010, June 2011

In the Circuit Court of Jefferson County Alabama
Jaeanette Moss Anthony, et al., Plaintiffs, vs. Drummond Company Inc., et al., Defendants
Civil Action No. CV 2008-2076
Rosenfeld Deposition September 2010

In the United States District Court, Western District Lafayette Division
Ackle et al., Plaintiffs, vs. Citgo Petroleum Corporation, et al., Defendants.
Case No. 2:07CV1052
Rosenfeld Deposition July 2009

EXHIBIT 4

201813610298

Secretary of State
Articles of Organization
Limited Liability Company (LLC)

LLC-1

FILED
Secretary of State
State of California
MAY 15 2018

IMPORTANT — Read Instructions before completing this form.

Filing Fee – $70.00

Copy Fees – First page $1.00; each attachment page $0.50;
Certification Fee - $5.00

Note: LLCs may have to pay minimum $800 tax to the California Franchise Tax Board each year. For more information, go to *https://www.ftb.ca.gov.*

ICC This Space For Office Use Only

1. Limited Liability Company Name (See Instructions – Must contain an LLC ending such as LLC or L.L.C. "LLC" will be added, if not included.)

UPPER WESTSIDE, LLC

2. Business Addresses

a. Initial Street Address of Designated Office in California - Do not enter a P.O. Box	City (no abbreviations)	State	Zip Code
401 WATT AVENUE, SUITE 4	Sacramento	CA	95864
b. Initial Mailing Address of LLC, if different than Item 2a	**City (no abbreviations)**	**State**	**Zip Code**

3. Service of Process (Must provide either Individual OR Corporation.)

INDIVIDUAL – Complete Items 3a and 3b only. Must include agent's full name and California street address.

a. California Agent's First Name (if agent is not a corporation)	Middle Name	Last Name	Suffix
GARY	G	PERRY	

b. Street Address (if agent is not a corporation) - Do not enter a P.O. Box	City (no abbreviations)	State	Zip Code
2251 FAIR OAKS BLVD., SUITE 200	Sacramento	CA	95825

CORPORATION – Complete Item 3c. Only include the name of the registered agent Corporation.

c. California Registered Corporate Agent's Name (if agent is a corporation) – Do not complete Item 3a or 3b

4. Management (Select **only** one box)

The LLC will be managed by:

☑ One Manager ☐ More than One Manager ☐ All LLC Member(s)

5. Purpose Statement (Do not alter Purpose Statement)

The purpose of the limited liability company is to engage in any lawful act or activity for which a limited liability company may be organized under the California Revised Uniform Limited Liability Company Act.

6. The information contained herein, including in any attachments, is true and correct.

Organizer sign here

GARY G. PERRY, ESQ.
Print your name here

EXHIBIT 5

El Centro Rd, Sacramento, CA 95833, Sacramento County

Expired Listing

APN: 274-0010-056-0000 CLIP: 3103332894

Beds	Full Baths	Half Baths	Sale Price	Sale Date
N/A	**N/A**	**N/A**	**$909,500**	**05/14/2019**
Bldg Sq Ft	**Lot Sq Ft**	**Yr Built**	**Type**	
N/A	**1,378,238**	**N/A**	**AGR LND**	

OWNER INFORMATION

Owner Name	**Upper Westside LLC**	Tax Billing Zip	**95864**
Owner Name 2		Tax Billing ZIP + 4 Code	
Tax Billing Address	**401 Watt Ave**	Owner Occupied	
Tax Billing City & State	**Sacramento, CA**	Mail Opt Out Flag	

COMMUNITY INSIGHTS

Median Home Value	**$730,313**	School District	**NATOMAS UNIFIED**
Median Home Value Rating	**8 / 10**	Family Friendly Score	**64 / 100**
Total Crime Risk Score (for the neighborhood, relative to the nation)	**41 / 100**	Walkable Score	**12 / 100**
Total Incidents (1 yr)	**67**	Q1 Home Price Forecast	**$680,954**
Standardized Test Rank	**39 / 100**	Last 2 Yr Home Appreciation	**34%**

LOCATION INFORMATION

Census Tract	**70.17**	Topography	
Tract Number		Traffic	
Mailing Carrier Route		School District	**Natomas**
Subdivision	**Natomas Riverside Sub 2**	Comm College District Code	**Los Rios Jt**
Zoning	**AG40**	Elementary School District	
Section		Flood Zone Code	**A**
Map Page/Grid		Flood Zone Panel	**06067C0160J**
Location Influence		Flood Zone Date	**06/16/2015**
Neighborhood Code	**M-M**	Within 250 Feet of Multiple Flood Zone	**No**

TAX INFORMATION

APN	**274-0010-056-0000**	Block ID	
Tax Area	**95009**	Lot #	**38**
Tax Appraisal Area		% Improved	
Water Tax Dist	**County**	Homestead Percent	
Fire Dept Tax Dist	**Natomas**	Exemption(s)	
Legal Description	**POR OF LOT 38 NATOMAS RIVER SIDE SUB 2 BEG AT PTON E LINE S 0%15'30"E 95.04 FT FROM NE COR OF LOT 38 TH N 89%57'W 1117.77 FT TH S 0%03'W 1242.26 FTTO S LINE TH N 89%38'30"E TO SE COR OF LOT 38 TH N 0%15'30"W TO POB**		

ASSESSMENT & TAX

Assessment Year	2024	2023	2022
Assessed Value - Total	**$873,275**	**$856,152**	**$839,365**
Assessed Value - Land	**$873,275**	**$856,152**	**$839,365**
Assessed Value - Improved			
YOY Assessed Change ($)	**$17,123**	**$16,787**	
YOY Assessed Change (%)	**2%**	**2%**	
Exempt Building Value			
Exempt Land Value			
Exempt Total Value			

Tax Year	Total Tax	Change ($)	Change (%)
2021	**$11,537**		
2022	**$11,429**	**-$108**	**-0.94%**
2023	**$12,381**	**$952**	**8.33%**

Jurisdiction	Tax Type	Tax Amount	Tax Rate
Rd 1000 Stormwater Service Fee	**Actual**	**$1,047.46**	
Safca Consolidated Capital Ass	**Actual**	**$529.80**	

Safca O & M Assessment #1	**Actual**	**$391.20**
Reclamation District #1000 M	**Actual**	**$218.32**
Safca Natomas Basin Dist	**Actual**	**$129.84**
Csa 1 Lights Sacunincorp Zone	**Actual**	**$2.56**
Total Of Special Assessments	**Actual**	**$2,319.18**

CHARACTERISTICS

Lot Frontage		Heat Type	
Lot Depth		Heat Fuel Type	
Lot Acres	**31.64**	Patio Type	
Lot Sq Ft	**1,378,238**	Parking Spaces	
Style		Garage Type	
Gross Area		Garage Capacity	
Building Sq Ft		Garage Sq Ft	
Above Gnd Sq Ft		Roof Material	
Ground Floor Area		Construction	
2nd Floor Area		Exterior	
Basement Sq. Ft.		Floor Cover	
Stories		Foundation	
Condition		Pool	
Quality		Pool Size	
Total Units		Year Built	
Total Rooms		Effective Year Built	
Bedrooms		Other Impvs	
Total Baths		Other Rooms	
Full Baths		Equipment	
Half Baths		Condo Amenities	
Fireplace		Building Class	
Fireplace Count		Building Type	
Water		County Use Code	**Vacant-Agricultural**
Sewer		Universal Land Use	**Agricultural Land**
Cooling Type		# of Buildings	

SELL SCORE

Rating		Value As Of	**2024-10-06 04:32:40**
Sell Score			

LISTING INFORMATION

Listing Number	17041396	Selling Date	
Status	**Expired**	Selling Price	
Status Change Date	**12/31/2017**	Listing Agent Name	
Listing Date	**07/01/2017**	Listing Office Name	**SHERWOOD REALTY**
Listing Price	**$900,750**	Selling Broker Name	
Original Listing Price	**$949,200**	Selling Agent Name	
Pending Date		Listing Cancellation Date	

Listing Number	
Status	
Listing Date	
Listing Price	
Original Listing Price	
Selling Date	
Selling Price	
Listing Expiration Date	
Listing Cancellation Date	

LAST MARKET SALE & SALES HISTORY

Recording Date	**05/20/2019**	Sale Type	**Full**
Settle Date	**05/14/2019**	Deed Type	**Grant Deed**
Sale Price	**$909,500**	Owner Name	**Upper Westside LLC**
Price Per Sq Ft		Owner Name 2	
Multi/Split Sale	**Multi**	Seller Name	**Bastiao Kathryn A Trust**
Document Number	1905200311	Title Company	**Stewart Title/Sacramento**

Recording Date	05/20/2019	04/03/2019	08/09/2018	12/08/2017	08/30/2016

Settle Date	**05/14/2019**	**03/21/2019**	**07/24/2018**	**10/31/2017**	**08/16/2016**
Sale Price	**$909,500**				
Nominal		**Y**	**Y**	**Y**	**Y**
Multi/Split Sale Type	**Multi**	**Multi**	**Multiple**	**Multiple**	**Multiple**
Owner Name	**Upper Westside LLC**	**Bastiao Kathryn A Trust**	**Bastiao Kathryn A Trust**	**Reynoso Cynthia A Trust**	**Bastiao Kathryn A**
Seller Name	**Bastiao Kathryn A Trust**	**Enos Ray**	**Bastiao Kathryn A**	**Reynoso Cynthia A**	**Bastiao Elvira J 1997 Trust**
Document Number	**1905200311**	**1904030578**	**1808091393**	**1712080179**	**160830-1661**
Deed Type	**Grant Deed**	**Quit Claim Deed**	**Grant Deed**	**Grant Deed**	**Correction Deed**
Title Company	**Stewart Title/Sacramento**	**Stewart Title/Sacramento**	**Attorney Only**	**Attorney Only**	**Attorney Only**

Recording Date	08/30/2016	07/13/2016	07/13/2016
Settle Date	**08/11/2016**	**06/15/2016**	**06/15/2016**
Sale Price			
Nominal	**Y**	**Y**	**Y**
Multi/Split Sale Type	**Multiple**	**Multiple**	**Multiple**
Owner Name	**Bastiao Kathryn A**	**Bastiao Kathryn A**	**Bastiao Kathryn A**
Seller Name	**Bastiao Manuel J Trust**	**Bastiao Manuel J Trust**	**Bastiao E J 1997 Trust**
Document Number	**160830-1660**	**160713-804**	**160713-798**
Deed Type	**Correction Deed**	**Trustee Deed**	**Trustee Deed**
Title Company	**Attorney Only**	**Attorney Only**	**Attorney Only**

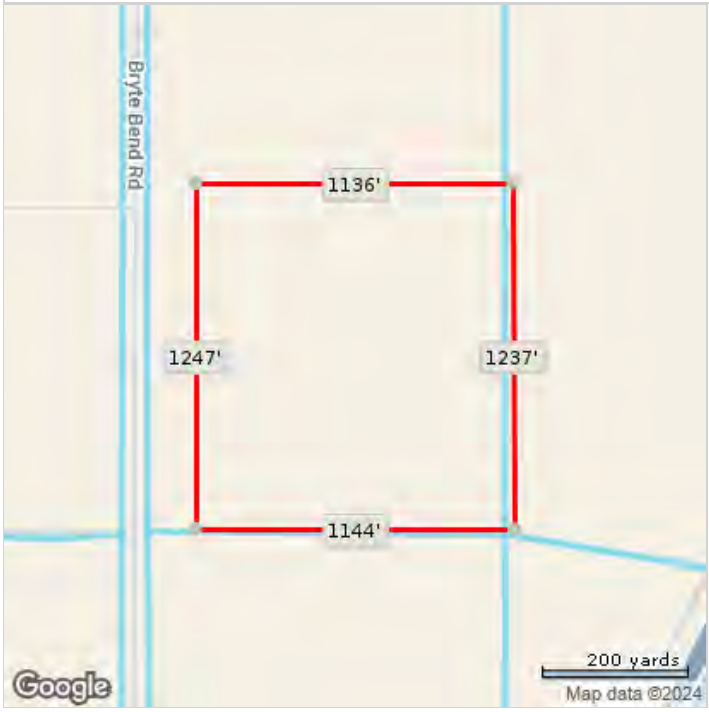
MORTGAGE HISTORY

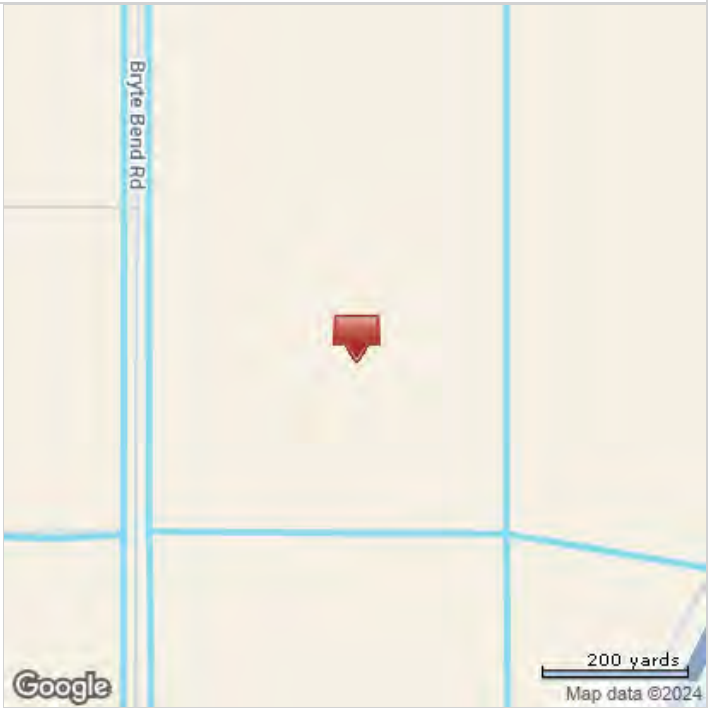
Mortgage Date
Mortgage Amount
Mortgage Lender
Borrower Name
Borrower Name 2
Mortgage Purpose
Mortgage Type
Interest Rate Type
Mortgage Int Rate
Mortgage Term
Mortgage Term Code

FORECLOSURE HISTORY

Document Type
Default Date
Foreclosure Filing Date
Recording Date
Document Number
Book Number
Page Number
Default Amount
Final Judgment Amount
Original Doc Date
Original Document Number
Original Book Page
Lien Type

PROPERTY MAP





*Lot Dimensions are Estimated

EXHIBIT 6

18-710194

Secretary of State
Statement of Information
(Limited Liability Company)

LLC-12

107SA

FILED
Secretary of State
State of California

MAY 21 2018

26/20/cc

Above Space For Office Use Only

IMPORTANT — This form can be filed online at *bizfile.sos.ca.gov*.

Read instructions **before completing this form.**

Filing Fee – $20.00

Copy Fees – First page $1.00; each attachment page $0.50; Certification Fee - $5.00 plus copy fees

1. Limited Liability Company Name (Enter the exact name of the LLC. If you registered in California using an alternate name, see *instructions*.)

UPPER WESTSIDE, LLC

2. 12-Digit Secretary of State Entity (File) Number	3. State, Foreign Country or Place of Organization (only if formed outside of California)
201813610298	CALIFORNIA

4. Business Addresses

	City (no abbreviations)	State	Zip Code
a. Street Address of Principal Office - Do not list a P.O. Box 401 WATT AVENUE, SUITE 4	SACRAMENTO	CA	95864
b. Mailing Address of LLC, If different than item 4a	City (no abbreviations)	State	Zip Code
c. Street Address of California Office, if Item 4a is not in California - Do not list a P.O. Box	City (no abbreviations)	State CA	Zip Code

5. Manager(s) or Member(s) If no managers have been appointed or elected, provide the name and address of each member. At least one name and address must be listed. If the manager/member is an individual, complete Items 5a and 5c (leave Item 5b blank). If the manager/member is an entity, complete Items 5b and 5c (leave Item 5a blank). Note: The LLC cannot serve as its own manager or member. If the LLC has additional managers/members, enter the name(s) and address(es) on *Form LLC-12A*.

a. First Name, if an individual - Do not complete Item 5b	Middle Name	Last Name	Suffix
STEVEN	A	GIDARO	
b. Entity Name - Do not complete Item 5a			
c. Address	City (no abbreviations)	State	Zip Code
401 WATT AVENUE, SUITE 4	SACRAMENTO	CA	95864

6. Service of Process (Must provide either Individual OR Corporation.)

INDIVIDUAL – Complete Items 6a and 6b only. Must include agent's full name and California street address.

a. California Agent's First Name (if agent is not a corporation)	Middle Name	Last Name	Suffix
GARY	G	PERRY	
b. Street Address (if agent is not a corporation) - Do not enter a P.O. Box	City (no abbreviations)	State	Zip Code
401 WATT AVENUE, SUITE 4	SACRAMENTO	CA	95864

CORPORATION – Complete Item 6c only. Only include the name of the registered agent Corporation.

c. California Registered Corporate Agent's Name (if agent is a corporation) – Do not complete Item 6a or 6b

7. Type of Business

Describe the type of business or services of the Limited Liability Company

REAL ESTATE DEVELOPMENT

8. Chief Executive Officer, if elected or appointed

a. First Name	Middle Name	Last Name	Suffix
b. Address	City (no abbreviations)	State	Zip Code

9. The information contained herein, including any attachments made part of this document, is true and correct.

Date	Type or Print Name of Person Completing the Form	Title	Signature
5-17-18	GARY G. PERRY	ATTORNEY	

EXHIBIT 7

Business Search

*The California Business Search provides access to available information for **corporations**, **limited liability companies** and **limited partnerships** of record with the California Secretary of State, with **free PDF copies** of over 17 million imaged business entity documents, including the most recent imaged Statements of Information filed for Corporations and Limited Liability Companies.*

*Currently, information for Limited Liability Partnerships (e.g. law firms, architecture firms, engineering firms, public accountancy firms, and land survey firms), General Partnerships, and other entity types are **not contained** in the California Business Search. If you wish to obtain information about LLPs and GPs, submit a Business Entities Order paper form to request copies of filings for these entity types. Note: This search is not intended to serve as a name reservation search. To reserve an entity name, select Forms on the left panel and select Entity Name Reservation ? Corporation, LLC, LP.*

Basic Search

*A Basic search can be performed using an entity name or entity number. When conducting a search by an entity number, where applicable, **remove "C"** from the entity number. Note, **a basic search** will search **only ACTIVE entities** (Corporations, Limited Liability Companies, Limited Partnerships, Cooperatives, Name Reservations, Foreign Name*

UPPER WESTSIDE, LLC (201813610298)

Request Certificate

Initial Filing Date	05/15/2018
Status	Active
Standing - SOS	Good
Standing - FTB	Good
Standing - Agent	Good
Standing - VCFCF	Good
Formed In	CALIFORNIA
Entity Type	Limited Liability Company - CA
Principal Address	401 WATT AVE STE 4 SACRAMENTO, CA 95864
Mailing Address	401 WATT AVE STE 4 SACRAMENTO,CA95864
Statement of Info Due Date	05/31/2022
Agent	Individual GARY G PERRY 401 WATT AVE STE 4 SACRAMENTO, CA 95864

View History

Request Access

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Advanced Search

An Advanced search is required when searching for publicly traded disclosure information or a status other than active.

An Advanced search allows for searching by specific entity types (e.g., Nonprofit Mutual Benefit Corporation) or by entity groups (e.g., All Corporations) as well as searching by ?begins with? specific search criteria.

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Although every attempt has been made to ensure that the information contained in the database is accurate, the Secretary of State's office is not responsible for any loss, consequence, or damage resulting directly or indirectly from reliance on the accuracy, reliability, or timeliness of the information that is provided. All such information is provided "as is." To order certified copies or certificates of status, (1) locate an entity using the search; (2)select Request Certificate in the right-

UPPER WESTSIDE, LLC (201813610298)

Request Certificate

Initial Filing Date	05/15/2018
Status	Active
Standing - SOS	Good
Standing - FTB	Good
Standing - Agent	Good
Standing - VCFCF	Good
Formed In	CALIFORNIA
Entity Type	Limited Liability Company - CA
Principal Address	401 WATT AVE STE 4 SACRAMENTO, CA 95864
Mailing Address	401 WATT AVE STE 4 SACRAMENTO,CA95864
Statement of Info Due Date	05/31/2022
Agent	Individual GARY G PERRY 401 WATT AVE STE 4 SACRAMENTO, CA 95864

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Entity Information	Initial Filing Date
UPPER WESTSIDE, LLC (201813610298)	05/15/2018

UPPER WESTSIDE, LLC (201813610298)

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Statement of Info Due Date	05/31/2022
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EXHIBIT 8

Planning and Environmental Review

Natomas Joint Vision Brief History

The Natomas Joint Vision project has been withdrawn and individual landowners have moved forward with their own projects:

- Grand Park Specific Plan
- Upper Westside Specific Plan

Brief Project History and Overview of the Natomas Joint Vision

Competition to Collaboration

In the late 1990s Sacramento City and County were both pursuing projects that would urbanize a substantial portion of the Natomas Basin. Both jurisdictions decided, however, that it would be mutually beneficial to plan the area cooperatively. Starting in 2001, City and County staff met to discuss a process for planning the unincorporated Natomas area. This gave rise to the City/County Joint Vision for Natomas. The two jurisdictions coordinated and along with input from stakeholders created the basic principles for development in the area.

View Miscellaneous Background Information - Prepared 1-13-2011

City - County Memorandum of Understanding

On December 10, 2002 the County Board of Supervisors and the Sacramento City Council each approved a Memorandum of Understanding (MOU) that outlined a joint vision for land use and revenue sharing principles for Natomas. The MOU recognized the City as the agent of development and the County as the agent of permanent open space, habitat, and farmland/ranchland preservation. View City-County MOU

The MOU defined a set of guiding principles for the implementation of the following goals:

- Proactively guide future urban growth for more efficient use of the land, while securing permanent preservation of open space/farmland at a mitigation ratio of at least one-to-one.

- Improve future air quality through efficient land use, which reduces automobile travel by accommodating future growth according to Smart Growth principles adopted by City Council (Smart Growth Principles/Resolution).
- Provide for revenue sharing between the City and County to prevent competition for tax revenues and promote balanced regional planning.
- Protect future airport operations.

Project Phases

1. The 2002 City-County Memorandum of Understanding and the Open Space Program **(complete)**
2. The Broad Visioning Process **(complete)**
3. An inclusive public stakeholder process to prepare **(in progress)**
   a. A conservation strategy amd initiate a new or amended habitat conservation plan (HCP)
   b. CEQA documents
   c. City and County General Plan amendments
   d. A specific/master plan
   e. Amendment of City's Sphere of Influence or County's Urban Services Boundary
4. Annexation or amendment to County's Urban Policy Area and completion of a new or amended HCP
5. Implementation of development projects

Important Links

- **Natomas Owners Group:** A private website provided by land owners in the Natomas area who are funding and participating in the Natomas Joint Vision process. This link is provided for public convenience and is neither maintained nor endorsed by Sacramento County. Note: The website is under construction.
- Sacramento County Board of Supervisors General Website: Includes information on how to contact Board members
- Local Agency Formation Commission General Website: Contains basic information on the annexation process and the function of LAFCo

Early Project History of Natomas Joint Vision

City - County Joint Planning Process -- 2008 - April 2009 --Broad Visioning Process

Through the Broad Visioning Process, a unique image will be crafted that accentuates the Joint Vision Area's distinctive features and geographic location to balance development and growth with conservation and livability. The intent is to move away from the status quo of planning for individual projects since analytic processes focused just on proposed projects are unlikely to reveal the full economic impacts or environmental costs of development.

The goals of the Broad Visioning Process are to:

- Create a special and unique place
- Assure quality and consistency in development projects
- Capitalize on existing assets - airports, freeways, rivers, farmland
- Locate and employ exemplary cases of urban design complementing (an enhancing) habitat preservation

The Broad Visioning process represents Phase 2 of the total five phases of the Natomas Joint Vision. City and County staff and representatives of Natomas landowners will lead the process and coordinate the necessary workshops. Technical consultants will be contracted to assist in conducting public outreach meetings, drafting conceptual land use diagrams, and developing an agriculture/open space/habitat strategy with a preliminary biological assessment.

2006 - 2008 -- Open Space Program

The Open Space Program (OSP) was designed to identify mitigation and funding mechanisms to help guide the implementation of open space goals and policies adopted by the City and County in the December 2002 Natomas Joint Vision MOU. The OSP evaluated the habitat-open space-agricultural values of the Natomas Joint Vision area to establish objectivity for decision making. The City and County shared the cost of the OSP.

Four public workshops for the OSP were completed between June 2006 and February 2008. The Final Draft Open Space Program Report was presented to the Board of Supervisors on January 20, 2008 and the City Council on February 12, 2008. The policies and maps in the Report were not adopted by either the County Board of Supervisors or City Council. The Report was received and filed.

The OSP was initially requested by the City Council and County Board of Supervisors to delineate areas best suited for open space preservation and identify associated implementation strategies. Recognizing the complexities of the Joint Vision Area, City and County staff have

since been directed to commence with a Broad Visioning Process to study the Area in a more comprehensive and inclusive manner.

Municipal Services Review, Sphere of Influence Amendment and Environmental Impact Report

The City was preparing a Municipal Services Review to provide a public service analysis for their proposed Sphere of Influence Amendment (SOI). This information combined with information from the Open Space Program will provide a framework for project description and any alternatives in the Sphere of Influence Environmental Impact Report.

The Environmental Impact Report (EIR) will assess the impacts of actions on biological resources related to the existing Natomas Basin Habitat Conservation Plan (NBHCP) and the effects of additional development for the development/preservation balance set out in the NBHCP. The EIR will be prepared for use by the City, County, and LAFCo in their evaluation of the effects of the City's SOI and necessary text and map amendments to both the City and County General Plans. The EIR was being prepared jointly by LAFCo and the City as co-lead agencies with the County participating as a responsible agency.

The draft Municipal Services Review project framework report and Environmental Impact Report have been delayed pending the development of a more precise project description.

Past Workshops, Hearing and Documents of Natomas Joint Vision

Broad Visioning Process 2008-2009

Workshop #1 - November 12, 2008

- Broad Visioning Workshop 1 Presentation
- Natomas Joint Visioning Background Report

Workshop #2 - January 28, 2009

- Broad Visioning Workshop 2 Agenda
- Broad Visioning Workshop 2 Presentation
- Broad Visioning Workshop 2 Matrix

Workshop #3 - March 26, 2009

- Broad Visioning Workshop 3 Agenda
- Broad Visioning Workshop 3 Presentation

Workshop #4 Series - Workshops with Planning Commissions, Council and Board

- Broad Visioning Workshop 4 Series Notice
- Revised Background Report - April 2009
  - April 9, 2009, 5:30 p.m. - City Planning Commission
  - April 13, 2009, 5:30 p.m. - County Planning Commission
  - April 14, 2009, 6 p.m. - City Council
  - April 22, 2009, 2 p.m. - County Board of Supervisors
    - Staff report to County Board of Supervisors
    - Presentation to County Board of Supervisors

Open Space Program 2006-2008

Workshop #1

- First Workshop Presentation
- Public Comments and Questions
- Joint Vision Flow Chart

Workshop #2

- Second Workshop Introduction
- Second Workshop Presentation

Workshop #3

- Third Workshop Presentation

Workshop #4

- Fourth Workshop Presentation

Natomas Vision Plan - Board Initiation

On February 7, 2012, the Board of Supervisors initiated a Master Plan process, including the initiation of an amendment to the General Plan to move the Urban Services Boundary (USB) and Urban Policy Area (UPA) within the Plan Area with the boundary locations to be determined through the Master Plan process. The initiation process simply allows the planning and environmental processes to begin. Full analyses, including public input opportunities, will follow. Board materials are provided below:

- Master Plan Initiation Staff Report (February 7, 2012)
- Master Plan Area Map
- Land Use Policy LU-119 Consistency Analysis

Special Planning Area Proceedings Initiation

On January 13, 2010 the Board of Supervisors initiated proceedings for a Special Planning Area zone (SPA). The Board materials for the SPA Proceedings Initiation hearing are provided below:

- Staff Report: SPA Proceedings Initiation (January 13,2010)
- Addendum: SPA Proceedings Initiation

Related Amendment to the Sacramento County General Plan

In November 2011, the Board of Supervisors approved the 2030 General Plan which included an overlay for the Plan area. The overlay reads as follows:

"Natomas Joint Vision Area. On December 10, 2002, the Sacramento City Council and Board adopted a Memorandum of Understanding (MOU) outlining principles of land use and revenue sharing between the City and County of Sacramento for the Natomas area, setting the stage for what has come to be known as the "Natomas Joint Vision." The "Natomas Joint Vision Study Area" overlay on the Land Use Diagram indicates the area addressed by this MOU. The cooperative effort addresses land use, economic development, and environmental opportunities

and challenges in Natomas. The result will be quality development balanced with permanent open space preservation systems. Additionally, SACOG's Blueprint shows significant development in the Natomas Joint Vision Area. Because of the MOU, the Blueprint and the importance of the Natomas Joint Vision Area to the region, the County anticipates development in portions of the Natomas Basin within the timeframe of the General Plan. Subject to the preparation and certification of the appropriate environmental documentation, this development shall be accomplished either by an expansion of the USB, the City's Sphere of Influence, or both. See related policy LU-114 and Implementation Measure C in the "Regional and Local Agency Coordination" section of this Element."

Contacts

Office of Planning and Environmental Review

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Local Agency Formation Commission (LAFCo)

Don Lockhart, Asst. Executive Officer, (916) 874-2937, donald.lockhart@saclafco.org

EXHIBIT 9

COUNTY OF SACRAMENTO

CALIFORNIA

For the Agenda of:
February 26, 2019
Timed: 2:15 PM

To: Board of Supervisors

Through: Navdeep S. Gill, County Executive

From: Leighann Moffitt, Planning Director,
Office of Planning and Environmental Review

Subject: PLNP2018-00284. Initiation of the Upper Westside Specific Plan Process

District(s): Serna

RECOMMENDED ACTION

Adopt the attached Resolution to:

1. Initiate the Upper Westside Specific Plan process pursuant to the Board-adopted Master Plan Procedures and Preparation Guide and County Code 21.14.060. This includes potential future adoption of a Specific Plan and a General Plan Amendment to move the Urban Services Boundary and the Urban Policy Area within the Natomas Joint Vision Area of the Natomas Basin.
2. Approve the proposed Outreach Program with the expectation that it be enhanced to reach a diverse stakeholder group, provide equitable opportunities for input and to ensure transparency of process.
3. Determine that the scope of the Study Area for potential plan boundaries is appropriate, with the understanding that actual plan boundaries may be adjusted based on the results of the future technical studies, outreach and planning as part of the Master Planning process.
4. Direct the Planning Director to assemble and convene a Technical Advisory Committee consistent with the Board-adopted *Master Plan Procedures and Preparation Guide* and County Code Section 21.14.060 (F).
5. Authorize the Planning Director to sign the Funding Agreement (Attachment 1) between the County of Sacramento and the Owners' Group.

BACKGROUND

Project Location and General Summary

The Upper Westside Project (Project) is located in the unincorporated Sacramento County portion of the Natomas Basin (Attachment 2) and is a new growth Specific Plan area requested pursuant to Sacramento County's Board-adopted *Master Plan Procedures And Preparation Guide* (Attachment 3). The Project applicants request initiation of a Master Planning process on approximately 2,000 acres to accommodate approximately 10,000 dwelling units and 5,000,000 square feet of commercial space (Attachment 4).

Initiation of the Master Plan will provide for the technical study of the process for, and feasibility of, allowing urbanization and the associated extension of infrastructure to the Project area. These efforts are substantial in nature and can take several years. The Project applicants envision creating a sustainable, economically beneficial, mixed-use, master-planned community directly adjacent to the existing communities of North Natomas and South Natomas. They seek to capitalize on existing infrastructure and the Project's proximity to downtown Sacramento and West Sacramento while supporting the substantial public investment that has already occurred in the Natomas Basin.

Natomas Basin Introduction

The Natomas Basin is a low-lying region of approximately 53,000 acres in Sacramento and Sutter counties (Attachment 5). It is generally bounded by the Sacramento River to the west, the American and Sacramento Rivers to the south, the Natomas East Main Drainage Canal to the east and the Cross Canal to the north.

In the late 1800s and early 1900s, the Natomas basin was used for agricultural production on its rich, fertile soils formed by the annual flooding of the Sacramento and American Rivers. Formed in 1911, Reclamation District 1000 (RD1000) began construction of a perimeter levee system for Natomas in 1913 and completed it in 1915. Then RD1000 created a system of canals, ditches and drains to collect both stormwater and agricultural runoff which is pumped out of the Natomas Basin into the Sacramento River. In the 1950s and 1960s urbanization of the Natomas Basin began, predominantly because of close proximity to downtown Sacramento and construction of the interstate highway system.

Approved and Proposed Developments

The City of Sacramento, Sutter County and Sacramento County have approved land use plans in the Natomas Basin and several new proposals are pending in Sacramento County (Attachment 6). These plans are listed in the Table on the next page.

Table 1: Major Approved and Proposed Natomas Basin Developments

Name	Status	Jurisdiction	Acres	Description/Notes
North Natomas-NBHCP Permitted	Approved in 1994	City of Sac.	8,050	Urban community-substantially built out.
Sutter Pointe-NBHCP Permitted	Approved in 2009	Sutter Co.	7,528	Urban community-construction not started.
Greenbriar	Approved in 2008	City of Sac.	577	Urban community-residential focused-construction not started.
Sac. Int. Airport Master Plan	Approved/ New Update Pending	Sac Co.	~6,000	The Region's International Airport
Metro Air Park- MAPHCP Permitted	Approved in 1993	Sac. Co.	1,983	Industrial focused Air Park – some construction started
Grandpark	Pending	Sac. Co.	5,689	New Growth Master Plan for urban development.
Upper Westside	Pending	Sac. Co.	2,084	New Growth Master Plan for urban development.
Paso Verde K-8 School	Pending	Natomas Unified School Dist.	34	New K-8 school in unincorporated Sacramento County to serve existing development in the City of Sacramento.

Natomas Basin Habitat Conservation Plan
The Natomas Basin Habitat Conservation Plan (NBHCP) provides the State and federal permitting pathway for City of Sacramento development in the Natomas Basin and for Sutter Pointe in Sutter County. Under the NBHCP, 15,517 acres are approved for development. Substantial buildout of the North Natomas area has occurred in the City of Sacramento and no buildout has yet occurred in Sutter County for the Sutter Point area.

Metro Air Park Habitat Conservation Plan
The Metro Air Park Habitat Conservation Plan (MAPHCP) provides the State and federal permitting pathway for the Metro Air Park project. Under the MAPHCP, 1,983 acres are approved for development. Substantial water, sewage and drainage infrastructure has been installed and an Amazon distribution center is constructed and operating. Other new projects are expected to break ground in the near future.

The Natomas Basin Conservancy
The Natomas Basin Conservancy (TNBC) is the Plan Operator for both the NBHCP and MAPHCP. As such, TNBC is responsible for the acquisition, operations and management of the required mitigation lands for both HCPs. Combined, the NBHCP and MAPHCP must secure a minimum 8,750 acres of land in the basin for mitigation. There is an HCP requirement that at the end of the 50-year permitting period, there be one preserve block of at least 2,500 contiguous acres and that the remaining preserves be in blocks of at least 400 acres and be connected by water. The preserves must be 50% in rice cultivation, 25% in managed marsh habitat and 25% in upland Swainson's hawk habitat. In addition to the mitigation lands, the HCPs are based on an assumption that in addition to the preserves with in-perpetuity easements, that an additional 15,095 acres of land will remain committed to agriculture in the basin and that 12,193 acres of exempt, already approved/entitled development exists. TNBC annually publishes a map of their acquired and managed lands in the basin (Attachment 7)

Past Legal Challenges and Ruling Related to Habitat Conservation Plans
Development in the Natomas Basin has been met with challenges from environmental groups due to the presence of numerous threatened, endangered or special status species. Two of the species of greatest concern are the giant garter snake and the Swainson's hawk. There have been several lawsuits filed over past environmental approvals associated with the NBHCP and the MAPHCP. A final ruling by United States District Judge David F. Levi on September 7, 2005 (Attachment 8) declared the HCPs valid and cleared the way for development. The environmental groups unsuccessfully argued that because Sacramento County was not a signatory to the HCPs that the HCPs were flawed because they relied on land in unincorporated

Sacramento County for future mitigation. However, with respect to the issues of potential future growth in Sacramento County, Judge Levi ruled the following:

> The NBHCP and BiOp [Biological Opinion (BiOp) utilized by the Secretary of the Interior and United States Fish and Wildlife Service] do assume that development in the basin will be limited to the 17,500 acres [15,517 acres under the NBHCP and 1,983 acres from the previously approved MAPHCP to total 17,500 acres cumulatively] in the permit areas and relies on that assumption in concluding that sufficient habitat will remain for the covered species. This assumption is based on the current land use plans of Sacramento County. The NBHCP, BiOp, and EIR/EIS also conclude that because any future development in the Basin not covered by the HCP and ITPs [Incidental Take Permit allowing for "take" of an endangered species] would likely result in injury to listed species, any future development in the Basin would require new federal approvals. Any such approvals would in turn require a new HCP and ITP for the particular project, and could also lead to revision of the existing NBHCP, were the additional development to exceed assumed limits.

Judge Levi went on to say,

> The NBHCP anticipates that development by the City and Sutter will be limited to 15,517 acres – 8,050 acres within the City [of Sacramento] and 7,467 acres in Sutter County – and provides that approval of any development beyond this limit – whether by the City and Sutter or by other entities – will trigger reevaluation and possible amendment of the plan, and could result in suspension or revocation of the City and Sutter permits.

With regard to the City/County Natomas Joint Vision, which plaintiffs claimed would fatally undermine the NBHCP, Judge Levi ruled the following:

> The Service, and the court, are entitled to assume at this point that future development will not be permitted if sufficient mitigation land is unavailable and the development will result in jeopardy.

The Judge footnoted the above sentence with the following:

> The court notes, however, that the Service and those seeking an ITP in the future will face an uphill battle if they attempt to argue that additional development in the Basin beyond 17,500 acres will not result in jeopardy. The NBHCP, BiOp, EIR/EIS, and Findings and Recommendations are all predicated on the

assumption that development in the Basin will be limited to 17,500 acres and that the remaining lands will remain in agricultural use.

Staff recognizes that any new development in the Natomas Basin above the 17,500 acres already approved and permitted by the Natomas Basin and Metro Air Park HCPs will require careful coordination and consideration of existing approved developments, their mitigation strategies, and the regional conservation context.

Flooding and Flood Protection

The original Natomas Basin levees were designed to handle the historical "flood of record" which was the 1907 and 1909 floods of the Sacramento River. In 1937, the system accommodated a large flood with only minor problems. In 1955, an even larger flood hit the Central Valley and the Natomas levees held, but minor damage to the levees occurred near the Sacramento/Sutter County line. As a result, the U.S. Army Corps of Engineers (USACE) raised the Natomas Cross Canal and Pleasant Grove Creek Canal levees by two to three feet in anticipation of even larger future events. The system remained in generally the same condition until 1986 when a new "flood of record" occurred causing significant seepage in Natomas levees; however, early emergency response by RD1000 and the USACE prevented the potentially catastrophic failure. As a result of the near failure, the levee system surrounding Natomas was de-certified and further development was halted.

The Sacramento Area Flood Control Agency (SAFCA) was formed in 1989 to address the vulnerability highlighted by the 1986 flood. The City of Sacramento, Sacramento County, Sutter County, American River Flood Control District, Sacramento County Water Agency, Sutter County Water Agency and RD1000 created SAFCA through a Joint Exercise of Powers Agreement to provide the Sacramento region with increased flood protection along the American and Sacramento rivers.

A system of repairs was initiated in the early 1990s on both the Sacramento River and Natomas East Main Drainage Canal. Work along the Sacramento River was completed by the USACE (Sacramento Urban Project) while the work on the Natomas East Main Drainage Canal was done by SAFCA (North Area Local Project). As a result, the levees were re-certified in 1997 and development began again.

In January 1997 a flood similar in size to the 1986 flood struck the area. The improved system held but a number of other levees in California failed. Levee safety concerns began to emerge and following an analysis of the

Natomas levees, they were again de-certified in 2003, stopping development for a second time.

To address the levee concerns within the Natomas Basin, SAFCA, the State of California, and the USACE have undertaken the Natomas Levee Improvement Program (NLIP) and the Natomas Basin Project (NBP) to enhance flood protection in the Natomas Basin and to bring the area up to a 200-year level of flood protection. According to the latest report from SAFCA (Attachment 9), the Natomas levee improvements will be completed by 2025. It is important to note that the SAFCA analysis is updated annually to determine if improvements are on track and sufficient funding is still available.

These ongoing improvements have resulted in re-mapping much of the Natomas Basin from Special Flood Hazard Area Zone A (a 100-year flood zone where no flood depths have been determined) to Zone A-99 on June 16, 2015. Zone A-99 means that while the levees still do not provide a 100-year level of flood protection, there is a project underway to improve to that level. This does not define the levees as safe; it simply rewards a community for making progress. Construction in Natomas, under Zone A-99, is allowed if the local jurisdiction finds the area to be “reasonably safe from flooding”, per Code of Federal Regulations 44CFR60.3(a)(3).

On May 19, 2015 the Board of Supervisors (Board) approved Resolution 2015-0392 (Attachment 10) making a “reasonably safe from flooding” finding for:

- Rebuilding fire damaged structures and those displaced by the levee projects
- Development and construction on entitled lots
- New entitlements within current zoning

New developments in Sacramento County, including the pending projects in Table 1, are not covered by the existing findings. Each would require either a new finding that they are “reasonably safe from flooding” or the completion of the levee improvements and re-mapping out of the A-99 zone.

Both the NLIP and NBP have required SAFCA to acquire land in the Natomas Basin both for the physical footprint of improvements and for mitigation of environmental impacts associated with the improvements. Current activity in the vicinity of the proposed Project involves the NBP Phase 4B project. At its November and December 2018 Board of Directors meetings, the SAFCA Board of Directors adopted several Resolutions of Necessity commencing land acquisition activities in the area. At the November 15, 2018 meeting, the SAFCA Board of Directors approved Resolution No. 2018-115 authorizing the SAFCA Executive Director to execute an agreement with the Natomas

Basin Conservancy for exchange of real property. Several properties within the proposed Project boundary are identified by SAFCA as lands for potential acquisition, potential borrow sites, and HCP exchange properties (Attachment 11 – Item 9, Figure 3 from 11/15/18 SAFCA Board Report). The SAFCA real estate transactions have not been completed as of the writing of this report.

The Project area contains an internal floodplain, designated as Zone A, which receives water from Placer and Sutter counties by overland flow (Attachment 12). The levee improvements discussed above do not address this internal floodplain.

Natomas Joint Vision Memorandum of Understanding

In 2002 the City of Sacramento and Sacramento County entered into a Memorandum of Understanding (MOU) called the Natomas Joint Vision MOU (Attachment 13) that identified the principles for future growth, revenue sharing, and permanent open space preservation in unincorporated Sacramento County's portion of the Natomas Basin. The principles for future growth addressed the following issues: cooperative land use planning, permanent open space protection, farmland preservation, airport protection, fiscal collaboration, and jurisdictional roles. Under the Natomas Joint Vision, the City of Sacramento was identified as the agent of development and Sacramento County was identified to be the agent of open space. However, in 2005, when the City of Sacramento did not advance any additional Natomas urbanization, Sacramento County, at the request of Natomas landowners, took a more active role in urbanization discussions.

Broad Visioning

In 2007 and 2008 Sacramento County, the City of Sacramento and major landowners had ongoing dialog about a "Broad Visioning Process". This process included numerous workshops with the Board. On July 23, 2008 the Board provided direction for the "Broad Visioning Process" and directed County staff to begin the preparation of a conceptual land use plan, to work with landowners on a funding agreement, and to engage with biological experts and urban design specialists to implement a work plan. This process resulted in three potential Natomas development sketches (Attachment 14) which were presented at various County Planning Commission and Board meetings, as well as Sacramento City Council meetings. The work continued from 2009 through 2011, but in 2011 the focus shifted to completing the Sacramento County General Plan update. When the General Plan was adopted on November 9, 2011 it contained new growth criteria as well as Natomas-specific policies. Additionally, the Land Use Diagram was amended to include a "Natomas Joint Vision Study Area" overlay (Attachment 15).

Natomas Joint Vision Area Master Plan

On February 7, 2012 the Board initiated a Master Plan process, called the Natomas Joint Vision Plan, for the entire Natomas Joint Vision Area to be funded by the Natomas Owners' Group (Natomas Joint Vison Funding Agreement). However, as time passed, landowners within different geographic areas of the Natomas Joint Vision Area differed in their ability to continue funding the effort. On June 30, 2015, the original Natomas Joint Vision Funding Agreement was formally closed-out. The intent was to create two new funding agreements: one to cover general work for the whole Natomas Joint Vision Area and be funded by all interested parties; and the other to be specific to the North Precinct area for a more detailed urbanization study.

The Natomas Joint Vision Plan was heard by the Sacramento County Planning Commission on September 28, 2015 to initiate the environmental review process pursuant to the Board-adopted *Master Plan Procedures and Preparation Guide*. The project proposal at that time included expansion of the Urban Services Boundary (USB) to include four urban precincts, and expansion of the Urban Policy Area (UPA) boundary to include the North Precinct. However, discussions among the Natomas Joint Vision Plan participating property owners led to controversy over the reimbursement provisions of the then-pending new funding agreements. Subsequently, the North Precinct applicant revised the project application to include urbanization and movement of the USB and UPA for only the North Precinct, as there were no property owners funding the work program from the other precincts. The North Precinct funding agreement was adopted on November 17, 2015, with a retroactive effective date of July 1, 2015. A second funding agreement for planning the broader Natomas Joint Vision Area never went forward. On March 23, 2016 a revised project description was presented to the Board as a workshop prior to initiating environmental review for the North Precinct only.

The proposed Project for the Upper Westside, like the North Precinct (now known as the Grandpark project), is a continuation of the Natomas Joint Vision process, but with a separate owners' group, funding agreement and Master Planning process. The previous Natomas Joint Vision work effort was funded by participating owners through a funding agreement that provided for reimbursement by subsequent developers. That funding agreement was replaced by the North Precinct funding agreement in 2015. It is unclear at this time whether the previous Natomas Joint Vision work effort provided substantial benefits to the Upper Westside applicant. However, staff acknowledges the potential for the Board to establish a reimbursement fee on a pro rata basis at a future time.

Sacramento County General Plan

As discussed above, the Sacramento County General Plan land use diagram contains a "Natomas Joint Vision Study Area" overlay. The General Plan states the following with regard to the area:

> On December 10, 2002, the Sacramento City Council and Board of Supervisors adopted a Memorandum of Understanding (MOU) outlining principles of land use and revenue sharing between the City and County of Sacramento for the Natomas area, setting the stage for what has come to be known as the "Natomas Joint Vision." The "Natomas Joint Vision Study Area" overlay on the Land Use Diagram indicates the area addressed by this MOU. The cooperative effort addresses land use, economic development, and environmental opportunities and challenges in Natomas. The result will be quality development balanced with permanent open space preservation systems. Additionally, SACOG's Blueprint shows significant development in the Natomas Joint Vision Area. Because of the MOU, the Blueprint and the importance of the Natomas Joint Vision Area to the region, the County anticipates development in portions of the Natomas Basin within the timeframe of the General Plan. Subject to the preparation and certification of the appropriate environmental documentation, this development shall be accomplished either by an expansion of the USB, the City's Sphere of Influence, or both. See related policy LU-114 and Implementation Measure C in the "Regional and Local Agency Coordination" section of this Element.

Land Use Element Policy LU-114 states the following:

> It is the policy of Sacramento County that development and open space preservation in the Natomas Joint Vision Overlay Area occur in a comprehensive, responsible and cohesive manner that best addresses land use, economic development and environmental opportunities and challenges in Natomas.

Implementation Measure C states the following:

> Pursue comprehensive and collaborative planning in the Natomas Joint Vision Overlay Area; either through the continued participation in the Natomas Joint Vision MOU or, if determined appropriate, with the County serving as the lead agency for development and open space preservation.

The above description of the Natomas Joint Vision Study Area overlay, Policy LU-114 and Implementation Measure C make it clear that the Board was willing to consider Sacramento County serving as the agent of development

in the Natomas Basin when they approved the General Plan in 2011. It is also clear that the Board recognized the need for close coordination and collaboration with surrounding jurisdictions, as well as the necessity of balancing open space preservation with development.

City of Sacramento General Plan Update
The City of Sacramento launched its 5-year general plan update in October 2018. Over the next 20 months City staff will conduct extensive public outreach meetings, with the first round beginning in early 2019. City staff has advised Sacramento County that as part of the update process, the City may revisit its vision for its five Special Study Areas, one of which includes the Natomas Joint Vision Study Area.

Significant Issues
The following list of issues, while not an exhaustive list of all items that will be addressed in the Master Planning process, does outline the significant issues that will need substantial additional work/study/coordination to develop a clear path forward beyond initiation:

- Project boundary
- Existing HCPs and State/federal permitting pathways, including out-of-Basin mitigation
- Agricultural viability and mitigation
- Drainage and flooding
- Water supply
- City/County coordination
- General Plan consistency
- Airport protection
- Climate change, climate adaptation, and resiliency

Sacramento County Interests
While pursuing master plan initiation in the Natomas Basin, the needs and concerns of all affected parties must remain in focus and be balanced. The County has an interest in assuring that the buildout of the approved development of Metro Air Park, the continued operation and expansion of Sacramento International Airport, the continued progress and clear permitting pathways for SAFCA and the USACE for improving the Natomas levees to 200-year protection, comprehensive open space planning, and the preservation of a viable agricultural economy remain part of the comprehensive planning for the Natomas Basin.

It is staff's qualitative assessment that Sacramento County's current interests are much the same as when the Natomas Joint Vision MOU was adopted in December 2002. The issues and concerns regarding open space, economic development, and future growth outlined in the MOU are still relevant today. Sacramento County remains committed to sound planning principles that result in protection of the airport from urban encroachment and wildlife attractors, open space preservation to enhance quality of life, continuation of productive agriculture, and the creation of high-quality communities.

Since adoption of the Natomas Joint Vision MOU, additional issues such as climate change, sustainability and climate resiliency have emerged. A secure and sustainable water supply as well as protection from flooding, given the variabilities associated with climate change, will also need to be provided.

Sacramento County recognizes that any new development in the Natomas Basin above the 17,500 acres already approved and permitted by the Natomas Basin and Metro Air Park HCPs will have serious implications and requires careful coordination and consideration of existing approved developments, their mitigation strategies, and the regional conservation context.

The complexities and interrelationships noted above demonstrate the need for close coordination among stakeholders and regulators, and the need for the Planning Director to assemble and convene a Technical Advisory Committee consistent with the *Master Plan Procedures And Preparation Guide* and County Code Section 21.14.060.

The Technical Advisory Committee will provide feedback, peer review and guidance on topics across multiple disciplines throughout the master plan process. Preliminary technical studies examining cultural resources, biological constraints and mitigation strategies, property ownership and expected uses, provision of public services, flood protection and drainage strategies, and airport noise and safety will be needed to inform the feasibility of the land use plan as currently proposed and to aid in preparation of a stable project description. Once a stable project description is reasonably certain, the next step in the Master Planning process will be to return to the Board for review of the final Draft Master Plan and any related technical support documents in a workshop setting to determine that the project is adequate to begin initiation of environmental review pursuant to the California Environmental Quality Act (CEQA). An Environmental Impact Report (EIR) will likely be the appropriate CEQA document for the proposed Project. Therefore, the next step after initiation of the environmental review process would be the development and release of a Notice of Preparation (NOP) of an EIR. A stable project description, supported by enough technical

study to demonstrate a reasonable likelihood of project feasibility is paramount to a defensible and informative CEQA process.

Further and more detailed technical studies, such as a transportation impact analysis, an air quality analysis, a greenhouse gas and climate adaptation analysis, a noise study, a fiscal impact analysis, an aesthetic analysis, and a bird airstrike analysis are dependent on a stable project description and land use plan. These studies will be finalized as part of the environmental review process and must be adequate and complete before the publication of a Draft EIR can be scheduled.

Master Plan Initiation Process Analysis

Staff developed the recommendation to proceed with master plan initiation after careful research of the history of development in the Natomas Basin, review of the principles of the Natomas Joint Vision MOU, review of past litigation and rulings, and conversations with stakeholders. However, the two greatest influences and determining factors in the recommendation to initiate the Master Planning process are the Board-adopted General Plan and the Board-adopted *Master Plan Procedures And Preparation Guide*. These two documents clearly lay out the pathway to initiate the Master Plan process, which this staff report recommends. The General Plan addresses applications for new growth areas in Land Use Element Policy LU-119 which states:

> The County shall only accept applications to expand the UPA or initiate an expansion of the UPA or any Master Plan processes outside of the existing UPA if the Board finds that the proposal meets the following:
>
> • *Parallel processes to expand UPA and prepare Master Plans:* Proposed additions to the UPA will only be considered when accompanied by a request to initiate a Master Plan process for all land encompassed by the proposed UPA expansion boundary. Likewise, requests to initiate a Master Plan process outside the UPA will only be considered when accompanied by a request to expand the UPA to include all land encompassed by the proposed Master Plan.
>
> • *Project Justification Statement and Outreach Plan:* Proposed UPA expansions/Master Plan processes must be accompanied by both a "Justification Statement" and an "Outreach Plan". The Justification Statement shall be a comprehensive explanation of the proposed request and the development it would allow. It must include background information, reasoning, and the goal(s) and benefits of the proposed project. The Outreach Plan shall describe how the project proponent plans to inform and engage neighbors and members of the general public about the proposed UPA expansion and project.

- *Proximity to existing urbanized areas:* Proposed UPA expansions/Master Plan processes must have significant borders that are adjacent to the existing UPA or a city boundary. As a guideline, "significant borders" generally means that the length of the boundary between the existing UPA or city boundary and the proposed UPA expansion/Master Plan should be 25 percent of the length of the boundary of the UPA expansion area.

- *Logical, comprehensive, and cohesive planning boundaries:* Proposed UPA expansions/Master Plan processes must consist of a contiguous set of parcels that have a regular outside boundary consistent with the logical planning boundary illustrations below [Note: Diagrams omitted for clarity but may be viewed in the General Plan.]. All parcels within this boundary must be included in both the proposed UPA expansion and proposed Master Plan area.

Staff has determined that the project reasonably complies with Policy LU-119, above. The Project proposes a parallel process to expand the UPA and prepare a Specific Plan. It also contains a justification statement and outreach plan. Staff, however, will be working with the applicant to enhance the outreach plan to reach more diverse stakeholder groups, provide equitable opportunities for input, and to ensure transparency of process. The Project is proximate to other urban areas and has reasonably logical boundaries, however, staff is reserving the ability to re-define the boundaries as the issues discussed above are studied and additional clarity emerges.

Initiation of the Master Plan will provide for the technical study of the process for, and feasibility of, allowing urbanization and the associated extension of infrastructure to the Project area. The funding agreement will assure that Sacramento County costs related to the process are reimbursed by the Owners' Group. Numerous and complex areas of concern exist, as outlined above, and County staff will work to proactively address these concerns consistent with the general concepts of the Natomas Joint Vision MOU and principles of modern land use planning and growth management.

The General Plan and the *Master Plan Procedures And Preparation Guide* set a high bar of expectations and responsibilities on the applicants to demonstrate compliance with the growth management criteria and other policies of the General Plan. While Policy LU-119 addresses Master Plan initiation, there are other policies such as LU-120, LU-127 and LU-15 which will be utilized by County staff, later in the Master Plan process, to determine whether or not the Master Plan could be recommended for approval. Initiation of the Master Plan process is only the first step and is not a guarantee of approval. The County strongly cautions that the applicants proceed at their own risk.

FINANCIAL ANALYSIS

The Master Plan process is funded entirely by the Owners' Group as outlined in the attached Funding Agreement and associated estimated budget of $2,015,245 in County reimbursable work. The work plan includes participation from several County departments over multiple years.

Attachments:

RES – Resolution to Initiate the Upper West Side Specific Plan Process
EXH A to RES - Upper Westside Boundaries
ATT 1 – Funding Agreement
ATT 2 – Project Location Map
ATT 3 – Master Plan Procedures and Preparation Guide
ATT 4 – Applicant's Project Initiation Application Attachment
ATT 5 – Natomas Basin Map
ATT 6 – Natomas Basin Existing and Proposed Development
ATT 7 – The Natomas Basin Conservancy 2019 Map
ATT 8 – Judge David F. Levi September 7, 2005 Ruling
ATT 9 – SAFCA 2018 Progress Report
ATT 10 – Reasonably Safe Findings and Staff Report
ATT 11 – Land Diagram SAFCA Board of Directors Meeting Nov 2018
ATT 12 – Map of Internal Floodplain
ATT 13 – Natomas Vision MOU
ATT 14 – Broad Visioning Sketches
ATT 15 – County General Plan Natomas Joint Vision Study Area

EXHIBIT 10

CHAPTER 3
System Description

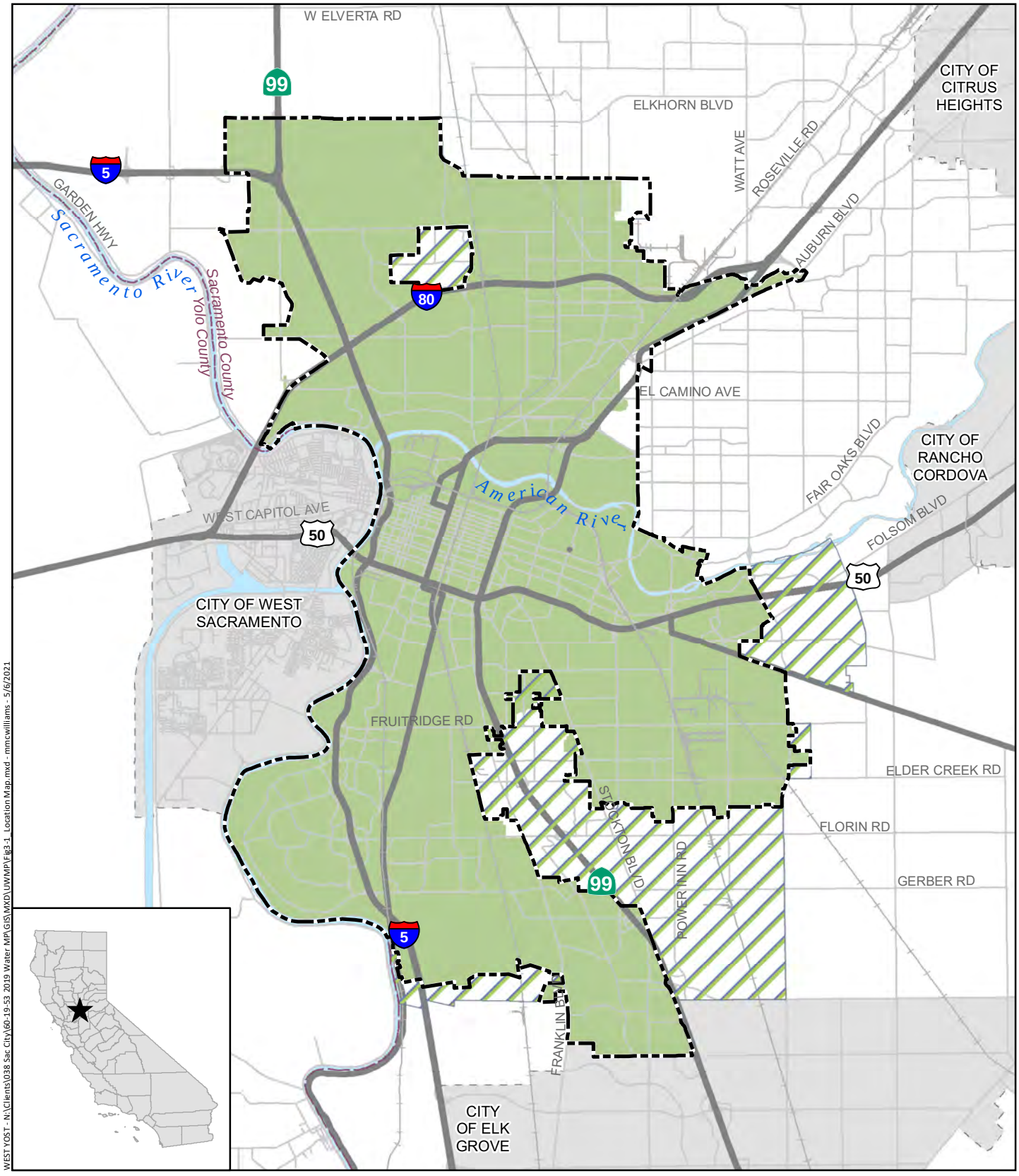
This chapter provides a description of the City's water system and service area. This includes a description of the water system facilities, climate, population, and housing within the City's service area.

3.1 GENERAL DESCRIPTION

The City is the capital of California and the seat of Sacramento County (County). The City is located in the Central Valley of California, which is surrounded by the Sierra Nevada Mountains to the east, coastal ranges to the west, Klamath Mountains to the North, and is oriented in a north-south direction. The City encompasses approximately 101 square miles (Dyett & Bhatia, 2019) and is located at the confluence of the Sacramento and American Rivers that meet on the western boundary of the City. The Sacramento River flows south from Lake Shasta, while the American River flows west from the Sierra Nevada Mountains. As shown on Figure 3-1, the City limits span the area north of the City of Elk Grove, west of the City of Rancho Cordova, east of the Sacramento River, and south of Placer and Sutter Counties. Figure 3-1 also displays the retail water service area and sphere of influence (SOI).

The City was founded in 1849 with a population of 9,087 people, and in 1920, voters adopted a City Charter (municipal constitution) and a City Council-City Manager form of government; this form of government is still in use today. The City's current population is approximately 510,931[1]. The City's Department of Utilities (DOU) is responsible for providing and maintaining water, sewer collection, storm drainage and flood control services for residents and businesses within the City's water service area.

[1] 2020 data from State of California, Department of Finance, *E-5 Population and Housing Estimates for Cities, Counties and State, 2011 – 2020 with 2010 Census Benchmark*. Sacramento, California, May 2020.



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City of Sacramento Limits

City of Sacramento Retail Water Service Area

Sphere of Influence

N

0 1.25 2.5

Miles

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Figure 3-1

Location Map

3.2 SERVICE AREA BOUNDARY

In this section, the City's retail service area and the wholesale agencies receiving water supply from (or providing water to) the City are described.

3.2.1 Retail Service Area

The City's retail water customers are located within the corporate limits of the City of Sacramento and foreseeable future expansions of the City limits. The City's retail water service area covers an area of approximately 101 square miles (64,425 acres)[2]. The City reported that it is approximately 99 percent metered as of December 31, 2020. The system is responsible for delivering treated water to residential, commercial, and irrigation customers in the City's retail water service area. The City also serves a small number of customers outside the City limits in an adjacent, unincorporated portion of the County, but does not serve a small portion of residents inside the City limits who receive their water from SSWD. The population of these two areas are roughly equivalent. In addition, the Sacramento Power Authority's (SPA's) Cogeneration (Cogen) Facility is located outside of the City limits and currently receives potable water from the City and recycled water through a partnership with the Regional Sanitation District.

Ground surface elevations generally range from about 5 feet above sea level east of the Sacramento River to approximately 75 feet above sea level in the northeast part of the service area. Soils within the City consist of unconsolidated clay, silt, and sand that resulted from floodplain deposits. The City is within the reclaimed flood plain of the Sacramento River.

The City has multiple surface water entitlements, consisting of five appropriative water right permits issued by the State Water Resources Control Board (SWRCB), pre-1914 rights and a water rights settlement contract with the United States Bureau of Reclamation (USBR). These water rights allow the City to divert water from the Sacramento and American Rivers. A description of the City's surface water rights is included in Chapter 6.

The City's authorized Place of Use (POU) for the Sacramento River includes all the land within the City limits. The POU for the American River supply includes the City limits and also defined areas adjacent to the City that includes portions of service areas of other water purveyors. The City's POU for each surface water source is shown on Figure 3-2.

[2] Based on current City limits (as of June 2019) per 2040 General Plan Draft Technical Background Report dated September 2019.

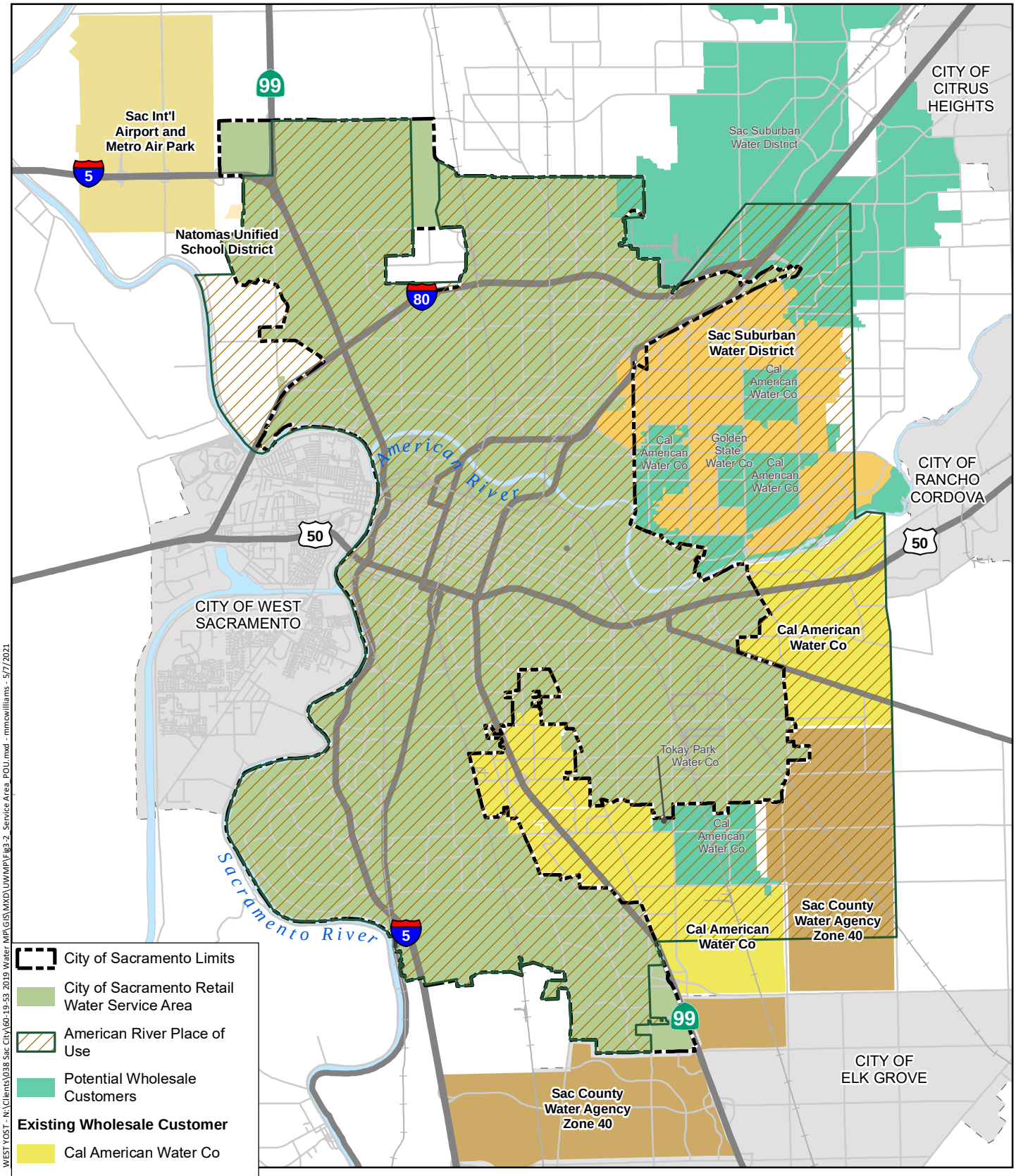

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Figure 3-2

Service Area, Limits, and Places of Use

3.2.2 Wholesale Service Area

Wholesale water service is where the City serves water from the City's entitlements to other agencies. The City's water rights and supply facilities provide regional benefits by making water available for the benefit of areas within the POU for each surface water source. The City currently delivers wholesale water to four customers (SCWA, SSWD, Cal Am and the Natomas Unified School District) through several turnouts that border the City's retail service area. The wholesale customers are shown on Figure 3-2 and described below. The total existing population served by the City's wholesale customers is estimated to be 617,200.

In general, wheeling service is where the City diverts, treats, and conveys water to another agency using that agencies' water supply entitlements. The City treats and wheels water to the Sacramento County Water Agency Zone 40.

The City uses the same surface water treatment facilities, groundwater wells, storage tanks, pumping facilities, and distribution/transmission pipelines described in Section 3.3 and shown on Figure 3-3 to deliver water to wholesale and wheeling customers.

3.2.2.1 Sacramento County Water Agency

SCWA was formed in 1952 by a special legislative act of the State of California and is governed by a Board of Directors. SCWA uses a combination of surface water, groundwater, and recycled water as its sources of water supply.

The City has two connections to serve SCWA. One connection located near Franklin Boulevard at the southern boundary of the City serves the Zone 40 service area. A second connection located in Bayou Road at the western edge of the City serves the Sacramento International Airport and Zone 50 Metro Air Park.

In addition to wholesale water service, the City wheels water for SCWA. The City treats and delivers SCWA water from the Sacramento River to serve a portion of SCWA's Zone 40 service area. Wheeled water is diverted and conveyed through the City's water system using SCWA's water entitlements. Wheeled water volumes are not included as a demand in this UWMP.

Also, in 2020, the City received water from SCWA as part of a groundwater substitution transfer.

3.2.2.2 Sacramento Suburban Water District

SSWD is made up of four service areas within the County. SSWD uses a combination of surface water and groundwater as its sources of water supply. In 2004, the City entered into an agreement with SSWD to supply up to 20 million gallons per day (MGD) (22,400 AFY) of American River water supply plus up to 10 MGD of additional water. The amount of water available to SSWD is impacted by the hydrologic conditions in the American River and is reduced during dry conditions. SSWD has been receiving wholesale water from the City for its South Service Area (SSA) located within the American River POU since 2007.

Also, in 2018 and 2020, the City received water from SSWD as part of a groundwater substitution transfer.

The City has a total of seven interties with SSWD. One main intertie is used to convey water between the agencies; this main intertie is located near Howe Avenue and Northrop Drive at the eastern boundary of the City. The other interties are for emergency use only.

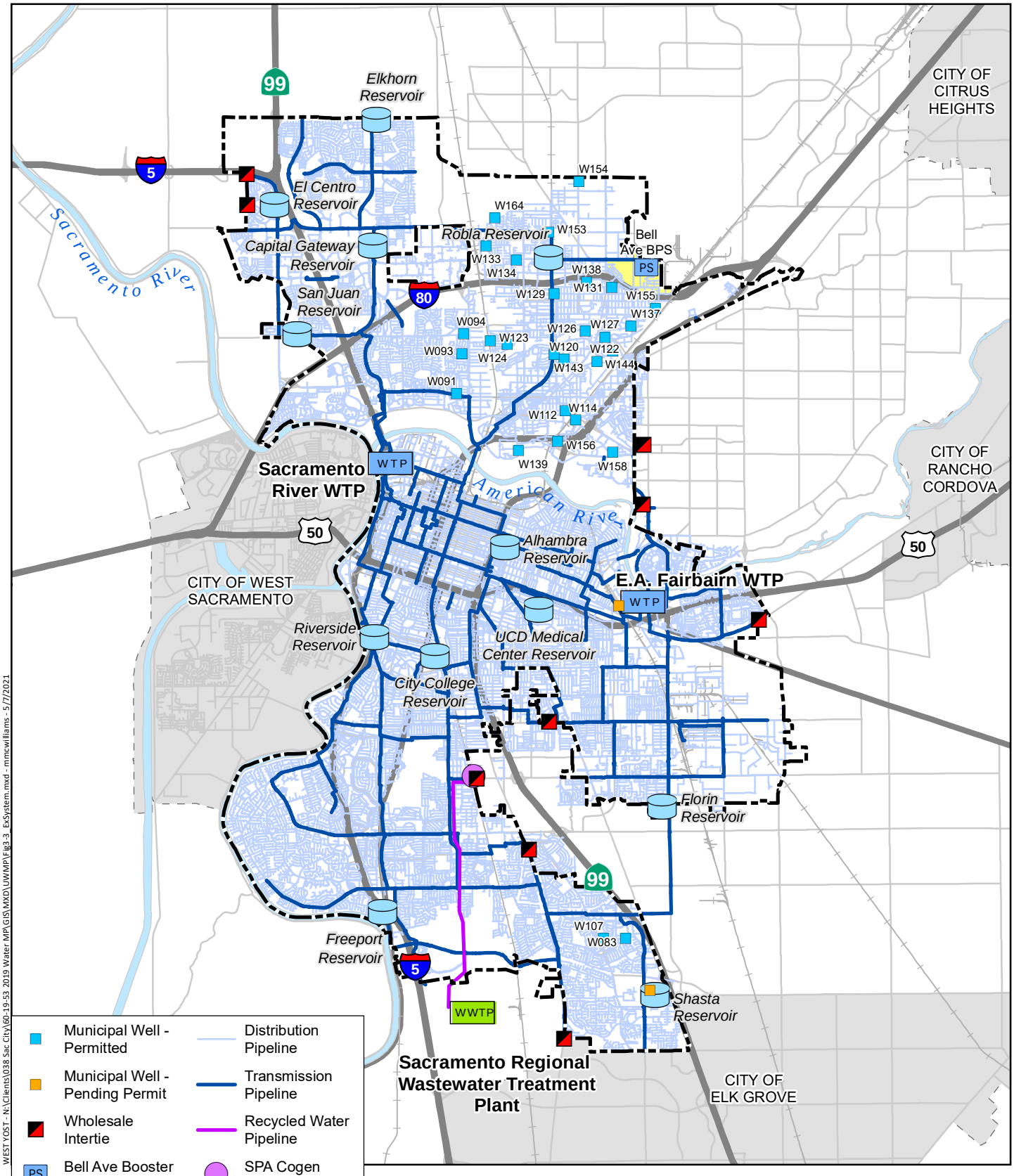

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Figure 3-3

Water Treatment and Distribution System

Notes:

1. Municipal wells with pending permit includes one well at the EAFWTP and two wells at the Shasta Storage facility.

3.2.2.3 California American Water Company

Cal Am is a wholly-owned subsidiary of the American Water Works Company. Cal Am was incorporated into American Water Works Company under California law in 1966. Three of the service areas lie within the American River POU: Arden, Parkway, and Suburban Rosemont. Cal Am uses a combination of groundwater and wholesale purchases as its water supply.

In 1997, the City entered into a wholesale agreement for the Parkway service area. In 2010, the agreement was modified to include both firm and non-firm capacity. The modified agreement includes a firm capacity of 2.3 MGD (2,580 AFY) and a non-firm capacity of 3.46 MGD (3,880 AFY) during off-peak periods (October 15th through May 14th), and can be delivered to any of the three services areas within the American River POU.

In 2019, Cal Am acquired the Fruitridge Vista Water Company (FVWC) which was formed in 1953 by the Cook family to serve water to homeowners in an unincorporated area south of the City in the County. The City had a wholesale agreement with FVWC which has now been transferred to Cal Am-Fruitridge. The Cal Am-Fruitridge service area is considered substantially built out with approximately 95 percent of the service area developed. Cal Am-Fruitridge uses primarily groundwater for supply with wholesale water as a supplemental supply source. The City's agreement with Cal Am-Fruitridge allows the purchase of 3.24 MGD (3,630 AFY) firm capacity which is subject to reductions under certain hydrologic conditions.

The City has five existing connections to serve Cal Am as follows:

- At the intersection of "A" Parkway and Franklin Boulevard to serve Cal Am's Parkway service area
- At the terminal end of a 24-inch diameter transmission main in Folsom Boulevard to serve the Rosemont service area
- At 47th Avenue near the western boundary of the Cal Am-Fruitridge service area
- Near the intersection of Fruitridge Boulevard and Sampson Avenue to serve the Cal Am-Fruitridge service area
- At the intersection of Howe Avenue and Alta Arden Expressway to serve Cal Am's Arden service area

3.2.2.4 Natomas Unified School District

As of July 2019, the City entered into an agreement with Natomas Unified School District to wholesale a small amount of water to serve the Paso Verde K-8 school located outside but adjacent to the City limits.

3.3 WATER SYSTEM DESCRIPTION

The City is responsible for delivering treated water to residential, commercial, and irrigation customers. The City's distribution system consists of two surface water treatment facilities, two pressure zones, groundwater wells, storage tanks, pumping facilities, and distribution/transmission pipelines. Each of these components are discussed in more detail below, and the locations of the major facilities are shown on Figure 3-3.

3.3.1 Surface Water Supply and Treatment Facilities

The City treats surface water diverted from the Sacramento and American Rivers with two water treatment facilities: the Sacramento River Water Treatment Plant (SRWTP) and the E.A. Fairbairn Water Treatment Plant (EAFWTP). The locations of the water treatment plants are shown on Figure 3-3.

3.3.1.1 Sacramento River Water Treatment Plant

The SRWTP located just east of Interstate 5 and south of Richards Boulevard, treats water that is pumped from the Sacramento River about one-half mile downstream of the American River confluence (Figure 3-3). The SRWTP began operation in 1924 with an initial capacity of 32 MGD. Expansions and modifications completed by the City since the 1920's have increased the diversion capacity to 160 MGD which is also the permitted capacity for the SRWTP. The City is permitted to operate the plant at 160 MGD in the summer months and 120 MGD in the shoulder months. However, summer operations can be impacted by unusually low river levels which potentially reduce capacity of the plant to 135 MGD in the summer months. The City is currently evaluating further expansion of the SRWTP to increase the diversion and treatment capacity to 310 MGD.

3.3.1.2 E.A. Fairbairn Water Treatment Plant

The EAFWTP is located on the south bank of the lower American River, approximately seven miles upstream from its confluence with the Sacramento River (Figure 3-3). Construction of the EAFWTP was completed in 1964 with various improvements completed over the years. The plant was designed to be expanded in stages to an ultimate treatment capacity of 404 MGD. The EAFWTP is currently rated at a diversion capacity of 200 MGD, with a permitted treatment capacity of 160 MGD (80 MGD for Basins 1 and 2, and 80 MGD for Basins 3 and 4). However, the EAFWTP is unable to operate reliably at capacity due to the poor condition of some of the plant facilities, and due to environmental agreements that frequently limit diversions during summer months, and other reduced rates during different parts of the year due to water rights agreements, as discussed in further detail in Chapter 6. Therefore, the current reliable capacity of the EAFWTP during peak demand periods is 80 MGD, with the ability to operate at up to 100 MGD, but only for short periods of time.

3.3.2 Groundwater Wells

The City currently has 26 permitted wells in the North American Subbasin and 2 permitted wells in the South American Subbasin; however, only 23 of these wells are operated on a regular basis to supply municipal water. The City's well inventory also includes 22 operational irrigation/park supply wells, and three recently completed, but as of yet not permitted wells, two at Shasta and one at EAFWTP. The total pumping capacity of the wells is about 23 MGD. Assuming that only 60 to 90 percent of the wells are available at any given time, the total pumping capacity is about 14 to 20 MGD. As of 2020, the average age of the City's active potable wells is about 60 years old with the oldest well at 76 years old. Well locations are shown on Figure 3-3.

3.3.3 Storage Tanks

The City currently has seventeen storage facilities: twelve storage reservoirs are located throughout the City, and five finished water clearwells that are located at the water treatment plants (two at EAFWTP and three at SRWTP). The cumulative distribution storage reservoir capacity is 49 million gallons (MG). The clearwell reservoirs located at EAFWTP and SRWTP have a combined capacity of approximately 45 MG.

The locations of the twelve storage tanks located throughout the City and the locations of the two water treatment plants are shown on Figure 3-3.

3.3.4 Pumping Facilities

The City currently operates eighteen (18) high lift service pumps at the SRWTP and EAFWTP and has capacity to add an additional six (6) high lift service pumps at the EAFWTP. The locations of the booster pump facilities are shown on Figure 3-3. All of the storage reservoirs have pump stations to deliver water to the residents and businesses as water demands vary. The City maintains one additional booster pump station to serve water in a small separated pressure zone in the northeast part of the City.

3.3.5 Distribution and Transmission Pipelines

The City maintains approximately 1,800 miles of transmission and distribution system mains ranging in size from 2 to 72 inches in diameter; only 415 miles are of pipeline sizes 12 inches in diameter or larger. Approximately 70 percent of the City's system consists of 6-inch and 8-inch diameter pipelines. The City has one dedicated recycled water pipeline that delivers recycled water from the Sacramento Regional Wastewater Treatment Plant to the Sacramento Power Authority Cogeneration Facility, as shown on Figure 3-3 and further discussed in Chapter 6.

3.3.6 Pressure Zones

Two pressure zones exist in the City. High service pumps at each of the treatment plants pump water directly into the distribution system, creating a pressure zone that encompasses the majority of the City. The second pressure zone is a small area in the northeast portion of the City. On average the City maintains approximately 45 pounds per square inch (psi) throughout its system with a minimum pressure threshold of 30 psi.

3.4 SERVICE AREA CLIMATE

The climate of the City's retail and wholesale service areas are typical of the Sacramento Valley. The winters are moist with mild temperatures, while the summers are hot and dry. As shown in Table 3-1, precipitation averages approximately 17 inches per year, while average temperatures range from a low of around 36 degrees Fahrenheit (°F) to a high of around 93°F. Average evapotranspiration (ETo) is based on data for Station 131 (Fair Oaks) obtained from the California Irrigation Management Information System (CIMIS) website. Rainfall and temperature data is based on data for Sacramento Executive Airport Station obtained from the Western Regional Climate Center (WRCC) website. The historical climate characteristics affecting water management in the City's service area are shown in Table 3-1.

Table 3-1. Monthly Average Climate Data Summary

Month	Standard Monthly Average ETo, inches	Average Total Precipitation, inches[(b)]	Average Temperature, degrees Fahrenheit	
			Maximum	Minimum
January	1.12	3.56	53.5	37.8
February	1.78	3.07	59.9	41.0
March	3.24	2.44	64.6	43.1
April	4.52	1.17	71.4	45.9
May	6.35	0.5	79.9	50.7
June	7.44	0.18	87.2	55.4
July	7.91	0.03	92.7	58.2
August	7.03	0.06	91.5	57.8
September	5.14	0.25	87.7	55.8
October	3.36	0.93	77.7	50.2
November	1.61	2.04	63.7	42.6
December	1.04	3.02	53.8	35.8
Totals	**50.54**	**17.24**	**73.6**	**48.1**

Source: California Irrigation Management Information System (CIMIS) data for Fair Oaks Station 131 (downloaded February 8, 2021).
Source: Western Regional Climate Center (www.wrcc.dri.edu) data for Sacramento Executive Airport Station 047630 (period of record: November 10, 1941 to June 9, 2016)

The American River Basin Study (ARBS) is a joint effort between the USBR and six local area non-federal cost partners including Placer County Water Agency (contracting lead), the cities of Folsom, Roseville, and Sacramento, El Dorado County Water Agency, and the Regional Water Authority to further refine the assessment of water supplies and demands in the American River Basin. The ARBS evaluates several potential climate change scenarios which may impact the region's water supplies and water demands. Key ARBS findings with respect to climate change impacts to temperature, precipitation/snowpack, and runoff are as follows:

- Surface air temperatures are projected to increase steadily, with summer temperature increasing by approximately 7.2°F by the end of the 21st Century, and winter temperature increasing by 4.9°F. Projections of daily maximum and minimum temperatures suggest similar seasonal trends. Maximum temperatures are projected to increase more than minimum temperatures during all seasons, with the largest increase of 7.3°F during the summer months.

- Annual precipitation projections show no change over the 21st Century. Approximately half of the projections indicate an increase in annual precipitation and half indicate a decrease, highlighting the large uncertainty in future precipitation over this region. Although lacking clear trend in projected annual precipitation, by the end of the 21st Century, average fall and spring precipitation is expected to decrease, with winter and summer precipitation increasing. Large variability is also expected in winter and fall precipitation. Snowpack will likely decline due to warming.
- Runoff is expected to increase during winter months. Projections indicate a pronounced shift in the distribution of runoff from May and June to earlier in the season (December to March), implying a shift in precipitation from snow to rainfall and/or earlier snowmelt. Peak runoff may shift by more than a month earlier by mid- to late-century. Spring runoff will decrease due to reduced winter snowpack.

Additional discussion on potential climate change impacts to the City's water demands and water supplies is provided in Chapters 4, 6, and 7 of this plan.

3.5 SERVICE AREA POPULATION AND DEMOGRAPHICS

The City's water service population is described below, along with demographics that may affect water management and planning.

3.5.1 Retail Service Area Population

As described above, the City provides water service to most of the area within the City limits, except a small number of City residents who receive their water from SSWD. The City also serves a small number of customers outside of the City limits in an adjacent, unincorporated portion of the County. The population of these two areas are roughly equivalent. Because the retail service area boundary and the City boundary are contiguous by at least 95 percent, the City estimates its service area population using California Department of Finance (CDoF) data. The City's current (2020) service area population is 510,931.

Land use planning within the City is undertaken by the City's Community Development Department. The City adopted its 2035 General Plan in March 2015. The 2035 General Plan provides a framework for the City's vision and guiding principles for development within the City for a planning horizon to 2035.

Projections of future population within the City's service area and sphere of influence for the years 2025 and 2035 are based on the 2035 General Plan. Projected population for 2040 was obtained from the City's 2015 UWMP. The 2040 population is based on the continued growth rate from the 2035 General Plan population projections plus the Natomas Joint Vision Study Area. To obtain population projections to 2045, an assumption of a continued growth rate within the current service area and sphere of influence consistent with the 2035 General Plan and 2040 population projection was used. The areas outside of the City's SOI are currently anticipated to be served by the County. Figure 3-1 shows the City's SOI. The City's current and projected service area populations are shown in Table 3-2.

Table 3-2. Retail Population – Current and Projected (DWR Table 3-1 Retail)

Population Served	2020	2025	2030	2035	2040	2045*(opt)*
	510,931	566,038	603,209	640,381	695,830	745,319

NOTES:
2020 data from State of California, Department of Finance, *E-5 Population and Housing Estimates for Cities, Counties and the State , 2011-2020 with 2010 Census Benchmark* — Sacramento, California, May 2020.
2025 – 2035 projected population from the City's 2035 General Plan.
2040 projected population is based on a continuous growth rate plus the Natomas Joint Vision Study Area.
2045 projected population estimated using growth rate of previous projections.
Opt, the abbreviation for optional, is used in this table and subsequent tables throughout this UWMP.

3.5.2 Wholesale Service Area Population

The City's wholesale current and projected service area population through 2040 is from the City's 2015 UWMP. The 2045 projected wholesale population was estimated by using the growth rate from the previous projections. The wholesale population numbers summarized in Table 3-3 represent the population for wholesale customer's entire service areas. Therefore, the information shown includes population outside the American River POU.

Table 3-3. Wholesale Population – Current and Projected (DWR Table 3-1 Wholesale)

Population Served	2020	2025	2030	2035	2040	2045*(opt)*
	617,200	669,000	725,200	787,100	828,500	887,600

NOTES: Projected wholesale population for 2020 through 2040 is from the City's 2015 UWMP. 2045 projected wholesale population estimated using growth rate of previous projections.

3.5.3 Retail Service Area Social, Economic, and Demographics

The CWC now requires the inclusion of service area socioeconomic information as part of the system description in UWMPs. However, differences in household water use across sociodemographic groups in the City has not been studied. Therefore, the following social, economic, and demographic information is being provided to comply with the new regulation. The information was derived from the US Census

Bureau's profile of Sacramento for 2014-2018 and is assumed to sufficiently apply to the City's water service area and the water service areas of its wholesale customers.[3]

- The average number of people per household in the five-year period analyzed was 2.66
- The median household income in Sacramento was $58,456, while 18.3 percent of all individuals and 24.6 percent of youth under the age of 18 lived in poverty
- The average unemployment rate was 8 percent
- The owner-occupied housing unit rate was 48 percent, with a median home value of $313,400
- The median gross rent was $1,179 per month
- The median age was 34.4 years
- Of persons 25 years or older in Sacramento, 84.7 percent had earned at least a high school diploma or equivalent and 32.6 percent had earned a bachelor's degree or higher
- Of persons under 65 years of age, 8.3 percent had a disability
- Of the non-institutionalized civilian population, 6.9 percent did not have health insurance
- Almost 92 percent of households had a computer, and 83.2 percent had a broadband internet subscription
- By race/ethnicity, 47.2 percent of people were White, 13.4 percent were Black, 0.8 percent were American Indian or Alaska Native, 18.9 percent were Asian, 1.7 percent were Hawaiian Native or Pacific Islander, 11 percent were another race, and 7 percent were two or more races. Of the total population in Sacramento, 28.7 percent of people were Hispanic or Latino and 71.3 percent were non-Hispanic or non-Latino
- Of Sacramento residents, 22.6 percent were foreign born, and 38.2 percent of people age five years and older spoke a language other than English at home

3.6 LAND USES WITHIN SERVICE AREA

The Sacramento Area Council of Governments (SACOG) projects that the County, as a whole, will continue to experience growth in jobs, housing, and population.[4] Land use that may impact water supply planning for the City's service area are discussed below.

3.6.1 Land Uses Within Retail Service Area

Existing land use within the City of Sacramento is summarized in Table 3-4. Total land use within the City is 52,242 acres, excluding rights-of-way. The City is currently approximately 86 percent developed.

[3] United States Census Bureau, American Community Survey, 2014-2018 ACS 5-Year Data Profile for Sacramento, CA.

[4] Sacramento Area Council of Governments, November 2019. *2020 Metropolitan Transportation Plan/Sustainable Communities Strategy*. https://www.sacog.org/post/adopted-2020-mtpscs.

Table 3-4. Existing Land Uses		
Land Use	Acres	Percent of City Area
Residential	23,278	45
Commercial, Office, and Mixed Use	4,048	8
Industrial	4,800	9
Public/Institutional	4,380	8
Open Space/Recreational	5,806	11
Other[(a)]	2,932	5
Vacant	6,998	14
Total	**52,242**	**100**

Source: 2040 General Plan, Draft Technical Background Report (Table 2-7), September 2019. Totals exclude rights-of-way.

(a) Other land uses include utilities, agricultural, miscellaneous, and parking.

These existing land uses are further described as follows:

- Residential land uses represent the largest land use category in the City limits, at 45 percent of total land use, with single family residential uses accounting for 84 percent of the residential land use.
- Commercial, office, and mixed uses are about 8 percent of the land within the City limits, with retail/commercial uses making up 4 percent. Commercial and office uses are typically along corridors, while office uses are often in office parks.
- Industrial uses account for 9 percent of the total land use and are located throughout the City, often near transportation infrastructure, such as freeways and rail lines.
- Public/Institutional uses account for 8 percent of the land use. These include State and local government uses in and around the Downtown area. Other public uses, such as schools, educational facilities, and other public and community facilities are distributed throughout the City.
- Open space and recreational uses, 11 percent of the land use total, includes public parks, paths and trails, sports facilities, and drainage and flood control areas.
- Other land uses, approximately 5 percent of the total, include utilities, agricultural, miscellaneous, and parking.
- Vacant land accounts for approximately 14 percent of all land use.

The City is currently in the process of updating its General Plan which will help guide future growth in the City. The City is anticipating future growth to occur in 59 Opportunity Areas around the City and has estimated growth for these areas in terms of anticipated new dwelling units and jobs. The City has projected the future growth to include approximately 70,000 new dwelling units and approximately 77,000 new jobs. Approximately 92 percent of future dwelling unit growth and 89 percent of future jobs is expected to occur within the Opportunity Areas. The remaining 8 percent of future dwelling unit growth and 11 percent of future job growth is expected to occur throughout the City. Table 3-5 provides a summary of the anticipated future growth in the City. Figure 3-4 shows the location of the 59 Opportunity Areas the City identified.

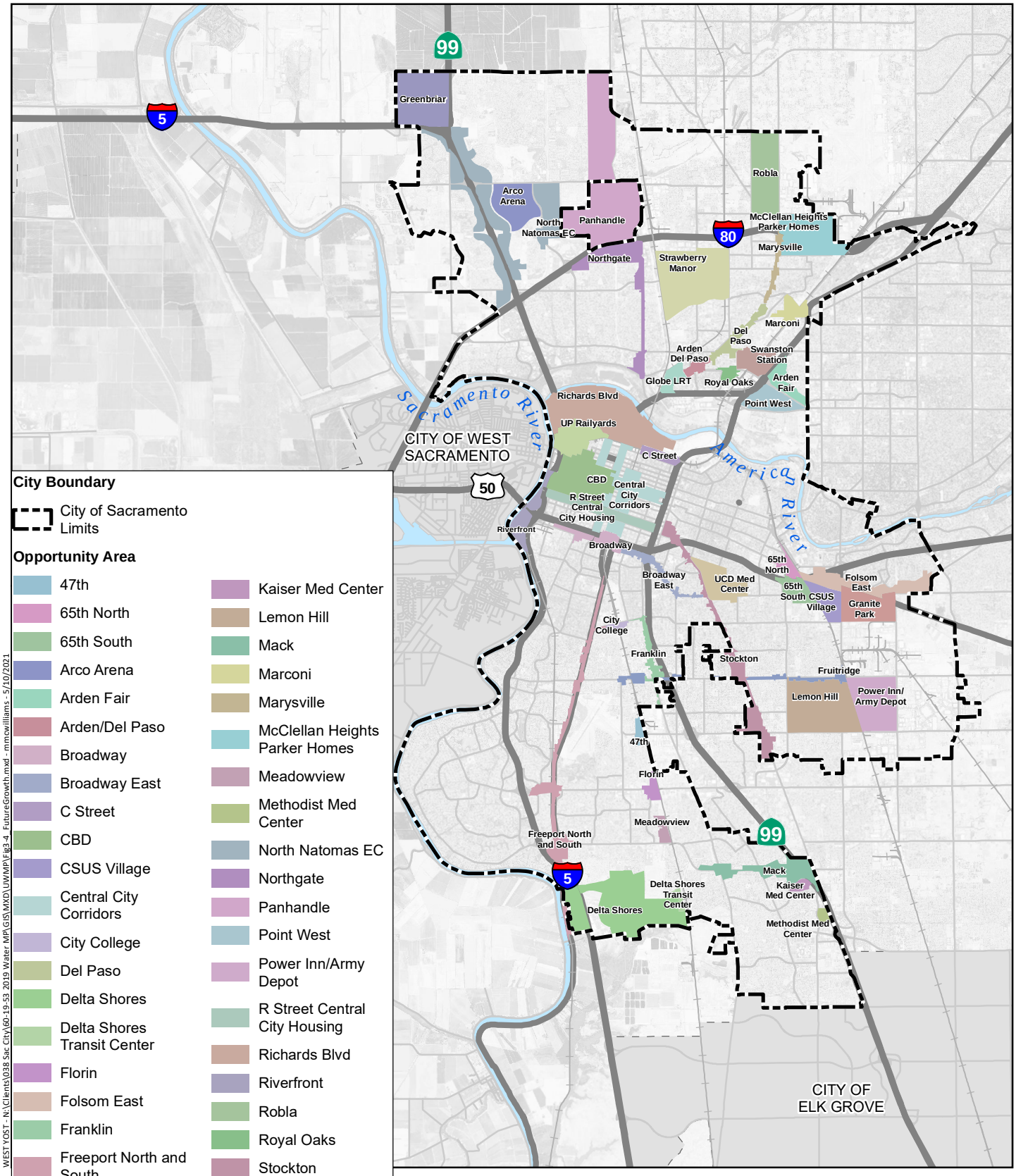
Table 3-5. Anticipated Future Growth in Housing Units and Jobs

Opportunity Area	Housing Units		Jobs	
	Anticipated Growth	Percent Growth	Anticipated Growth	Percent Growth
47th	44	0.1	29	0.0
65th North	2,612	3.8	2,254	2.9
65th South	1,670	2.4	2,717	3.5
Arco Arena	1,918	2.8	3,056	4.0
Arden Fair	749	1.1	1,169	1.5
Arden/Del Paso	371	0.5	107	0.1
Broadway	866	1.3	365	0.5
Broadway East	143	0.2	117	0.2
C Street	200	0.3	221	0.3
Central Business District	7,271	10.6	6,787	8.9
Central City Corridors	5,399	7.9	1,352	1.8
City College[(a)]	128	0.2	23	0.0
Cosumnes River[(a)]	471	0.7	441	0.6
CSU-Sacramento Village	237	0.3	1,383	1.8
Del Paso	258	0.4	200	0.3
Delta Shores	5,222	7.6	1,418	1.9
Delta Shores Transit Center	370	0.5	687	0.9
Florin	1,124	1.6	368	0.5
Folsom East	579	0.8	180	0.2
Franklin	77	0.1	27	0.0
Freeport North	72	0.1	57	0.1
Freeport South	515	0.8	143	0.2
Fruitridge	30	0.0	-16	0.0
Globe Light Rail Transit	361	0.5	136	0.2
Granite Park	531	0.8	1,356	1.8
Greenbriar	2,766	4.0	829	1.1
Jackson[(a)]	1,155	1.7	538	0.7
Johnston East[(a)]	155	0.2	166	0.2
Johnston West[(a)]	56	0.1	150	0.2
Kaiser Med Center	0	0.0	500	0.7
Lemon Hill	517	0.8	100	0.1
Mack	215	0.3	450	0.6
Marconi	78	0.1	191	0.2
Marysville	184	0.3	183	0.2
McClellan Heights/Parker Homes	287	0.4	227	0.3
Meadowview	518	0.8	22	0.0
Methodist Med Center	80	0.1	910	1.2

Table 3-5. Anticipated Future Growth in Housing Units and Jobs

Opportunity Area	Housing Units		Jobs	
	Anticipated Growth	Percent Growth	Anticipated Growth	Percent Growth
North City Farms[(a)]	34	0.0	28	0.0
North Natomas EC	1,758	2.6	2,583	3.4
North Northgate	535	0.8	93	0.1
Northgate	83	0.1	136	0.2
Panhandle	1,622	2.4	654	0.9
Point West	0	0.0	45	0.1
Power Inn/Army Depot	351	0.5	2,363	3.1
R Street Central City Housing	1,530	2.2	573	0.7
Raley[(a)]	0	0.0	1,357	1.8
Richards Boulevard	3,352	4.9	8,832	11.5
Riverfront	5,443	8.0	4,026	5.3
Robla	576	0.8	46	0.1
Royal Oaks	259	0.4	189	0.2
Southwest Natomas[(a)]	442	0.6	222	0.3
Stockton	888	1.3	106	0.1
Stockton North[(a)]	452	0.7	106	0.1
Stockton South[(a)]	217	0.3	235	0.3
Strawberry Manor	544	0.8	27	0.0
Swanston Station	64	0.1	56	0.1
Truxel[(a)]	534	0.8	569	0.7
UCD Med Center	254	0.4	4,678	6.1
UP Railyards	6,767	9.9	12,571	16.4
Opportunity Area Growth	62,935	92	68,338	89
Non-Opportunity Area Growth	5,470	8	8,261	11
Total Growth	**68,405**	**100**	**76,600**	**100**

(a) Not shown on Figure 3-4.



City Boundary

City of Sacramento Limits

Opportunity Area

- 47th
- 65th North
- 65th South
- Arco Arena
- Arden Fair
- Arden/Del Paso
- Broadway
- Broadway East
- C Street
- CBD
- CSUS Village
- Central City Corridors
- City College
- Del Paso
- Delta Shores
- Delta Shores Transit Center
- Florin
- Folsom East
- Franklin
- Freeport North and South
- Fruitridge
- Globe LRT
- Granite Park
- Greenbriar
- Kaiser Med Center
- Lemon Hill
- Mack
- Marconi
- Marysville
- McClellan Heights Parker Homes
- Meadowview
- Methodist Med Center
- North Natomas EC
- Northgate
- Panhandle
- Point West
- Power Inn/Army Depot
- R Street Central City Housing
- Richards Blvd
- Riverfront
- Robla
- Royal Oaks
- Stockton
- Strawberry Manor
- Swanston Station
- UCD Med Center
- UP Railyards

Notes:

1. The following opportunity areas are not shown: City College, Consumnes River, Jackson, Johnston East, Johnston West, North City Farms, Raley, Southwest Natomas, Stockton North, Stockton South, and Truxel.

N

0 1.25 2.5

Miles

WEST YOST

DRAFT

Figure 3-4

Future Growth Opportunity Areas

City of Sacramento
2020 UWMP

3.6.2 Land Uses Within Wholesale Service Area

Land uses for the City's wholesale customers are briefly described below. Projected population for the City's existing and future wholesale customers are summarized in Table 3-3.

3.6.2.1 Sacramento County Water Agency

The SCWA Zone 40 service areas are predominantly residential with a small amount of commercial and institutional customers.

3.6.2.2 Sacramento Suburban Water District

The SSWD service area is projected to reach buildout by 2031.[5] Based on SACOG data, SSWD projects that single family homes will grow at a faster rate than multi-family homes in its service area.

3.6.2.3 California American Water Company

Cal Am's Arden, Parkway, and Fruitridge service areas are in the unincorporated region of the County, and SACOG projects most employment growth will be in the unincorporated areas of the County. A region that is expected to grow more intensely is Rancho Cordova; Cal Am's Rosemont service area partially overlies the City of Rancho Cordova.[6] The service area is mostly residential, with 88 percent of the customers being residential and 9 percent commercial. Cal Am's Fruitridge service area is considered substantially built out with approximately 95 percent of the service area developed.

3.6.2.4 Natomas Unified School District

As of July 2019, the City entered into an agreement with Natomas Unified School District to wholesale a small amount of water to serve the Paso Verde K-8 school located outside but adjacent to the City limits.

[5] Sacramento Suburban Water District, 2015 Urban Water Management Plan Draft (April 2016)

[6] California American Water, Sacramento District 2010 Urban Water Management Plan (October 2011)

CHAPTER 4
Water Use Characterization

This chapter describes and quantifies the City's historical, current, and projected water uses to the extent that records are available. The terms "water use" and "water demand" are used interchangeably and refer to water conveyed by a distribution system and used by the City and its customers for any purpose.

4.1 NON-POTABLE VERSUS POTABLE WATER USE

Potable water is water that is safe to drink and which typically has had various levels of treatment and disinfection.

Recycled water is municipal wastewater that has been treated to a specified quality to enable it to be used again for non-potable uses. Recycled water is discussed in Chapter 6 (Section 6.5).

Raw water is untreated water that is used in its natural state or with minimal treatment. The City does not deliver raw water to any retail customers within its service area.

4.2 WATER USES BY SECTOR

This section describes the City's retail water use by customer type, or sector, including historical, current, and the projected water uses through 2045. As of December 2020, 99 percent of the City's water connections were metered.

The City delivers water to the following sectors: single family residential, multi-family residential, commercial (including industrial), institutional, landscape irrigation customers, and other. Water supplied to wholesale and wheeling customers is discussed in Section 4.3. The remaining demand is distribution system losses. The City uses the following definitions for each sector, as outlined in the DWR Guidebook:

- **Single Family residential:** A single-family dwelling unit. A parcel with a free-standing building containing one dwelling unit that may include a detached secondary dwelling.
- **Multi-Family residential:** Multiple dwelling units contained within one building or several buildings within one complex.
- **Institutional (and Governmental):** A water user dedicated to public service. This type of user includes, among other users, higher education institutions, schools, courts, churches, hospitals, government facilities, and nonprofit research institutions.
- **Commercial (and Industrial):** The City reports commercial and industrial demand sectors as a single demand sector that includes water users that provide or distribute a product or service and water users that are primarily a manufacturer or processor of materials as defined by the North American Industry Classification System (NAICS) code sectors 31 to 33, inclusive, or an entity that is a water user primarily engaged in research and development.
- **Landscape:** Water connections supplying water solely for landscape irrigation. Such landscapes may be associated with multi-family, commercial, industrial, or institutional/governmental sites, but are considered a separate water use sector if the connection is solely for landscape irrigation.
- **Distribution System Losses:** Distribution system water losses are the physical water losses from the water distribution system and the supplier's storage facilities, up to the point of customer consumption.

- **Other:** Demand that is not covered in the above demand sectors which include such volume as parcels recently recoded as vacant, metered construction water, or metered water utilized for water main cleaning.

4.2.1 Historical Retail Water Use

The estimated retail water use by sector for the City for 2016 through 2019 is summarized in Table 4-1. Retail water use is estimated because the City was not fully metered for the years shown in Table 4-1. The retail water distribution system is also used to deliver supply to the City's wholesale customers. The wholesale customer water demand is included to accurately represent the water loss, which is total production minus total consumption, in the retail water distribution system.

Table 4-1. Historical Water Demand by Water Use Sector, AF

Water Use Sector	2016	2017	2018	2019
Single Family	41,435	41,868	40,853	39,414
Multi-Family	13,825	12,892	12,171	13,470
Commercial (and Industrial)	16,751	17,949	17,889	16,572
Institutional (and Governmental)	4,029	4,464	4,668	5,478
Landscape	4,275	4,915	4,676	2,492
Other	79	127	235	492
Total Retail Demand	**80,394**	**82,215**	**80,491**	**77,919**
Wholesale Demand	958	2,460	1,027	8,465
Losses	5,803	9,147	11,379	10,998
Total	**87,155**	**93,823**	**92,897**	**97,382**

4.2.2 Current Retail Water Use

The City currently serves 142,946 retail customer connections as of December 2020. The customer connection count does not include fire service connections. Actual retail water demand by sector in 2020 is reported in Table 4-2.

Table 4-2. Retail Demands for Potable and Non-Potable Water – Actual (DWR Table 4-1 Retail)

Use Type	2020 Actual		
Drop down list May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool	Additional Description (as needed)	Level of Treatment When Delivered Drop down list	Volume*
Add additional rows as needed			
Single Family		Drinking Water	44,419
Multi-Family		Drinking Water	13,979
Commercial	Includes Industrial Use Type	Drinking Water	15,984
Institutional/Governmental		Drinking Water	5,740
Landscape		Drinking Water	2,905
Other Potable		Drinking Water	650
Sales/Transfers/Exchanges to other agencies	To Wholesale Customers	Drinking Water	3,607
Losses		Drinking Water	13,197
		TOTAL	100,483
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES: Units are in acre-feet (AF).			

4.2.3 Projected Retail Water Use

Demand projections provide the basis for sizing and phasing future water facilities to ensure adequate supply is available to all customers. The City's on-going Water Master Plan Update projected water demands through 2050 and is the basis for the projected water demands summarized in Table 4-3. The City's on-going Water Master Plan Update incorporated the most recent and accurate future development estimates and unit water use factors to develop the water demand projections. Unit water use factors were refined based on recent, post-drought water use trends and reflect current and on-going water use efficiencies and water conservation by the City's water customers. In addition, the water demand projections take into account a future drought rebound factor since the 2012 to 2016 historical drought in California to provide conservative demand projections.

The water demand projections are lower compared to the water demand projections in the 2015 UWMP. The 2015 UWMP used the City's 2013 Water Master Plan as a basis for its demand projections. Since 2013, the City has implemented a variety of water conservation programs, which has helped reduce water use. The City has also increased the number of water connections which are metered. In 2016, the City was estimated to be approximately 67 percent metered. As of December 2020, 99 percent of the City's water connections were metered. Lastly, the projected new growth within the City's service area (both in terms

of number of planned new housing units and employment) is less than what was projected for the 2013 Water Master Plan. All of these factors contribute to the lower projected water demand presented in Table 4-3.

Table 4-3. Retail Demands for Potable and Non-Potable Water – Projected (DWR Table 4-2 Retail)

Use Type	Additional Description (as needed)	Projected Water Use* *Report To the Extent that Records are Available*				
Drop down list May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool		2025	2030	2035	2040	2045 (opt)
Add additional rows as needed						
Single Family		46,913	47,491	48,069	48,647	51,098
Multi-Family		15,334	16,085	16,837	17,588	18,474
Commercial	Includes Industrial Use Type	17,871	19,068	20,266	21,464	22,545
Institutional/Governmental		6,094	6,200	6,306	6,412	6,736
Landscape		5,087	7,144	9,200	11,257	11,824
Other Potable		2,366	4,054	5,742	7,430	7,804
Losses		13,767	13,767	13,766	13,766	14,460
	TOTAL	107,432	113,809	120,187	126,564	132,942
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*						
NOTES: Units are in acre-feet (AF).						

4.2.3.1 30-Year Planning Horizon

As part of the City's on-going Water Master Plan Update, a 2050 demand scenario was developed to evaluate the sensitivity of sizing of the City's distribution system infrastructure to future demand increases for development beyond that identified by the 2040 General Plan. This demand scenario includes increased demand within the City's current SOI, and potential demand outside of the City's SOI that is currently anticipated to be served by Sacramento County.

For the sensitivity analysis, demands within the retail service area were projected through 2050, assuming the same growth rate beyond 2040. Demands were also included for future developments in the former Natomas Joint Vision Area, including Grand Park Specific Plan and Upper Westside Specific Plan, based on preliminary estimates provided by the County. As noted above, it is currently anticipated that areas outside of the City's SOI will be served by the County, and the purpose of the analysis is solely to evaluate the sensitivity of sizing for future infrastructure, should the City need to serve areas that are currently not anticipated to be served. Table 4-4 shows the projected 2050 retail water use. The total projected retail water use is 155,000 AF, with an equivalent average daily use of 138 MGD.

Table 4-4. Projected 2050 Retail Water Use		
Parameter	Projected Demand, AF	Projected Average Day Demand, MGD
Existing Retail Use[a]	91,867	82.0
Drought Rebound Factor for Existing Use[a]	9,187	8.2
Increase for Future Retail Use	38,266	34.2
Natomas Joint Vision Area Future Demand[b]	15,900	14.2
Airport South Industrial Area	643	0.6
Total 2050 Projected Retail Use	**155,219**	**138.6**

(a) The City's on-going Water Master Plan Update used 2018 data for the existing retail use and drought rebound factor.
(b) Includes estimated use for the Grandpark Specific Plan and Upper Westside Specific Plan for purposes of a sensitivity analysis but recognizing that the Natomas Joint Vision Area would require annexation into the City prior to receiving any water supply and services from the City of Sacramento.

4.2.3.2 Characteristic Five-Year Retail Water Use

The estimated retail water use for the next five years, following 2020, is summarized in Table 4-5. Projected water demands for 2021 through 2024 were estimated as a linear interpolation between the 2020 consumption by use type, reported in Table 4-2, and the 2025 projected water use, reported in Table 4-3. The characteristic five-year water use does not assume drought conditions and will be incorporated into the DRA, further discussed in Chapter 7.

Table 4-5. Projected Five-Year Water Use for Retail Customers, AF					
Water Use Sector	2021	2022	2023	2024	2025
Single Family	44,918	45,417	45,916	46,414	46,913
Multi-Family	14,250	14,521	14,792	15,063	15,334
Commercial (and Industrial)	16,361	16,739	17,116	17,494	17,871
Institutional (and Governmental)	5,811	5,882	5,952	6,023	6,094
Landscape	3,342	3,778	4,214	4,651	5,087
Other	994	1,337	1,680	2,023	2,366
Losses	13,311	13,425	13,539	13,653	13,767
Total	**98,987**	**101,098**	**103,209**	**105,320**	**107,432**

4.3 WHOLESALE WATER USE

The City's water rights and supply facilities provide regional benefits by making water available to areas adjacent to the City. The City currently provides wholesale and wheeling service to a number of neighboring agencies. In general, wholesale water service is where the City sells water collected under the *City's entitlements* to other agencies. Wholesale water deliveries are discussed below. Wheeling service is where the City diverts, treats, and conveys water to another agency *using that agencies' entitlements*. Wheeled water is not considered a City water demand because it does not reduce the amount of water entitled to the City, and therefore wheeled water use is not included as a demand in this UWMP.

The City has historically delivered and has agreements to provide more than 3,000 AFY to wholesale customers. Therefore, the City is required to report the demands for wholesale customers separately from their retail customers in accordance with the DWR Guidebook. The wholesale customers are described in Chapter 3.

4.3.1 Historical Wholesale Water Use

The City's historical water wholesale deliveries for 2016 through 2019 are summarized in Table 4-6.

Table 4-6. Historical Water Deliveries by Wholesale Agency, AF

Water Use Sector	2016	2017	2018	2019
SCWA – Airport	428	427	655	903
SCWA – Zone 50 Metro Air Park	0	357	0	0
SSWD	423	1,301	0	6,402
Cal Am Arden	0	0	0	0
Cal Am Fruitridge	0	2	1	1
Cal Am Parkway	57	369	0	668
Cal Am Rosemont	49	4	371	492
Total	**958**	**2,460**	**1,027**	**8,465**

4.3.2 Current Wholesale Water Use

The City's actual water wholesale deliveries for 2020 are summarized in Table 4-7.

Table 4-7. Wholesale Demands for Potable and Non-Potable Water – Actual (DWR Table 4-1 Wholesale)

Use Type	2020 Actual		
Drop down list May select each use multiple times These are the only use types that will be recognized by the WUE data online submittal tool	Additional Description (as needed)	Level of Treatment When Delivered Drop down list	Volume*
Add additional rows as needed			
Sales to other agencies	SCWA - Airport	Drinking Water	712
Sales to other agencies	SCWA - Zone 50 Metro Air Park	Drinking Water	90
Sales to other agencies	SSWD - Arden	Drinking Water	390
Sales to other agencies	Cal Am Arden	Drinking Water	0
Sales to other agencies	Cal Am Fruitridge	Drinking Water	267
Sales to other agencies	Cal Am Parkway	Drinking Water	1,127
Sales to other agencies	Cal Am Rosemont	Drinking Water	1,022
		TOTAL	3,607
**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*			
NOTES: Units are in acre-feet (AF). The City did not deliver water to Natomas Unified School District in 2020.			

4.3.3 Projected Wholesale Water Use

In the future, the City may expand its role as a wholesaler for the benefit of other water purveyors and their customers in the region. Projected wholesale demands were developed in the on-going Water Master Plan Update and are based on two future supply scenarios: 1) probable estimate of future wholesale demands; and 2) maximum estimate that assumes all water agencies within the American River Place of Use Boundary receive wholesale water. The probable estimate is based on other agencies' master plans, communications that other agencies have had with the City, or by judgment of the City staff, as reported in the City's on-going Water Master Plan Update. As discussed in Chapter 3, the City currently provides wholesale and wheeling service to several neighboring water agencies. A brief description of the POU boundaries is presented in Chapter 3.

For the purposes of this 2020 UWMP, it is assumed that the existing wholesale customers will take the probable estimate by 2030 and assumed that all wholesale customers within the American River POU Boundary will take the maximum estimate by 2040. Projected wholesale demands past 2040 are not expected to change. The interim years are linearly interpolated. Table 4-8 summarizes the projected wholesale customer water use through 2045.

Table 4-8. Wholesale Demands for Potable and Raw Water – Projected (DWR Table 4-2 Wholesale)

Use Type	Additional Description (as needed)	Projected Water Use * Report To the Extent that Records are Available				
Drop down list May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool.		2025	2030	2035	2040	2045 (opt)
Add additional rows as needed						
Sales to other agencies	SCWA - Airport	1,056	1,400	1,400	1,400	1,400
Sales to other agencies	SCWA - Zone 50 Metro Air Park	2,545	5,000	5,000	5,000	5,000
Sales to other agencies	SSWD - Arden	1,945	3,500	14,782	26,064	26,064
Sales to other agencies	SSWD - Northridge	0	0	2,130	4,260	4,260
Sales to other agencies	Golden State Water Company	0	0	518	1,037	1,037
Sales to other agencies	Del Paso Manor Water District	0	0	672	1,344	1,344
Sales to other agencies	Cal Am Arden	457	913	1,384	1,855	1,855
Sales to other agencies	Cal Am Fruitridge	4,479	8,692	8,692	8,692	8,692
Sales to other agencies	Cal Am Parkway	2,803	4,480	6,258	8,036	8,036
Sales to other agencies	Cal Am Rosemont	3,591	6,160	8,163	10,166	10,166
Sales to other agencies	SCWA - Arden Park	0	0	2,106	4,211	4,211
Sales to other agencies	SCWA - Zone 41 CSA Wholesale	4,800	9,600	10,122	10,644	10,644
Sales to other agencies	SCWA - Zone 41 NSA, CSA, and SSA	6,661	13,321	12,836	12,350	12,350
Sales to other agencies	Tokay Park	0	0	47	95	95
Sales to other agencies	Florin County Water District	0	0	919	1,837	1,837
Sales to other agencies	Natomas Unified School District	69	69	69	69	69
	TOTAL	28,406	53,135	75,098	97,060	97,060

**** Units of measure (AF, CCF, MG)*** *must remain consistent throughout the UWMP as reported in Table 2-3.*

NOTES: Units are in acre-feet (AF). Projected wholesale water use estimates were developed in the on-going Water Master Plan Update. 2030 wholesale projected water use is equal to the probable estimate (average likely water delivery in the on-going Water Master Plan Update) of future wholesale demands. 2040 and 2045 wholesale projected water use is equal to the maximum estimate assuming that all water agencies in the American River Place of Use Boundary receive wholesale water. Interim years (2025 and 2035) were linearly interpolated. The City estimates that it will deliver approximately 69 AF to Natomas Unified School District.

4.3.3.1 Characteristic Five-Year Wholesale Water Use

The estimated water use for the next five years, following 2020, is summarized in Table 4-9 for the City's existing wholesale customers. Projected wholesale water use for 2021 through 2024 was linearly interpolated between the 2020 actual use and the projected 2025 water use. The characteristic five-year water use does not assume drought conditions and will be incorporated into the DRA, further discussed in Chapter 7.

Table 4-9. Projected Five-Year Water Use for Existing Wholesale Customers, AF					
Water Use Sector	2021	2022	2023	2024	2025
SCWA – Airport	781	849	918	987	1,056
SCWA – Zone 50 Metro Air Park	581	1,072	1,563	2,054	2,545
SSWD	701	1,012	1,323	1,634	1,945
Cal Am Arden	91	183	274	365	457
Cal Am Fruitridge	1,109	1,952	2,794	3,637	4,479
Cal Am Parkway	1,462	1,797	2,133	2,468	2,803
Cal Am Rosemont	1,536	2,050	2,563	3,077	3,591
SCWA – Zone 41 CSA Wholesale	960	1,920	2,880	3,840	4,800
SCWA – Zone 41 NSA, CSA, and SSA	1,332	2,664	3,996	5,328	6,661
Natomas Unified School District	69	69	69	69	69
Total	**8,622**	**13,568**	**18,514**	**23,460**	**28,406**

4.4 TOTAL WATER USE

Projected total annual retail water use in five-year increments through the year 2045 is shown in Table 4-10. Recycled water demand is addressed separately in Chapter 6 (Section 6.5).

Table 4-10. Projected Total Retail Water Use (Potable and Non-Potable) (DWR Table 4-3 Retail)

	2020	2025	2030	2035	2040	2045 (opt)
Potable Water, Raw, Other Non-potable *From Tables 4-1R and 4-2 R*	100,483	107,432	113,809	120,187	126,564	132,942
Recycled Water Demand *From Table 6-4*	29	1,000	1,000	1,000	1,000	1,000
Optional Deduction of Recycled Water Put Into Long-Term Storage[1]						
TOTAL WATER USE	100,512	108,432	114,809	121,187	127,564	133,942
*[1] Long term storage means water placed into groundwater or surface storage that is not removed from storage in the same year. Supplier **may** deduct recycled water placed in long-term storage from their reported demand. This value is manually entered into Table 4-3.*						
NOTES: Units are in acre-feet (AF). Table references refer to DWR table numbers.						

Projected total annual wholesale water use in five-year increments through the year 2045 is shown in Table 4-11. As will be discussed in Section 6.5, recycled water is not planned to be treated or distributed by the City to wholesale customers.

Table 4-11. Projected Total Wholesale Water Use (Potable and Non-Potable)
(DWR Table 4-3 Wholesale)

	2020	2025	2030	2035	2040	2045 (opt)
Potable and Raw Water From Tables 4-1W and 4-2W	3,607	28,406	53,135	75,098	97,060	97,060
Recycled Water Demand* From Table 6-4W	0	0	0	0	0	0
TOTAL WATER DEMAND	3,607	28,406	53,135	75,098	97,060	97,060
NOTES: Units are in acre-feet (AF). Table references refer to DWR table numbers.						

4.4.1 Total Water Use Beyond 2045

To meet the 20-year planning requirement for future water supply assessments (Senate Bill 610), the City has decided to include demand projections to the year 2050 in its 2020 UWMP. The City's projected 2050 retail demands are 155,000 AF potable water and 1,000 AF recycled water for a total retail demand of 156,000 AF. The City's projected 2050 wholesale water demand is 97,060 AF. The future projections are anticipated to evolve over time with the implementation of conservation measures and will be reevaluated when long-range planning documents are updated.

4.5 DISTRIBUTION SYSTEM WATER LOSSES

System losses are the difference between the actual volume of water treated and delivered into the distribution system and the actual metered consumption. Such apparent losses are always present in a water system due to pipe leaks, unauthorized connections or use, faulty meters, unmetered services such as fire protection and training, and system and street flushing.

The City uses the American Water Works Association (AWWA) method to annually evaluate its distribution system losses on a fiscal year basis. For the 2020 fiscal year, the City's water losses were estimated to be approximately 10,097 AF. Copies of the City's Water Audit worksheets from Fiscal Years 2016 to 2020 are provided in Appendix E.

Table 4-12 summarizes the system losses for the last five fiscal years. The most recent 12-month period began on July 1, 2019.

Table 4-12. Retail Last Five Years of Water Loss Audit Reporting (DWR Table 4-4 Retail)

Reporting Period Start Date (mm/yyyy)	Volume of Water Loss [1,2]
07/2015	9,856
07/2016	6,801
07/2017	8,391
07/2018	9,160
07/2019	10,097
[1] Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet. *[2] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*	
NOTES: Units are in acre-feet (AF). Water loss audits are prepared based on the fiscal year.	

Losses from the City's wholesale water distribution system are included in the retail water distribution system reporting. The City's distribution system for retail and wholesale customers is a single system and not separated. Therefore, Table 4-13 assumes a wholesale loss of 0 AF to avoid over counting system losses. In addition, the City's wholesale customers will report their individual system water losses in their UWMPs.

Table 4-13. Wholesale Last Five Years of Water Loss Audit Reporting (DWR Table 4-4 Wholesale)

Reporting Period Start Date (mm/yyyy)	Volume of Water Loss [1,2]
-	-
[1] Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet. *[2] **Units of measure (AF, CCF, MG)** must remain consistent throughout the UWMP as reported in Table 2-3.*	
NOTES: Water loss audit reporting for the City's wholesale customers is included in the Retail Water Loss Audit reporting as the City's water distribution system for wholesale and retail customers is a single system.	

At the time of preparation of this UWMP, DWR and the State Water Board are in the process of adopting water loss standards. This is discussed further in Chapter 9.

4.6 WATER USE FOR LOWER INCOME HOUSEHOLDS

This UWMP considers current adopted codes, plans, and other policies or laws to estimate water savings projections as shown in Table 4-14. It also includes projected water use for low income households in the City's service area.

A lower income household has an income below 80 percent of an area median income, adjusted for family size. Projected water demands for low-income, single-family, and multi-family residential water uses are included in the total water demands described in Section 4.2.

The City is a member of SACOG and participates in the Regional Housing Needs Plan (RHNP) which allocates participating cities and counties their "fair share" of the region's projected housing needs. The RHNP is updated every five years and provides the housing units that a city or county must plan for within a 7.5-year time period. The SACOG 2021 – 2029 RHNP was adopted March 2020. This information is used by cities and counties to update their General Plan Housing Elements.

The City's 2021 – 2029 Housing Element includes the number of existing lower income households. The Housing Element indicates approximately 50 percent of the City's households are Low Income (17 percent), Very-Low Income (14 percent), or Extremely-Low Income (19 percent)[7]. Assuming that gross per capita water demand is equal for all residential housing units regardless of income, an estimated 29,199 AF (50 percent) of the City's residential water deliveries in 2020 (58,399 AF) were to lower income households. More refined estimates for the distribution of water among different customers demographics will be possible upon completion of the City's water meter program. The City assumes that lower income households will continue to represent approximately 50 percent of the City's total residential customers through 2040, but is subject to change as demographic changes occur.

Table 4-14. Retail Only Inclusion in Water Use Projections (DWR Table 4-5 Retail)

Are Future Water Savings Included in Projections? (Refer to Appendix K of UWMP Guidebook) *Drop down list (y/n)*	Yes
If "Yes" to above, state the section or page number, in the cell to the right, where citations of the codes, ordinances, or otherwise are utilized in demand projections are found.	California Code of Regulations, Title 23 Waters, Division 2 DWR, Chapter 2.7 Model Water Efficient Landscape Ordinance (MWELO), updated 2015. (a)
Are Lower Income Residential Demands Included In Projections? *Drop down list (y/n)*	Yes
NOTES: (a) MWELO applied only to irrigation demand projections.	

[7] City of Sacramento. January 2021. *2021 – 2029 Housing Element An 8-Year Housing Strategy Appendix H-1*

4.7 CLIMATE CHANGE CONSIDERATIONS

Climate change has the potential to alter local climatic patterns and meteorology. The City adopted the Sacramento Climate Action Plan (CAP) in 2012 to identify how the City and the broader community can reduce greenhouse gas emissions (GHGs). The CAP identifies strategies and actions to adapt to the effects of climate change. Example of strategies and actions include planning for mixed-use developments that encourage walking and biking, use of public transit, or water conservation measures. The CAP was incorporated into the City's 2035 General Plan. The City's 2040 General Plan is currently under development. As part of the 2040 General Plan, the CAP will be updated to be a standalone document to provide framework for GHG reduction and establish the City as a leader of climate action.

In December 2019, the Sacramento City Council approved a Climate Emergency Declaration acknowledging the threat of climate change and the need for climate action. The declaration commits the City to build on existing climate commitments and to accelerate municipal and community carbon elimination in the short term, with maximum feasible efforts to implement carbon reduction actions towards eliminating emissions by 2030 as much as possible, recognizing the goal can only be achieved through collaboration with regional partners as well as appropriate financial and regulatory assistance from state and federal authorities.

In 2020, the City participated in the ARBS to identify supply-demand imbalances and climate change adaptation strategies specific to the American River Basin (Basin). The ARBS evaluated projected future climate conditions as summarized below:

- Increase in average winter and summer temperatures
- Change in precipitation patterns
- Decrease in snow water equivalent
- Increase in potential evapotranspiration due to increase in air temperatures
- Change in watershed runoff patterns

Through proactive adaptation management actions, the ARBS highlights ways for the region to alleviate climate change impacts.

As described above, the water demand projections included in this 2020 UWMP reflect current and on-going water use efficiencies and water conservation by the City's water customers. The potential impacts of climate change of the City's water supplies are described in Chapter 6.

The City is aware of additional climate change reports and studies that indicate the potential for noticeable impacts at a greater acceleration than may be described in the ARBS. This includes California's Fourth Climate Assessment (2018), which states that impacts from climate change on water in reservoirs and groundwater in the Sacramento Valley are happening in the near term. The City continues to monitor a variety of sources addressing climate changes as it aligns its policies and water supply portfolio to adapt to the future.

EXHIBIT 11

File ID: 2022-02041 | 12/6/2022 | **Consent Item 14.**

Upper Westside Water Supply Assessment

File ID: 2022-02041

Location: Citywide

Recommendation: Pass a **Motion** to ratify a Water Supply Assessment (WSA) prepared for the Upper Westside project and direct that it be submitted to the County of Sacramento in accordance with Senate Bill 610 (Stats. 2001 chapter 643), referred to as SB610 or Cal. Water Code § 10910.

Contact: Brett Ewart, Supervising Engineer, (916) 808-1725, bewart@cityofsacramento.org; Sherill Huun, Engineering & Water Resources Division Manager, (916) 808-1455, shuun@cityofsacramento.org; Department of Utilities

Presenter: None

Attachments:
1-Description/Analysis
2-Water Supply Assessment

Description/Analysis

Issue Detail: Staff recommends Council ratify a WSA for the Upper Westside project, which is a potential development project in the unincorporated County of Sacramento. The proposed project lies within the boundary of water right entitlements maintained by the City of Sacramento.

California Water Code, § 10910 (g)(1) requires the governing body of the water system (City Council) to submit this assessment to the requesting party not later than 90 days from the date on which the request was received. Sacramento County has requested a water supply assessment be completed no later than December 31, 2022.

This action is limited to identifying that a legal source of water is available and does not approve development, dedicate infrastructure capacity, or obligate a water service from the City.

Staff have affirmed that the potential project area is within the legal boundaries of the City's water

entitlements as contemplated within the currently adopted Urban Water Management Plan and adequate volume of water is present within those entitlements.

Policy Considerations: Not applicable.

Economic Impacts: None.

Environmental Considerations: The City action regarding the WSA is defined in Water Code section 10910. The County of Sacramento has determined that the Upper Westside project is subject to the California Environmental Quality Act (CEQA) and has requested the City to confirm the WSA. The City is required to determine whether the projected water demand associated with a proposed project was included as part of the most recently adopted urban water management plan adopted pursuant to Part 2.6 (commencing with Section 10610). Water Code section 10910(c)(1). The action requested is an administrative activity that would not result in direct or indirect physical changes in the environment. The County has determined that an environmental impact report (EIR) will be prepared for the Upper Westside project; the EIR will identify and evaluate the potential effects of the Upper Westside project on the environment as provided for in CEQA.

Sustainability: Not applicable.

Commission/Committee Action: Not applicable.

Rationale for Recommendation: Presentation of a WSA is required by California Water Code, § 10910 (g)(1).

Financial Considerations: This has no impact to the General Fund.

Local Business Enterprise (LBE): Not applicable.

Background: The California Water Code (Water Code) requires coordination between land use lead agencies and public water purveyors. The purpose of this coordination is to ensure that prudent water supply planning has been conducted, and that planned water supplies are adequate to meet both existing demands and demands of planned development.

Water Code Sections 10910 - 10915 (inclusive) require land use lead agencies: 1) to identify the responsible public water purveyor for a proposed development project, and 2) to request a WSA from the responsible purveyor. The objective of a WSA is to demonstrate the sufficiency of a purveyor's water supplies to satisfy the water demands of a proposed development project while still meeting the current and projected water demands of existing customers. Water Code Sections 10910 - 10915 delineate specific information that must be included in a WSA.

The Upper Westside Specific Plan is located in unincorporated Natomas community of Sacramento

County between the Sacramento River and the I-5 freeway and North of the I-80. The Upper Westside Specific Plan area is bounded on three sides by the City of Sacramento. The area encompasses approximately 2,000 acres of proposed residential, commercial, schools, parks, urban farms/greenbelts and agricultural uses. The County of Sacramento is the land use lead agency and has identified (1) City of Sacramento (City) - Department of Utilities (DOU), (2) Sacramento County Water Agency (SCWA) and (3) Natomas Central Mutual Water Company (NCMWC) as three potential water purveyors. Each entity has been requested to prepare a WSA in accordance with Water Code Sections 10910 - 10915.

The City of Sacrmento processes WSAs upon request to determine if its planned water supplies are sufficient to meet the demands of new areas in addition to its existing and projected water supply obligations. The area addressed in this WSA lies within an area contemplated by the City’s 2020 Urban Water Management Plan demand forecast and within the legal boundaries of the City’s water rights entitlements.

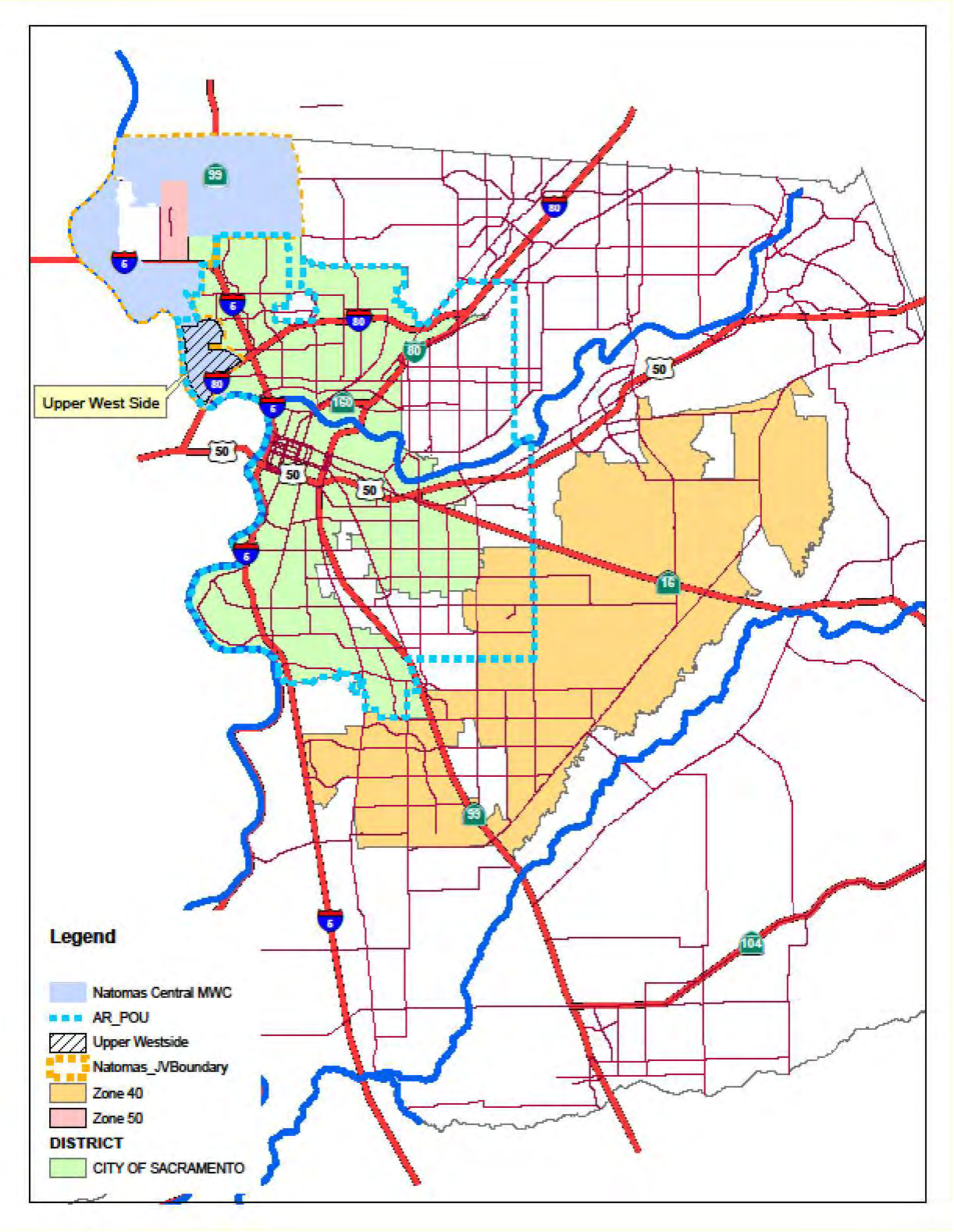


Figure 1 **Upper Westside Specific Plan Area Location Map**

☐ Press to clear form

City of Sacramento
SB 610/SB 221 Water Supply Assessment and Certification Form

This form may be used to complete water supply assessments for projects located in an area covered by the City's most recent Urban Water Management Plan.

Note: Please do not use this form if the projected water demand for your project area was not included in the City's latest Urban Water Management Plan. To review the City's Urban Water Management Plan, please visit: https://www.cityofsacramento.org/Utilities/Reports

Project: Upper Westside Specific Plan

Date: June 21, 2022

Project Applicant (Name of Company): Upper Westside, LLC

Applicant Contact (Name of Individual): Nick Avdis (Thomas Law Group on behalf of applicant)

Phone Number: (916) 287-9292

E-mail: navdis@thomaslaw.com

Address: 455 Capital Mall, Suite 801, Sacramento, California 95814

Project Applicant to fill in the following:

1. Does the project include:

Type of Development	Yes	No
A proposed residential development of 500 or more dwelling units	✓	
A shopping Center employing more than 1,000 persons or having more than 500,000 square feet?		✓
A Commercial Office building employing more than 1,000 persons or having more than 250,000 square feet?	✓	
A proposed hotel or motel, or both, having more than 500 rooms	✓	
A proposed industrial, manufacturing, or processing plant or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area		✓
A mixed use project that includes one or more of the projects specified above	✓	
A project that would demand an amount of water equivalent to, or greater than, the water required by a 500 dwelling unit project	✓	

If the answer is no to all of the above, a water supply assessment is not required for the project.

2. Is the projected water demand for the project location included in the City's 2020 Urban Water Management Plan, adopted June 29, 2021?

Yes: ☑ No: ☐

If the answer is no, you cannot use this form. Please refer to the requirements of SB 610 for preparing a water supply assessment.

3. Please fill in the project demands below:

Type of Development	Land Use Category	Demand Factor		Proposed Development			Current Zoning		
		Residential Water Use Factor, afy/dwelling unit	Non-Residential Water Use Factor, afy/employee	Number Dwelling Units	Number Employees	Total Demand	Number Dwelling Units	Number Employees	Total Demand
Residential - Low	Rural Residential (RR)	.61	.09	197		120 AF			
	Suburban Neighborhood Low Density (SNLD)			2366		1443 AF			
	Traditional Neighborhood Low Density (TLDR)			1063		649 AF			
Residential - Medium	Suburban Neighborhood Medium Density (SMDR)	.39	.09						
	Urban Neighborhood Low Density (ULDR)			749		292 AF			
Residential - High	Suburban Neighborhood High Density (SHDR)	.12	.04						
	Traditional Neighborhood Medium Density (TMDR)			911		109 AF			
	Urban Neighborhood Medium Density (UMDR)								
	Traditional Neighborhood High Density (THDR)								
Mixed Use	Employment Center Mid Rise (ECMR)	.19	.09						
	Suburban Center (SCnt)								
	Suburban Corridor (Scor)								
	Traditional Center (TCnt)			791		151 AF			

Mixed Use - Higher Density	Urban Center High (UCntHigh)	.15	.04	3279		492 AF			
	Urban Center Low (UcntLow)								
	Urban Corridor High (UCorHigh)								
	Urban Corridor Low (UCorLow)								
Central Business District	Central Business District (CBD)	.15	.02						
	Urban Neighborhood High Density (UHDR)								
Commercial	Regional Commercial (RC)	.15	.09				47.1 ac	@1.5 AF/ac	70.7 AF
	Employment Center Low Rise (ECLR)								
Industrial	Industrial (IND)		.14						
Public	Public/Quasi-Public (PUB)	.37	.17	141.1 ac	@2.0 AF/ac	282 AF			
Park	Parks and Recreation (PRK)	.37	.17	120.5 ac	@3.0 AF/ac	362 AF			
Open Space	Open Space (OS)	0	0	154.2 ac		0 AF			
Other	Agricultural (AR, AG)	0	0				2018.9 ac		0 AF
Other									
Other	Add'l demand per project's WMP					342 AF			
Total Demand (AFY)						4,242 AF			71 AF

4. Required Elements of Water Supply Assessment (Water Code § 10910)

A. Water supply entitlements, water rights or water service contracts (Water Code § 10910(d)):

The City's water supply entitlements, water rights and water service contract are identified and discussed in the Urban Water Management Plan, Chapters 3, 6, and 7.

All infrastructure necessary to deliver a water supply to the project is in place, excepting any distribution facilities required to be constructed and financed by the project applicant: Yes: ☑ No: ☐

B. Identification of other sources of water supply if no water has been received under City's existing entitlements, water rights or water service contracts (Water Code § 10910(e)):

Not applicable.

C. Information and analysis pertaining to groundwater supply (Water Code § 10910(f)):

Addressed by Urban Water Management Plan, Chapters 3, 6, and 7.

Verification of Water Supply
(for residential development of more than 500 dwelling units)

Based on the City's most recent Urban Water Management Plan, are there sufficient water supplies for the project during normal, single dry and multiple dry years over a 20 year period?

Yes: ☑ No: ☐

By: Brett Ewart

Title: Supervising Engineer

Date: November 11, 2022

This box to be filled in by the City

Distribution:

Applicant
Development Services Department (Org: 4913) – Assigned Planner:_____
Utilities Department (Org: 3334) - Development Review (Tony Bertrand)
Utilities Department (Org: 3332) - Capital Improvements (Brett Ewart)

EXHIBIT 12

Aerosol Science and Technology, 45:1123–1134, 2011

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Very Fine and Ultrafine Metals and Ischemic Heart Disease in the California Central Valley 1: 2003–2007

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[2]*The Health Effects Task Force, Breathe California of Sacramento—Emigrant Trails, Sacramento, California, USA*
[3]*Division of Mathematical and Natural Sciences, Arizona State University West Campus, Phoenix, Arizona, USA*

The enhancement of mortality associated with cardiovascular and specifically ischemic heart disease (IHD) has been observed in the southern California Central Valley since at least 1990, and it continues to be a major source of mortality. While there is a strong statistical association of IHD with wintertime $PM_{2.5}$ mass, the causal agents are uncertain. Medical studies identify some potential causal agents, such as very fine and ultrafine metals, but they have not been fully characterized in most Central Valley regions. To provide improved information on specific and potentially causal agents, a five site aerosol sampling transect was conducted from Redding to Bakersfield during a 17-day period of strong stagnation, January 5–22, 2009. Mass and elemental components were measured every 3 h in eight particle size modes, ranging from 10 to 0.09 μm, while the ultrafine particles (<0.09 μm) were collected on Teflon filters. Ancillary studies were performed including direct upwind–downwind profiles across a heavily traveled secondary street near a stoplight. Very fine and ultrafine iron, nickel, copper, and zinc were identified as vehicular, with the most probable sources being brake drums and pads and the lubrication oil additive zinc thiophosphate. High correlations, many with $r^2 >$ 0.9, were found between these vehicular metals and IHD mortality, enhanced by the meteorology, terrain, and traffic patterns of the southern Central Valley. The braking systems of cars and trucks must now be considered along with direct exhaust emissions in estimating the health impacts from traffic.

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The staff of all of the Air Resources Board (ARB) sampling sites were key to successful execution of the project.

The authors also wish to gratefully acknowledge the financial support of the Sacramento Metropolitan Air Quality Management District under its CEO, Larry Greene.

The authors wish to acknowledge the input and oversight of the Health Effects Task Force (HETF) of Breathe California of Sacramento-Emigrant under Jananne Sharpless, Chair; Betty Turner, consultant to the HETF, and especially members Ralph Propper and Earl Withycombe. Helpful suggestions and review were provided by William Wilson, US Environmental Protection Agency (EPA).

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[Supplementary materials are available for this article. Go to the publisher's online edition of *Aerosol Science and Technology* to view the free supplementary files.]

INTRODUCTION

The task of determining the causal factors that lie behind the statistically sound association of mortality with aerosols continues to labor under severe difficulties. Reliance on Federal Reference Method (FRM) methodologies, even if enhanced by periodic compositional analysis, does not provide enough information to allow health research scientists to identify causal factors (Lippmann 2009). Intensive research studies, which can provide such data, are so expensive as to limit their scope in space and time and thus pose problems with statistical significance. An alternative is to identify regions with persistent and specific health impacts of suspected aerosol origins and then augment monitoring data and special studies to provide a suite of data from which causal factors may be identified. However, other factors such as meteorology, land use, and socioeconomic factors can often weaken the significance (Pope et al. 1995). The California Central Valley, however, is a region of such homogeneity that such efforts there might be fruitful.

The southern part of the California Central Valley, the San Joaquin Valley, is the largest contiguous area of the United Sates in serious violation of both ozone (summer) and $PM_{2.5}$ (winter) ambient air quality standards. While the summer ozone levels are relatively uniform over the Central Valley, the winter PM_{10} and $PM_{2.5}$ concentrations vary strongly, from low in the northern Sacramento Valley to high in the southern San Joaquin Valley. During individual winter stagnation episodes, the south to north

(Bakersfield to Redding) mass ratio is up to a factor of 8 for PM_{10}, and a factor of 5 for $PM_{2.5}$.

In addition to improving monitoring data, a series of extensive research studies by and through the California Air Resources Board (ARB), such as California Regional Particulate Air Quality Study (CRPAQS 2001), Central Coast Ozone Study (CCOS), and Fresno Asthmatic Children's Environment Study (FACES), were initiated in 1999 through 2001 that greatly added to our knowledge of San Joaquin Valley aerosols. However, most field data were taken before the current understanding of aerosols and cardiovascular impacts was achieved (Devlin 2003, Lippmann 2009) and thus lack some critical measurements, especially ultrafine metals (Chow et al. 2006, 2007, 2008; Chen et al. 2007; Kleeman et al. 2009). One of the major results of these studies is an understanding that most of the $PM_{2.5}$ mass in the winter in the San Joaquin Valley is ammonium nitrate and wood smoke, neither of which are a known cardiovascular threat.

The mortality data in the entire Central Valley are relatively uniform for three of the four major causes of mortality, pulmonary disease, stroke, and cancer, but the 4th and most important, heart attacks from all causes, is higher by about 20% in the central and extreme southern California Central Valley [California Department of Health Services (CA DHS) 2010] and especially in Bakersfield. For one specific and major component of heart disease, ischemic heart disease (IHD), the incidence rises to about 35% (CA DHS 2010). In this research, we have measured some of the components of aerosols found by recent health studies most likely to be causal factors in this statistically strong association to cardiovascular disease, namely very fine and ultrafine metals, and size and compositionally-resolved organics (Cahill 2010), over the entire Central Valley, with the goal to enhance data from the earlier studies and provide additional material for future epidemiological analyses.

EXPERIMENTAL METHODS

Study Region Geography and Climatology

The Central Valley of California (Figure 1) has remarkable uniformity in terrain and meteorology. It is one of the richest agricultural areas in the world, with two major metropolitan areas, the Sacramento–Stockton and Fresno, with smaller cities of a few 100,000 to small towns spread throughout the Valley. The Valley is a major transportation corridor for road and rail traffic but generally lacks strong industrial sources. There are active areas of oil extraction near and north of Bakersfield. The Central Valley offers an ideal situation to examine the effects of pollutants on health since many potential confounding factors, such as meteorology, land use patterns, socio-economic factors, and cigarette smoking, are very similar throughout the Valley (Cahill et al. 1998; note that the values in that report are slightly different in the present report since we have now available CORE Report #2 (1996), while the original report used CORE Report #1 (1994)).

FIG. 1. Map of the Central Valley of California. The northern part is referred to as the Sacramento Valley while the southern part is called the San Joaquin Valley. The areas within the dotted circumference vary in altitude from almost sea level in the Delta to a few hundred feet in elevation. The small arrows denote the typical winter wind patterns (Hayes et al. 1984). The cities marked were used in this study.

In summer, high temperatures in the Valley (mean daily high, July, 36°C ± 1°C) lower the surface pressure and draw massive inputs of marine air into the Valley from the San Francisco Bay, bringing with it oceanic aerosols and typical urban pollutants enhanced by the major petrochemical industrial sites at the Carquinez Strait, between Sacramento and San Francisco. These winds often funnel south down the entire San Joaquin Valley, south of the strait, but less often funnel north up the entire Sacramento Valley, north of the strait. Rainfall in the Valley is rare during the period from May through October (Hayes et al. 1984).

In winter, the Central Valley air basin tends to become stagnant due to its flat valley floor and circumferential mountains, except at the Straits (Figure 1). There is slow drainage of cold air from the Sierra Nevada Mountains each night to the Valley floor (mean daily low, January, 3°C ± 1°C). The air drains slowly, at the rate of about 50 km/day, from both the northern and southern ends of the valley towards the lowest point, the Sacramento–San Joaquin Delta, southwest of Sacramento and directly east of the Carquinez Strait. This pattern results in persistent stagnation episodes that are periodically interrupted by synoptic storms.

Typical Pollution Patterns

The annual pattern of $PM_{2.5}$ mass reflects the effects of the winter stagnation, with elevated levels from about November through February (Figure 2). All valley sites have similar annual

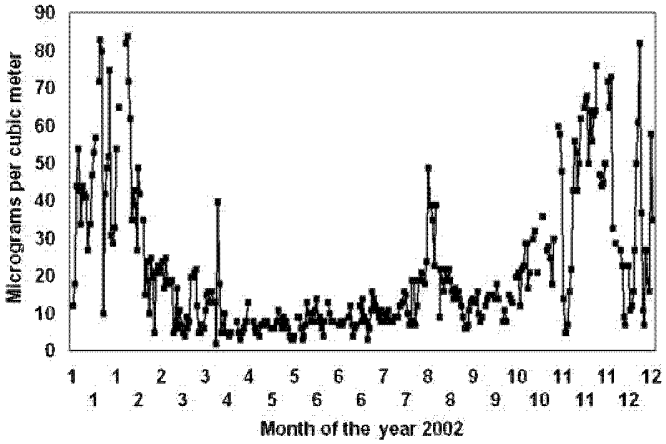

FIG. 2. Annual pattern of $PM_{2.5}$ mass as seen at Fresno.

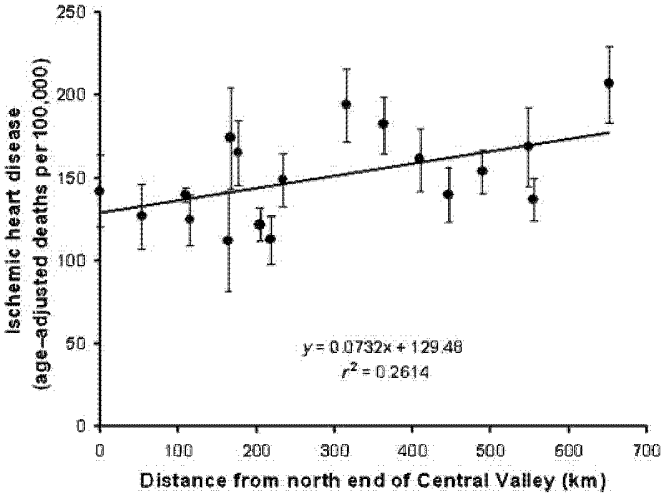

FIG. 3. IHD in the Central Valley of California, 2003–2007. Distances span from Redding in the north (0 km) through Chico (170 km), Sacramento (220 km), Fresno (400 km) to Bakersfield (680 km).

patterns, high in winter and low in summer. The $PM_{2.5}$ peak seen in August was from a forest fire in Oregon. While the southern reaches of the Central Valley have serious violations of federal and state mass standards (ADAM 2010), other parts of the valley that share agriculturally based land uses and meteorology do not exhibit serious violations of these standards. For PM_{10} mass, the ratio from Bakersfield in the south to Redding in the north can be as high as a factor of 9 in winter stagnation events, while for $PM_{2.5}$, the ratio can be as high as a factor of 5 (ADAM 2010). The pattern of winter air movement makes the high aerosol mass levels at Bakersfield difficult to explain, since the nighttime airflow into Bakersfield is from the mountains to the south, southeast, and east of the city. There is essentially no influence from the Los Angeles basin due to the blocking mountains. The air at Bakersfield then flows slowly north towards Fresno, which has generally lower $PM_{2.5}$ mass levels despite greater population and industry.

Epidemiological Data

Greatly improved data on mortality and morbidity became available circa 2001 from the California Department of Health Services (CA DHS 2010), which allow detailed analyses of death by hundreds of cause on an annual basis. These data show a persistent enhancement, 2003–2007, of IHD mortality of roughly 50% in the central region and at Bakersfield, at the extreme southern edge of the San Joaquin Valley, as compared with the northern valley (Figure 3).

Aerosol Sampling Methods

Aerosol samples were collected along a transect in the Central Valley to investigate the causal factors behind the increased mortality due to IHD in the Central Valley of California. Since routine air quality measurements were available in this region, we collected and analyzed aerosols not routinely measured by existing monitoring programs that were known or suspected to be causal factors in cardiovascular disease. Further, we selected a period of stagnation that maximizes winter particulate mass concentrations, avoiding the synoptic fronts and rain that periodically clean out the valley in winter. Using meteorological predictions, we simultaneously sampled continuously by size, time, and composition for 17 days starting on Jan 5, 2009, at five sites from the extreme north, Redding, to the extreme south, Bakersfield.

Rotating drum impactors (DELTA Group 8 DRUMs; Cahill et al. 1985; Raabe et al. 1988) were used at all sites to provide continuous samples capable of 3-h data in eight impaction size modes from 10 to 0.09 μm diameter plus an integrating Teflon after filter. The impaction samples were collected onto Apiezon-L greased Mylar stages (Wesolowski et al. 1977). Analyses were made for mass and elements from aluminum to molybdenum plus lead by synchrotron-induced x-ray fluorescence (Bench et al. 2002). The quality assurance validations, including a year-long inter-method comparison to ARB's FRM particular samplers, are summarized in the supplemental information. For the ARB side-by-side over the entire year, agreement for $PM_{2.5}$ mass was better than $\pm 10\%$, DRUM versus FRM, with the winter agreement much better than that, a few percent, probably because of higher winter mass values. Note that 49 individual mass values from a DRUM with 3-h time resolution and 6 sub-2.5-μm size cuts plus a <0.09 μm after-filter were required to match a single 24-h $PM_{2.5}$ mass value.

Aerosols destined for organic analyses were likewise collected with DRUM samplers at the same time and locations as the elemental samplers. However, the organic samples were analyzed averaging over the entire 17-day study, and the aerosols were collected onto fired aluminum substrates (Cahill 2010).

The study included three components, all conducted in winter conditions and using the same equipment, including integrating ultrafine Teflon filters: (1) an initial year-long study of the DRUM sampler side-by-side with the ARB's FRM at the

Sacramento test site at 13th and T Street to establish equivalency of the sampling and analysis (Cahill and Barnes 2009), (2) a simultaneous transect across a heavily traveled secondary street to identify very fine and ultrafine aerosols from roadways, and (3) the main transect study in winter, 2009. Summaries of these studies are included in supplemental information.

For the transect study, samples were collected at five existing ARB and district monitoring sites covering the entire Central Valley (Figure 1):

Redding (roof of Health Department),
Chico (ARB Manzanita Avenue site),
Sacramento (ARB 13th and T Street site),
Fresno (ARB First Street site), and
Bakersfield (ARB California Street site).

Paired UC Davis DELTA Group 8 DRUM samplers were used at all sites except Sacramento, which had to use a PM 2.5 3 DRUM for lack of equipment. One 8 DRUM was used at each site for mass and elements (3-h time resolution), sampling onto lightly greased Mylar, and the other for organic matter (17-day average), sampling onto fired aluminum foils. All included identical Teflon ultrafine filters that integrated the entire 17-day period. The parameters measured at all sites include but are not limited to

1. time-averaged ultrafine particulate elemental composition, Al to Mo, plus lead, and mass, $0.09 > D_p > 0.0$ μm aerodynamic diameter,
2. time-dependent (3 h) mass and elements (see above) for the eight particle sizes 10.0–5.0, 2.5, 1.15, 0.75, 0.56, 0.34, 0.26–0.09 μm aerodynamic diameter,
3. time-averaged organic matter by size, 10.0–5.0, 2.5, 1.15, 0.75, 0.56, 0.34, 0.26–0.09 and <0.09 μm diameter, including polycyclic aromatic hydrocarbons (PAHs), sugars (including levoglucosan), fatty acids, and *n*-alkanes have been published (Cahill 2010).

RESULTS

Meteorology

After the sites were selected, deployment was delayed until weather predictions indicated at least a 10-day period of low winds and stagnation, conditions that produce the highest $PM_{2.5}$ mass. The prediction was accurate and the meteorology was favorable and allowed us to extend the study to a 17-day period characterized by high mass values and persistent hazes (Table 1).

Aerosol Mass Values

PM_{10} mass values were available at all sites on January 19, while all sites except Redding had daily $PM_{2.5}$ mass values collected by the ARB and local agencies (ADAM 2010). The $PM_{2.5}$ values were averaged over the entire 17-day study period

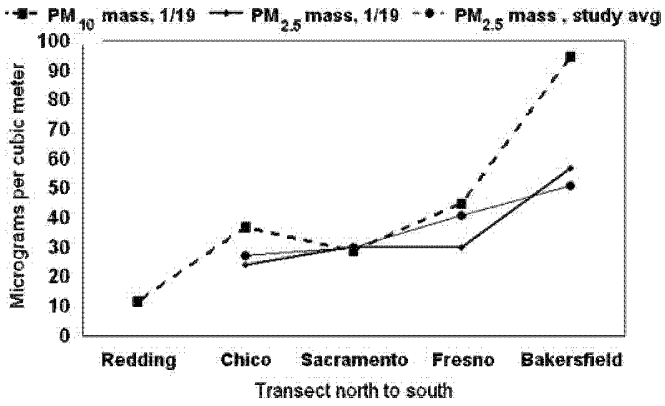

FIG. 4. $PM_{2.5}$ mass values were available every day, but only January 19th had PM_{10} mass at all valley sites. The high PM_{10} to $PM_{2.5}$ ratio on January 19 is unusual and unexplained.

and were typical of prior winter stagnation events (Table 2 and Figure 4). Looking in more detail, we can see that the north to south increase in average $PM_{2.5}$ mass is driven not as much by the increase in mass on a given day but the number of days that saw the high mass values.

Aerosol monitoring by state and local agencies with compositional data for $PM_{2.5}$ aerosols was only available at the Fresno site via the IMPROVE sampler (Malm et al. 1994). The evolution of the aerosol event is shown in Figure 6, showing that the study period would represent a winter day in violation of the $PM_{2.5}$ mass standard. The important role ammonium nitrate plays during these aerosol episodes is clearly indicated.

Size-Resolved Mass and Inorganic Aerosols

For the period from January 5 through 22, over 6400 measurements were made of mass and inorganic elements in nine size modes, measured every 3 h except for the integrating ultrafine filters. In addition, a simultaneous study (Cahill 2010) measured organic aerosols in four classes (alkanes, PAHs,

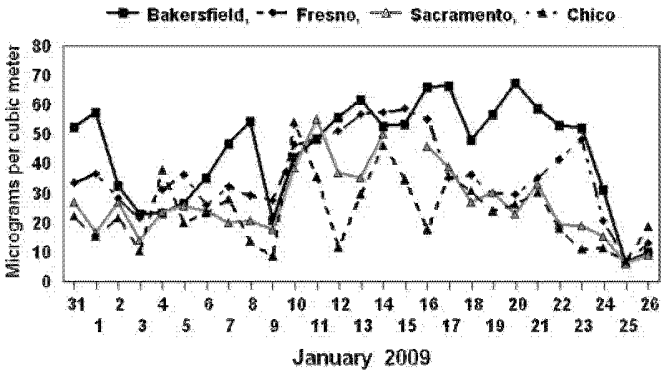

FIG. 5. $PM_{2.5}$ mass values before, during, and after the study period of January 5–22, 2009.

TABLE 1
Summary of meteorological parameters during sample collection period of January 5–22, 2009. The values reported are the average over the entire aerosol sampling period except for rainfall, which includes the rain on the days of setup and take down, January 5 and 22

Parameter	Redding	Chico	Sacramento	Fresno	Bakersfield
Average temperature (°C)	11.3	9.6	9.0	9.4	10.6
Average high (°C)	19.3	15.5	16.1	15.4	16.5
Average low (°C)	3.0	3.7	1.7	3.2	4.4
Relative humidity (%)	56.4	71.6	73.4	71.8	66.4
Average wind speed (m/s)	1.92	1.27	0.47	0.62	1.17
Rain (cm)	1.2	2.2	2.5	1.2	0.1
Number of rain events	4	3	3	2	2
Number of fog events	0	2	11	2	2
Average visibility (km)	14.6	12.3	7.1	6.9	6.6

sugars, and organic acids) in nine size modes at all sites. In this article, we focus on those particles that have the best support from the health literature as having the potential for causing or exacerbating IHD. Thus, we focus on only those insoluble particles in the very fine (0.26–0.09 μm) and ultrafine (<0.09 μm) modes that are able to penetrate deeply into the lung and pass into the cardiovascular system. However, before we focus on these particles, we need to examine the overall aerosol behavior important to eventually isolate the sources of these particles.

Using the well-studied Fresno site, we can see that the size distribution roughly matches expectations with a few differences (Figure 7). In Figure 7, three points stand out. First, the DRUM sampler with its coated substrates operated well, with negligible soil mass penetrating into the accumulation mode as shown by the calcium results. Second, there is a distinct deviation in the size profile of iron, which shows an enhancement in the 1.15–2.5 μm size mode not seen in other soil elements. Third, potassium becomes enhanced in the finest modes, clearly from non-soil sources. It is also much finer in size than typical wood smoke, which almost always peaks in the 0.34–0.75 μm mode.

Examining the non-soil iron anomaly (Figure 8), the size and 3-h time data show enhancement in the 2.5–1.15 μm mode each night not seen in other soil elements and not seen at any other valley site. The very fine iron often tracks the fine iron, but sharp deviations occur, indicating complex source behavior. Bakersfield lacks time information due to a system failure, and thus its behavior in time is unknown.

Further insight on zinc in Fresno can be obtained by examining zinc over most of a year (Cahill et al. 2003). The persistent presence of very fine zinc occurs throughout the entire year and becomes dominant in wintertime, closely associated with other vehicular aerosols. The zinc to very fine mass ratio was close to that seen in laboratory diesel tests (Zielinska et al. 2003).

Data on Very Fine and Ultrafine Aerosols

Very fine aerosols were collected on DRUM stage 8, 0.26 to 0.09 μm, and integrated over the 17-day study period to match the integrating ultrafine filters. Ultrafine aerosols were collected on the same 47-mm Teflon filters as the organic samples and averaged over the same 17-day period. The filters were analyzed by scans of S-XRF every 0.5 mm across the filter diameter. All filters were uniform except for Chico, which had contamination on one edge. This was easily avoided by modifying the averaging program. Two different averages were generated: one by summing the spectra, then analyzing and the other by averaging the typical eighteen individual elemental results.

In Table 3a, we show a summary time averaged DRUM very fine data and, in Table 3b, the integrated ultrafine filter data for the study period.

TABLE 2
Mass values for PM_{10} on January 19 and $PM_{2.5}$ averaged from January 5 though January 22, 2009. The value of ~9 for $PM_{2.5}$ is estimated assuming the same $PM_{10}/PM_{2.5}$ ratio as the other cities

Site	Redding	Chico	Sacramento	Fresno	Bakersfield
Size (μm)	PM_{10}	PM_{10}	PM_{10}	PM_{10}	PM_{10}
Mass (1/19) ($\mu g/m^3$)	12	37	29	46	95
Size (μm)	$PM_{2.5}$	$PM_{2.5}$	$PM_{2.5}$	$PM_{2.5}$	$PM_{2.5}$
Mass average ($\mu g/m^3$)	~9	27.3	30.2	40.9	51.0

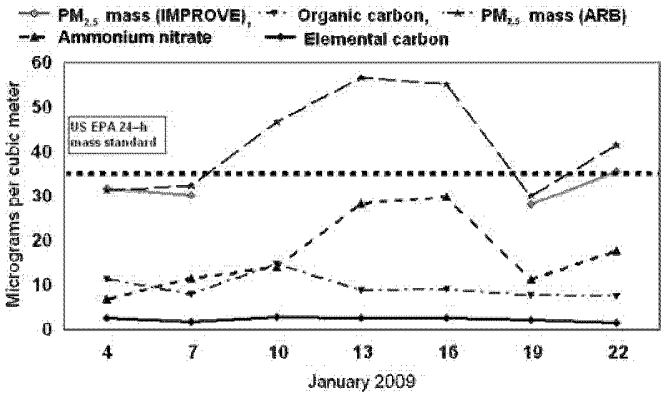

FIG. 6. IMPROVE and ARB $PM_{2.5}$ data at the Fresno site during the study. Note the dominance of ammonium nitrate in the mass maxima.

The values in bold represent vehicular sources identified in the next section of this article. The copper ultrafine values are suspect from contamination by copper containing filter holders. K_{non} is non-soil potassium, corrected by the Calcium content, and a standard IMPROVE tracer of wood smoke (Malm et al. 1994). MDL is minimum detectable limit. Uncertainties are nominally ±5%, and detailed quality assurance and uncertainties are in the supplemental information.

The correlations of sulfur (ammonium sulfate) and selenium are driven by the oil extraction and refining near Bakersfield (Figure 10). But there are strong associations between many metals and IHD in both the very fine and ultrafine modes. Although mass levels in the very fine and ultrafine modes are low, the concentration of metals was significant. Thus metals are a major contributor to particle numbers, many presumably in insoluble compounds. Examining spatial trends for very fine metals with known vehicular origins, we see at Bakersfield a clear north to south enhancement of many very fine metals that far exceeds the ×1.6 increase in $PM_{2.5}$ mass for the same period (Figure 9).

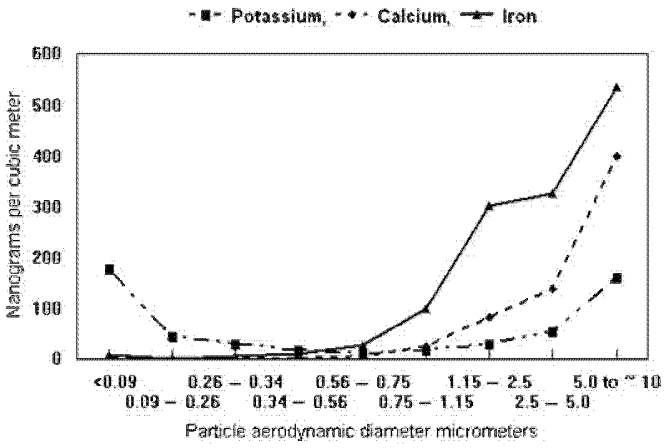

FIG. 7. Size distribution for Fresno aerosols.

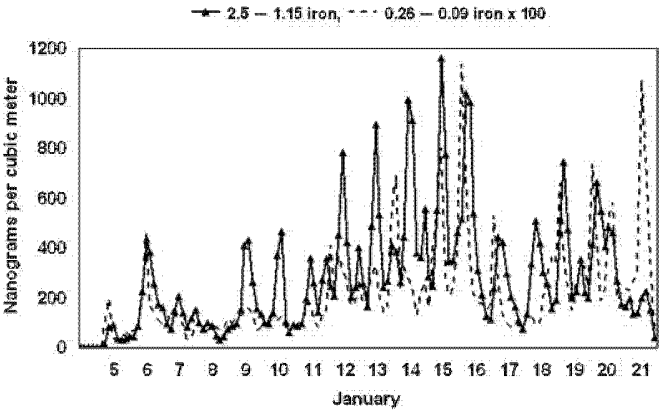

FIG. 8. Fine and very fine nonsoil iron at Fresno. Recall that the study began directly after a rainfall event and had almost no winds to stir up dust. Thus we propose that most of the iron is roadway and vehicle derived.

The upward trend of sulfur must be interpreted in accord with the meteorology, which moves air from Bakersfield towards the Delta. Typical elements associated with vehicles include nonsoil iron, phosphorus, zinc, nickel, and copper. From the ratio present in the zinc thiophosphate in lubricating oil, there are clearly additional zinc sources present at all sites except perhaps Bakersfield.

In summary, there are significant contributions of metals in the very fine and ultrafine mode, many of which rise to their highest levels at Bakersfield (Figures 11 and 12) and correlate strongly with the IHD mortality data.

DISCUSSION

Sources of the Metals

The generation of metals in the ultrafine mode requires high temperatures and/or pressures. Thus, many sources of metals from vehicles, such as zinc from tire wear, are not candidates for sources of ultrafine aerosols. Two potential sources are engines, and especially diesel engines because of the high temperatures and pressures involved, and the braking systems in vehicles.

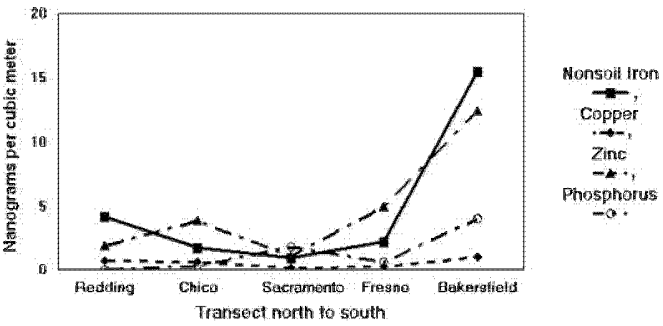

FIG. 9. Very fine transition metals with known vehicular sources, zinc and phosphorus from zinc thiophosphate in lubricating oil, iron, copper, and zinc potentially from braking systems.

TABLE 3a
Aerosol mass data from the study and their correlation to IHD mortality. Uncertainties are nominally ±5%, and detailed quality assurance and uncertainties are in the supporting materials. Concentration (ng/m^3) of very fine (0.09 to 0.26 μm) aerosols

Site	Redding	Chico	Sacramento	Fresno	Bakersfield	Correlation r^2 to IHD
Ammonium sulfate	45	82	75	120	580	0.98
Chlorine	<0.4	2.5	1.8	0.7	2.6	0.22
Phosphorus	**<0.1**	**0.4**	**0.8**	**0.7**	**4.0**	**0.98**
Potassium (non-soil)	18.0	54.1	10.9	45	32.7	0.00
Vanadium	<0.1	0.03	0.04	0.2	<0.1	0.04
Chromium	<0.1	0.01	0.01	0.6	0.2	0.04
Iron (non-soil)	**2.2**	**1.8**	**1.0**	**2.3**	**15.5**	**0.95**
Nickel	**<0.03**	**0.03**	**0.07**	**0.05**	**0.16**	**0.95**
Copper	**0.7**	**0.6**	**0.16**	**0.27**	**1.1**	**0.47**
Zinc	**1.9**	**3.9**	**1.1**	**4.9**	**12.5**	**0.88**
Arsenic	0.15	0.2	0.07	0.54	1.07	0.87
Selenium	<0.1	<0.1	0.09	0.10	0.24	0.95
Bromine	0.5	0.7	1.3	1.1	4.2	0.98
Lead	0.1	0.4	0.4	0.55	2.0	0.97

While there is considerable information on the total particulate emissions from vehicles, the information on ultrafine metals from vehicular exhaust is limited (Kleeman et al. 2000; Zielinska et al. 2003, 2004). The Zielinska et al.'s (2003) study involved detailed analysis of diesel exhaust. As part of the study, we analyzed for 32 elements collected in 11 tests with a 14-stage nano-MOUDI (lowest stage 0.01 μm). Sulfur, phosphorus and the metals zinc, calcium, and, in one of the 11 tests, lead, all peaked generally in the 0.10–0.056 μm modes (Zielinska et al. 2003). In addition to elemental and organic carbon, the tracer elements were assigned to sources: sulfur was from the fuel (CA low sulfur), the zinc and phosphorus from the zinc thiophosphate stabilizer in the lubricating oil, and calcium from an antacid additive. No other transition metals were seen in statistically significant amounts.

A second potential source of very fine and ultrafine metals is the braking systems of cars and trucks, since high temperatures and/or pressures are involved in this process. The brake drums have evolved from the massive, heat-conductive structures and generally well cooled in the past and now are often made of "grey iron," roughly 90% iron with the admixture of a few percent carbon, plus copper, silicon, and other metals in

TABLE 3b
Concentration (ng/m^3) of ultrafine (<0.09 μm) aerosols

Site	Redding	Chico	Sacramento	Fresno	Bakersfield	Correlation r^2 to IHD
Ammonium sulfate	122	215	270	470	999	0.95
Chlorine	2.5	5.1	0.6	3.0	0.5	−0.38
Phosphorus	**1.3**	**0.6**	**4.0**	**3.3**	**10.5**	**0.96**
Potassium (non-soil)	40.7	138.1	76.9	176.1	70.9	−0.05
Vanadium	0.05	0.15	0.10	0.21	0.02	0.00
Chromium	0.13	0.04	0.75	0.28	0.32	0.03
Iron (non-soil)	**3.9**	**3.9**	**14.3**	**7.7**	**27.7**	**0.88**
Nickel	**0.9**	**0.1**	**0.6**	**0.3**	**1.6**	**0.70**
Copper	**na**	**na**	**na**	**na**	**na**	**na**
Zinc	**8.6**	**11.2**	**14.3**	**22.4**	**12.3**	**0.00**
Arsenic	0.41	0.64	1.1	2.6	1.5	0.12
Selenium	0.47	0.64	0.62	1.1	0.9	0.05
Bromine	11.2	12.4	13.7	25.3	18.9	0.16
Lead	1.7	2.2	2.5	3.6	2.6	0.06

na: not available.

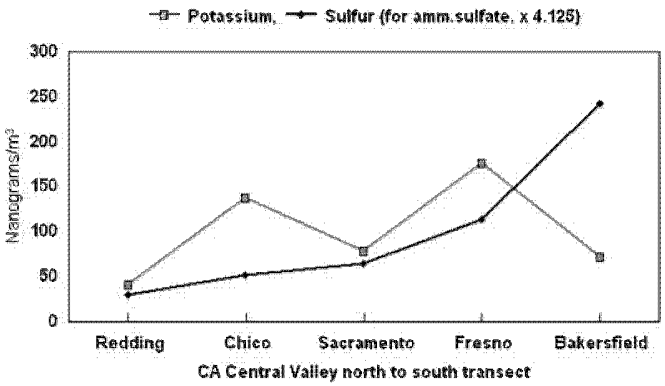

FIG. 10. Ultrafine potassium and sulfur.

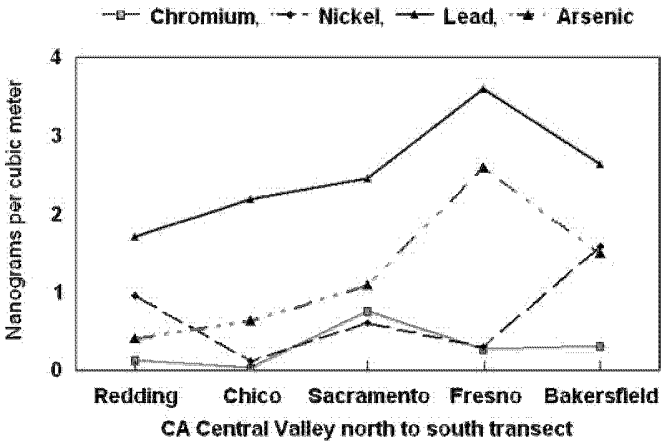

FIG. 12. Additional ultrafine elements.

smaller amounts, making them like brake pads an erodible surface. Brake pads are far more complex in composition and are traditionally designed to erode.

Limited information is available on a complete inventory of vehicular expendables. An early one was developed as a part of the extensive California freeway lead and particulate studies in the 1970s. In Cahill and Feeney (1973), the UC Davis vehicle fleet was studied for all forms of expendables, including fuel, oil, brake wear, exhaust train erosion, tires, etc., by directly measuring mass loss at replacement intervals. While many of the results are uncertain due to technological changes in the fuels and engines, measurements of brake drums and brake pads gave ~5 and 108 gm, respectively, at a replacement cycle of 58,400 km, or <1 and 15 mg/km. However, these data were based on asbestos-containing brake pads and may not be reliable, which also impacts the US Environmental Protection Agency (EPA) PART5 model estimate of 20.6 mg/km, based on 1985 data. In terms of brake drums, changes in brake drums from iron to "grey iron" containing graphite could materially increase that source of particles from prior values. Even with the uncertainties, it is clear that brakes contribute a significant component of typical vehicle total emission rates. However, averages are misleading because braking is only used for limited times. Thus the emission rates at stoplights and especially extensive mountain

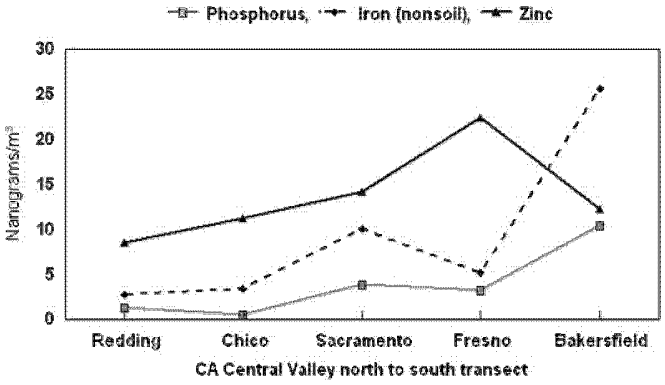

FIG. 11. Typical vehicular ultrafine metals.

down grades will be much higher than these values. It is worth noting that traditional dynamometer studies and roadside side studies near freeways are likely to miss brake wear as an emission source, thus these emissions may be largely unrecognized by the majority of vehicle emission and assessment studies.

Information on brake pad composition was reviewed by Kennedy et al. (2002) and Chan and Stachowiak (2004). The latter report, "A multitude of different brake pads have sprung onto the market in the post-asbestos brake pad revolution, each with their own unique composition," often proprietary. Brake pads comprise four subcomponents: (1) frictional additives, abrasives, and lubricants; (2) fillers; (3) a binder; and (4) reinforcing fibers for strength. The brake pads are described as metallic, semimetallic, with organic components, and organic. Asbestos to be used mainly as a reinforcing fiber in brake pads, and after its removal, a variety of materials have been used, including iron fibers. Some of them include potentially hazardous materials potassium titanate and sepiolite, a magnesium-silicon compound, both of which have potential health hazards. Organic aramaid fibers (e.g., Kelvar) and ceramics such as alumina and carbides are becoming more popular as prices decline. Fillers include a wide variety of organic (cashew hulls, old tires) and inorganic materials (barium sulfate is popular). The frictional components include graphite and metal sulfides including copper, antimony, tin, zirconium, and lead. Copper in particular has been identified as a problem in aquatic systems, and legislation to remove it from brake pads has been passed in the states of Washington and California.

While there is enormous variability in the data, as shown by the percentile distributions, the four main elements are iron, copper, zinc, and nickel (Table 4). In summary, there is a wide variety of very fine and ultrafine metals that may arise from brake drums and pads, but iron and copper are clearly two major components.

Information on ambient and near source very fine and ultrafine metals was derived from two additional studies in Sacramento. The first was a complete analysis of ultrafine (<0.09 μm)

TABLE 4
Summary of concentrations of elements in New Zealand brake pads, from largest to smallest concentrations of transition metals plus heavier elements. The distributions are shown to emphasize with wide variability between manufacturers

Element (ppm)	10th percentile	Median	90th percentile
Iron	11,700	18,300	190,000
Copper	29	5000*	116,000
Zinc	127	1630	37,400
Nickel	44	342	652
Manganese	143	315	1088
Lead	6	50	949
Barium	558	3195	6144

*Preferred interim median for copper due to high variability. Barium (median = 3100 ppm) was not resolved in our data due to interferences.

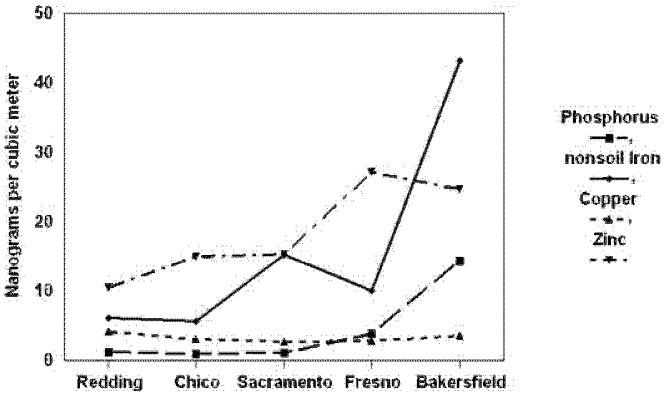

FIG. 13. Very fine plus ultrafine aerosols with known vehicular sources.

aerosols over a 2-week period, November–December, 2007, as part of an 8-month DRUM to FRM intercomparison with the California ARB in central Sacramento at the 13th and T Street ARB site (Cahill and Barnes 2009, supplementary materials), and the second was a 2007 study directly measuring aerosols across a heavily traveled (65,000 v/day, 1.5% diesels) secondary street in Sacramento, Watt Avenue (Cahill et al. 2007, supplementary materials).

One period in the Sacramento ARB intercomparison in November and December was chosen for mass closure through addition of surrogate organic measurements (Cahill et al. 1989; Malm et al. 1994). As anticipated, most of the ultrafine mass is organic (Table 5). Note also that the only nondetermined major species, nitrate, could not have been a major factor in Sacramento or the agreement would not have been as robust. Farther south in the San Joaquin Valley, nitrates are always a major factor. The presence of the fine transition metals in these quantities represents a very large number of particles. Note that the zinc value seen in Sacramento in 2007, 11.5 ng/m^3, is similar to the transect zinc value in 2009, 14 ng/m^3.

The second study was performed at Watt Avenue, the site of several studies on the impact of Watt Avenue on Arden Middle School (Cahill et al. 2007, supplementary materials). The Watt Avenue study utilized the same sampler as the ARB study, with two identical eight stage DRUM samplers with greased Mylar substrates and a 47-mm stretched Teflon after filter for the <0.09 μm ultrafine mode. The school sampler was 15 m downwind from the nearest traffic lane on the roof of the one story building and 50 m south of a stoplight on Arden Way that backed traffic up to and south of the Arden Middle School site. Thus considerable braking occurred directly upwind of the Arden Middle School sampler. The far upwind sampler was 500 m away in a residential neighborhood. Samples were collected continuously over 8 weeks in February and March, 2007. The results of these studies are shown in Table 5.

Through the direct upwind downwind measurements across Watt Avenue, the source of the metals seen in downtown Sacramento can also be shown to be largely derived from traffic sources despite the fact that the nearest freeway to the 13th and T Street site is over 1 km away.

Almost identical values of the same four elements are seen in Sacramento and especially in Bakersfield (Table 6 and Figure 13).

Since the ultrafine four elements, non-soil iron, nickel, copper, and zinc, and a few others, are traffic related, we can examine the mass levels in the Central Valley to see how the levels correspond to traffic. Since the wind flows downslope across Bakersfield from the south, where I-5 descends from the Grapevine and Hwy 58 descends from Tehachapi Pass, we used the sum of the cars plus 10 times the trucks, to roughly match to emission rates, and compared the ratio of traffic to $PM_{2.5}$ at the ends of the Valley and across the Chico and Fresno lateral transects for I-5 plus Hwy. 99. For the valley ends, the traffic ratio was 4.6 and the aerosol ratio 4.4, while for the central lateral transect, traffic was 2.1 and the aerosol was 1.4. Therefore the $PM_{2.5}$ mass values in the study were similar to the local traffic volumes, and the ultrafine metals at Bakersfield are from the two major highways south of Bakersfield climbing and descending the mountain passes.

Support for this hypothesis comes from historical data taken in Bakersfield in winter, 1974–1976 (Cahill and Flocchini 1974; Flocchini et al. 1976). The historical data show that particulate pollution from cars was high in Bakersfield in the 1970s data. Lead levels at Bakersfield, population circa 75,000 in 1975, in the average winter period were higher on average than in parts of the Los Angeles urban area. This is a clear indication that the local meteorology and geographical setting of Bakersfield results in it being highly impacted by vehicular sources, most likely vehicles on I-5 and Hwy 58 as they climb out of or descend into the valley.

TABLE 5
Measured and reconstructed ultrafine mass and elemental components in two studies in Sacramento, 2007. Watt 0.5 km is 500 m upwind; Watt 15 m is downwind. Sac Center is the ARB 13th and T Street site. There are no elemental carbon data or nitrate data, so the reconstructed mass is incomplete

	Watt ave. upwind (~ 0.5 km)	Watt ave. downwind (15 m)	Sacramento center
Major components	$\mu g/m^3$	$\mu g/m^3$	$\mu g/m^3$
Mass (gravimetric)	Na	Na	2.04
Mass (recon.)	Na	Na	2.15
Organics (H)	Na	na	1.72
Sulfur (ammonium sulfate)	0.09	0.18	0.34
Chlorine (NaCl)	0.00	0.00	0.04
Soil	0.04	0.08	0.048
K non-soil (wood smoke)	0.04	0.14	0.053
Metals	0.01	0.09	0.035
Minor components	ng/m^3	ng/m^3	ng/m^3
Phosphorus	1.1	1.0	2.4
Vanadium	0.06	0.18	0.15
Chromium	2.2	1.3	0.45
Iron (non-soil)	5.2	34.9	17.0
Nickel	0.3	16.3	3.5
Copper	0.1	9.8	8.3
Zinc	1.2	17.3	11.5
Arsenic	0.16	0.46	0.6
Selenium	0.10	0.13	0.3
Bromine	0.8	1.1	3.7
Lead	0.5	2.3	4

Examining the current IHD mortality data from Figure 3, we observed that if we remove a totally arbitrary average background IHD mortality rate of 120 from the total rate (about 2/3 of the valley average rate), and matching the Bakersfield result, the excess IHD mortality roughly scales with local truck traffic on the major freeways (CalTrans 2010) and the very fine–ultrafine iron (Figure 14).

The pattern reflects the pattern that the two major north–south freeways, I-5 and Hwy 99, come close to each other only at Sacramento–Stockton and Bakersfield. Note that car traffic has a very different pattern because of the large automobile traffic on local Sacramento highways. When ultrafine aerosols alone are correlated with IHD mortality for the entire Central Valley, the highest correlations are for phosphorus ($r^2 = 0.96$) and iron ($r^2 = 0.88$), both with known vehicular sources.

The association of IHD with toxic organic contaminants, specifically benzo[*a*]pyrene (B*a*P) and coronene (Cahill 2010),

TABLE 6
Very fine and ultrafine metals with known vehicular sources

Site	Redding	Chico	Sacramento	Fresno	Bakersfield
Class	Very fine + ultrafine	Very fine + ultrafine	Very fine + ultrafine	Very fine + ultrafine	Very fine + ultrafine
Size	0.26–0 μm	0.26–0 μm	0.26–0 μm	0.26–0 μm	0.26–0 μm
Species					
Phosphorus	1.3	1.0	1.2	4.0	14.5
Iron	6.1	5.7	15.3	10.0	43.2
Nickel	0.9	0.13	0.67	0.35	1.8
Copper	4.2	3.1	2.8	2.9	3.6
Zinc	10.5	15.1	15.4	27.3	24.8

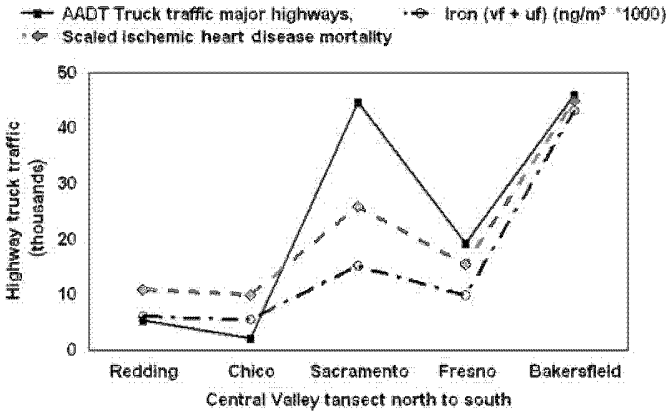

FIG. 14. Association between local average annual daily truck (AADT) traffic on major freeways, scaled ischemic heart disease, and very fine plus ultrafine iron.

was examined but the pattern did not produce a fit to the IHD increase (Figure 15). The relatively high values of B*a*P at Chico in winter, observed for years in prior CARB toxics data reported in the ADAM database (ARB ADAM 2010), was traced to the burning of primarily pine wood.

Coronene is normally associated with the exhaust of automobiles, while B*a*P has known vehicular sources (diesels and cars) as well as wood smoke (Fujita et al. 2007; Riddle et al. 2007; Kleeman et al. 2009; Cahill 2010). The non-soil, nonwood smoke potassium was also observed by Gertler et al. (2003) in the Tuscarora Tunnel studies from light duty vehicles, but not from diesels. Thus, there appears to be a spark emission source of potassium and coronene in the very fine/ultrafine. A south valley enhancement was also seen in petroleum derived alkanes (Cahill 2010), which were present in the largest amounts in Fresno, lesser amounts in Bakersfield, and negligible elsewhere. In summary, it does not appear that organic aerosols from wood smoke, diesels, and automobiles are a component in the IHD excess.

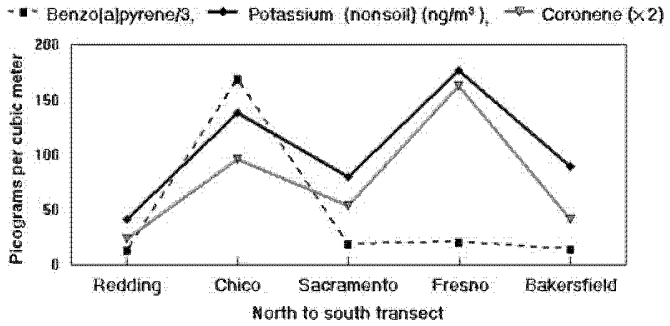

FIG. 15. Comparison of ultrafine B*a*P, potassium, and coronene.

CONCLUSIONS

Persistent enhancement of mortality associated with cardiovascular and specifically IHD has been observed in the southern San Joaquin Valley since 1990, yet while there is a strong statistical association with mass, most of the mass is known to be relatively innocuous to the cardiovascular system. Most of the mass is ammonium nitrate, which is soluble in lung fluid. This makes ammonium nitrate unlikely as a source of cardiovascular disease. In order to examine potential causal agents, a profile was made of mass, inorganic, and organic components of mass in nine size modes, including ultrafines $<0.09\ \mu$m, at five sites from Redding to Bakersfield during a 3-week period of strong stagnation, January 5–22, 2009. The strongest correaltions to IHD mortality were found in very fine (0.26–0.09 μm) to ultrafine metals, with most tied to vehicular sources. This result is supported by several independent lines of reasoning. First, there is an association with truck traffic and IHD throughout the Valley. Second, the four key transition elements, non-soil iron, nickel, copper, and zinc, are closely tied to vehicular sources through upwind–downwind measurements at Watt Avenue, a secondary artery in suburban Sacramento. Third, the same four elements are found at the downtown ARB 13th and T Street site. Fourth, there are known diesel sources of zinc and phosphorus, from zinc thiophosphate in lubricating oil, plus calcium as an antacid. No iron, nickel, or copper were seen in the diesel dynamometer tests, so these elements are not coming from engine wear. Conversely, brake pads include many elements, including iron, nickel, copper, and zinc. The Watt Avenue data were taken just south of a stoplight, so braking was occurring. Heavy braking also occurs on the I-5 "Grapevine" and Highway 58 downgrades, each more than a 1000 m descent, and both carry heavy truck traffic into Bakersfield, where the same elements are seen again correlating with increased rates of IHD.

Thus, in summary, we present here evidence that, while not conclusive, strongly supports the hypothesis that very fine and ultrafine transition metals are a causal factor in IHD in the Central Valley of California. Removal of zinc thiophosphate from lubricating oil could greatly reduce the zinc concentration, while changes in brake drums and pads could reduce the non-soil iron, copper, zinc, and nickel concentrations in ambient air. After a 15-year fight that surfaced with concerns about the San Francisco Bay, on October 5, 2010, Governor Arnold Schwarzenegger signed SB346, which requires brake pad manufacturers to reduce the use of copper to not more than 5% by 2021 and no more than 0.5% by 2025. The reasons were based on the toxicity of copper in water run-off from roads and follows similar action by Washington State.

Finally, it is clear that the lack of correlation between $PM_{2.5}$ (or $PM_{1.0}$) composition and very fine and ultrafine aerosol composition makes measurements of the composition of very fine and ultrafine particles critical for obtaining causal relations to health impacts, both for organic and inorganic species.

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EXHIBIT 13

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Very Fine and Ultrafine Metals and Ischemic Heart Disease in the California Central Valley 2: 1974–1991

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The southern part of Central Valley of California in winter has long had high PM_{10} mass, which until about 1990 included sulfate, vanadium, and nickel from the burning of crude oil used to generate steam to enhance heavy petroleum recovery. In roughly 1990, natural gas became the major energy source used for steam generation. In 1989–1991, data were collected throughout California on the mortality from strokes and ischemic heart disease (IHD). Although no spatial variability was seen for strokes, the southern San Joaquin Valley was found to have IHD mortality rates roughly 60% greater than the rest of the valley. PM_{10} was statistically identified as the major factor associated with the IHD mortality. However, when the rate of IHD was reexamined in the 2003–2007 period, a sharp reduction, about 30%, was seen in the relative rates for southern San Joaquin Valley as compared with the northern Sacramento Valley. We have measured very fine and ultrafine vanadium and nickel aerosols in a winter experiment in 2009, which shows an order of magnitude reduction in vanadium and nickel aerosols as compared with the pre-1990 data, which is a consequence of the switch from burning crude oil to natural gas to generate the steam. The inference of a causal relationship between the reduced vanadium and nickel and the improved IHD rate is supported by a growing body of laboratory and epidemiological work on the toxicity of vanadium and nickel, including from oceangoing ships burning crude or residual oil.

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INTRODUCTION

The Central Valley of California is well known for exhibiting in much of its area serious violations of federal PM_{10}, $PM_{2.5}$, in winter, and ozone standards, in summer, matching or exceeding those seen for any commensurate area of the United States. Yet other parts of the valley share agriculturally based land uses and meteorology and do not exhibit serious violations of these standards. Although efforts continue to control particulate matter (PM) and ozone violations, this pollutant gradient offers an ideal situation to examine the effects of pollutants on health. Many of the confounding variables seen in comparison studies, such as meteorology, land use patterns, and cigarette smoking, are very similar throughout the Valley, and a wealth of data exists on the pollutants and their sources from district air monitoring and Air Resources Board (ARB) studies. The presence of detailed analysis of mortality from ischemic heart disease (IHD) and stroke during 1989–1991 reported by the Cardiovascular Disease Outreach and Epidemiology (CORE) Program (Kao et al. 1994) and the California Department of Health Services (CADHS 2010) provides a natural opportunity to compare the pollutant data and mortality data for the identical time ranges. While this article focuses on PM effects, the original report (Cahill et al. 1998) also examined the effects of ozone and carbon monoxide (CO) on IHD and stroke mortality; some of which are presented in this article for completeness. However, complexities in the spatial and temporal gradients of ozone require further interpretation, and thus, they are not examined in any detail in this article.

BACKGROUND

The northwest-southeast trending 550 km by 100 km Central Valley of California is one of the richest agricultural areas in the world (Figure 1). In addition, there are two major metropolitan areas in the Valley, the Sacramento-Fresno regions each with about 1 million residents, and otherwise towns are generally medium (circa a few 100,000) to small and spread

FIG. 1. Map of the Central Valley of California. The northern part is referred to as the Sacramento Valley while the southern part is called the San Joaquin Valley. The areas within the dotted circumference vary in altitude from almost sea level in the Delta to a few 100 m in elevation. The small arrows denote the typical winter wind patterns (Hayes et al. 1984).

throughout the Valley. The mean population density is about 60 people/km^2.

High summer temperatures in the Valley (mean daily high, July, 36°C ± 1°C) lower the surface pressure and draw massive inputs of cool air into the Valley from the San Francisco Bay area, bringing with it oceanic aerosols and typical urban pollutants enhanced by the major petrochemical industrial sites at the Carquinez Strait. These latter sources lie directly in the path for the cold, dense winds from the San Francisco Bay. These winds funnel down the entire San Joaquin Valley, south of the strait, but rarely penetrate north very far in the Sacramento Valley, north of the strait. Rainfall in the Valley is rare during the period from May through October.

In winter, there is slow drainage of cold air off the Sierra Nevada to the Valley floor (mean daily low, January, 3°C ± 1°C) and then, at the rate of about 50 km/day, the air drains toward the lowest point, the Sacramento–San Joaquin Delta, directly east of the Carquinez Strait. Thus, little impact from the San Francisco Bay area is seen on most winter days in the Central Valley beyond the immediate Delta region. Winter rainstorms and strong northwest winds periodically clean out the Valley. Thus, the Valley tends to fall into two distinct and very different conditions: hot, dry summers with strong diurnal winds, and cool, foggy winters with long periods of stagnation. This results in two very different aerosol types: summer and winter (Figure 2).

In Figure 2, 24 h, one day in six PM_{10} mass at the Fresno 1st Street "Super-site" is shown (ADAM 2010). The site is in a largely residential neighborhood roughly 1 km east of the

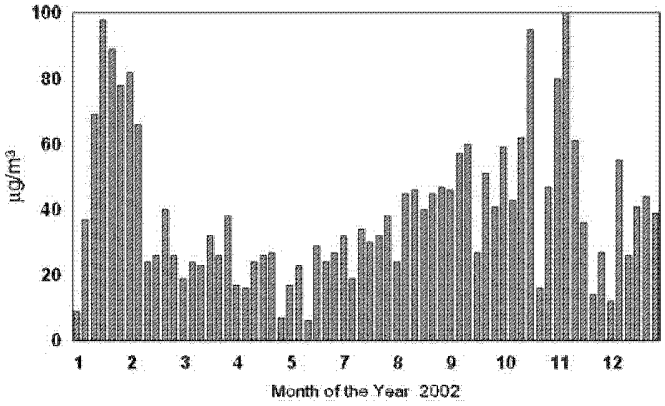

FIG. 2. PM_{10} mass at the Fresno "Super-site", 2002.

nearest major freeway, well away from agricultural operations. It is thus a good representation of what the average Fresno resident inhales. The annual pattern of PM_{10} mass has been consistent in the valley for many years, but this data only really became available around 1997, hence why Figure 2 uses more recent data to demonstrate the traditional annual cycle of particulate mass.

The health effects data are derived from CORE (Kao et al. 1996) and CADHS (2010). CORE collected city (>20,000 inhabitant) and countywide data on mortality from stroke and IHD; the latter is the largest source of mortality in the California Central Valley accounting for about one fourth of all deaths. The CORE data were corrected for age, >35 years, and reduced to incidence per 100,000 residents. The results were then presented as a ratio to the California average values the both males and females. Individual city data were weighted and averaged to obtain countywide averages in order to match the air pollution data.

The effect of race was examined over the entire California dataset. The data were available only in three classifications: "White," "Black," and "Other," with "Other" in the Central Valley being largely Latinos. No statistically significant difference was seen in the IHD rates for the dominant >75 years age group, but a slight enhancement of the rates for Blacks was seen in the 64- to 75-year cohort. For all ages, the mortality/100,000, 95% confidence limit, was 196 ± 3 for white males, 212 ± 9 for black males, and 199 ± 4 for other males; the corresponding values for females were 127 ± 3, 166 ± 5, and 135 ± 3. The stroke deaths, on the contrary, while only roughly one third of the rate of IHD mortality, showed stroke rates roughly twice as high for the "Black" and "Other" cohorts than the "White" cohort. Consideration was given to cigarette-smoking patterns, but no significant difference was seen along the length of the Valley (Table 1).

Four metrics for air pollution were studied, each with very different cardiovascular impacts: ozone (top 30 h and hours above 0.09 ppm), annual average CO, and annual average PM_{10}. The approximate cigarette-smoking patterns were calculated

TABLE 1
Ischemic heart disease (IHD) and stroke mortality versus air pollutants in the Central Valley of California, 1989–1991

County (north to south)	IHD rate vs. CA average (%)	Stroke rate vs. CA average (%)	Ozone top 30 h (ppm)	Ozone hours >0.09 (h)	CO annual average (ppm)	PM_{10} annual average ($\mu g/m^3$)	Smoking rate average (%)
Shasta	−14	+9	0.095	20	0.54	30	22.4
Butte	−27	−3	0.078	6	0.93	38	22.4
Sutter	−4	+26	0.090	4		44	22.8
Placer	−17	−4		125		30	22.8
Sacramento	−6	+2	0.107	153	1.29	44	23.4
Yolo	+2	+13		16		30	22.4
San Joaquin	+15	+17	0.096	36	1.13	51	22.8
Stanislaus	−7	−3	0.102	119	0.75	48	22.0
Madera	+11	−23		30		53	22.0
Fresno	+3	−12	0.129	369	0.87	77	22.0
Kings	+17	+20	0.106	21		61	22.5
Tulare	+22	+8	0.093	192	0.88	67	22.5
Kern	+33	−11	0.111	605	0.80	68	22.5

from cigarette sales data. Correlations were calculated for all parameters and are presented in Table 2 and Figures 3 and 4. At some sites, measurements were lacking. No data were deleted.

To further investigate the statistical robustness of these data, we used "proc glm" on SAS version 9.1 for the analyses. Because there are only 13 observations in total, we did not feel that imputation would prove fruitful. Therefore, we ran multiple regression models with "percentage change of IHD" and "percentage change of stroke" as the outcome variables. The possible explanatory variables were "number of hours of ozone above 0.09 ppm" ("ozone"), "annual average PM less than 10 μm, measured in micrograms per cubic meter" ("PM_{10}"), and "percentage rate of smoking" ("smoking"). We checked the assumption of normality of the errors by formally using the Shapiro–Wilk test and the assumption of homoskedasticity informally using residual plots.

The overall stroke model was not significant ($p = 0.1108$). We did not proceed further for that outcome. However, the overall IHD model was significant ($p = 0.0330$). We used backward elimination as the model selection strategy, for example, that of Neter et al. (1996). Ozone and smoking were eliminated—in that order—leaving PM_{10} as the sole significant explanatory variable ($p = 0.0026$). The resulting linear regression is given by

$$\text{estimated percentage change of IHD} = -41.5 + 0.87 \times PM_{10},$$

and the corresponding r-squared value is 0.576. It is noteworthy that Fresno appears to be an outlier. If this point is removed, the slope and r-squared values jump dramatically. We have no cause to remove that point and we therefore use the model, as indicated earlier, as our finding. However, the Fresno value includes semirural sampling sites at the urban fringe that are not present in other San Joaquin Valley cities, which had at that time only a single city center site.

However, the strong association between aerosol mass and IHD posed a problem. As additional data were developed in the Central Valley from the IMPROVE program (Malm et al. 1994) and from extensive California studies (CRPAQS 2001, Cahill et al. 2003), it became clear that the major aerosol species that dominated fine mass was ammonium nitrate, with much smaller contributions from organic matter, including a wood smoke component, and ammonium sulfate. These are however water soluble and have not been closely linked to IHD in animal and laboratory studies. (Devlin 2003; Lippmann 2009).

TABLE 2
Correlation of air pollution to mortality by IHD and stroke in the Central valley of California, 1989–1991

Mortality	Ozone average top 30 h (ppm)	Ozone number hours > 0.09 (ppm)	CO (ppm)	PM_{10} ($\mu g/m^3$)
Correlation to IHD	$r^2 = 0.18$	$r^2 = 0.27$	$r^2 < 0.05$	$r^2 = 0.56$
Correlation to stroke	$r^2 = 0.21$	$r^2 = 0.19$	$r^2 < 0.05$	$r^2 < 0.05$

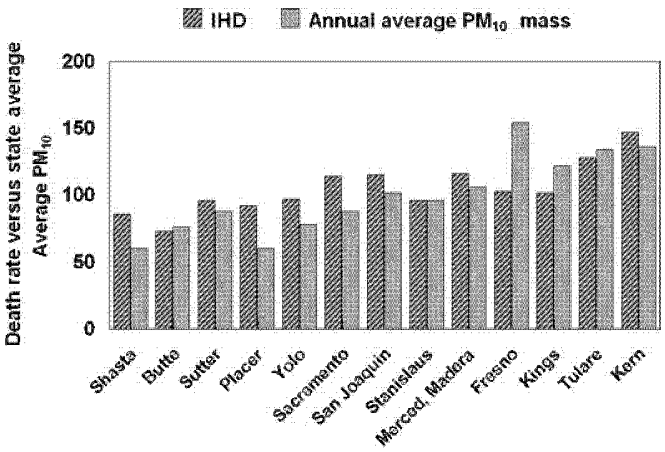

FIG. 3. Comparison of death rate from IHD, compared to the California average, and annual PM_{10} inhalable aerosol mass. Shasta County is at the very northern end of the California Central Valley, and Kern County is at the southern end.

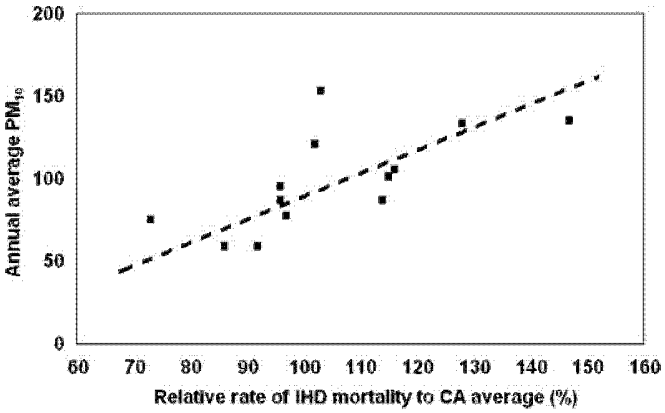

FIG. 4. IHD mortality rate relative to the California average versus PM_{10}. The parameters are associated by a regression $r^2 = 0.56$.

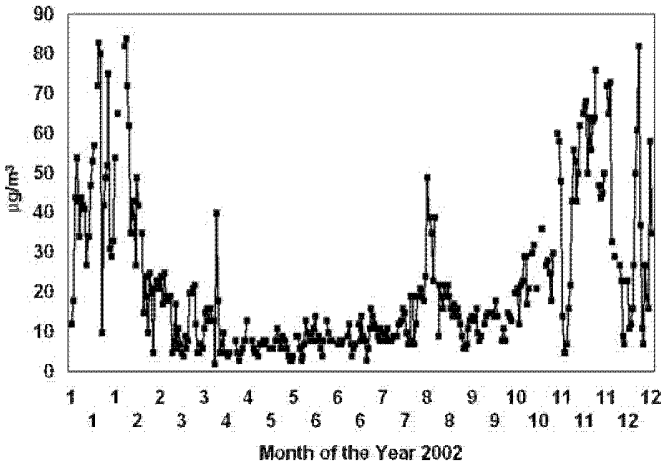

FIG. 5. $PM_{2.5}$ mass at the Fresno "Super-site," 2002, the same period used in Figure 2.

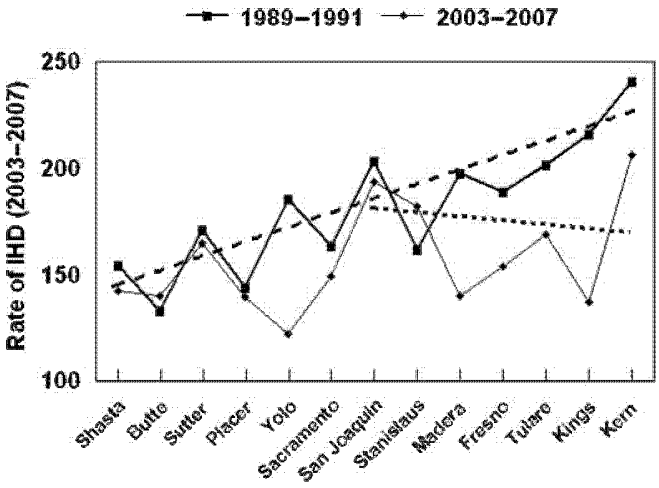

FIG. 6. IHD in the California Central valley, 1989–1991 versus 2003–2007. The 1989–1991 data are scaled to match the Shasta–Butte data, 2003–2007, as diagnostic protocols differed.

Reduction of IHD Rates: 2003–2007 Versus 1989–1991

Beginning around 1999, data on aerosol in the Central Valley were enhanced by the availability of $PM_{2.5}$ mass and chemical speciation at some San Joaquin Valley sites. In Figure 5, the same period for the Figure 2, one day in six PM_{10} mass is shown for 24 h daily fine $PM_{2.5}$ mass (ADAM 2010). The old federal 24-h $PM_{2.5}$ standard was 65 $\mu g/m^3$ and the current 24-h standard is 35 $\mu g/m^3$, which is routinely violated in winter. The annual average standard is 15 $\mu g/m^3$.

The question of IHD and aerosols was revisited for the period 2003–2007 (Cahill et al. 2010). From the recent data, it became

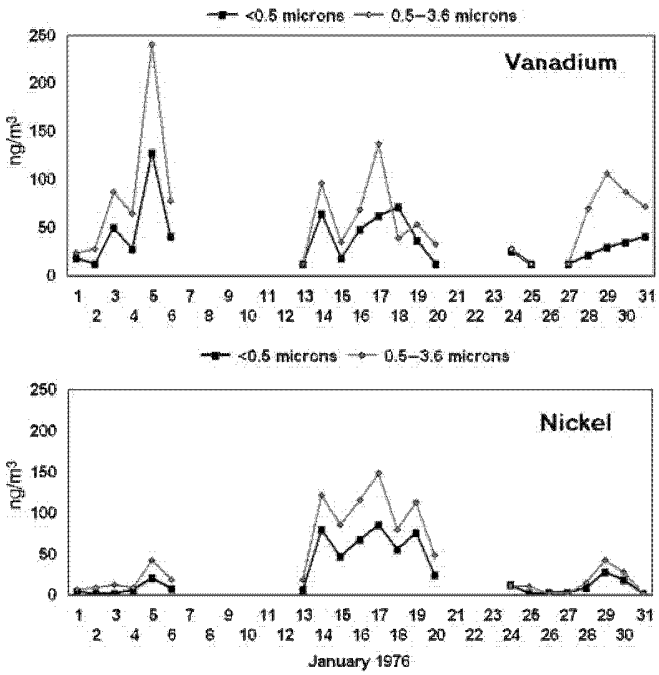

FIG. 7. Vanadium and nickel aerosols in Bakersfield, January 1976.

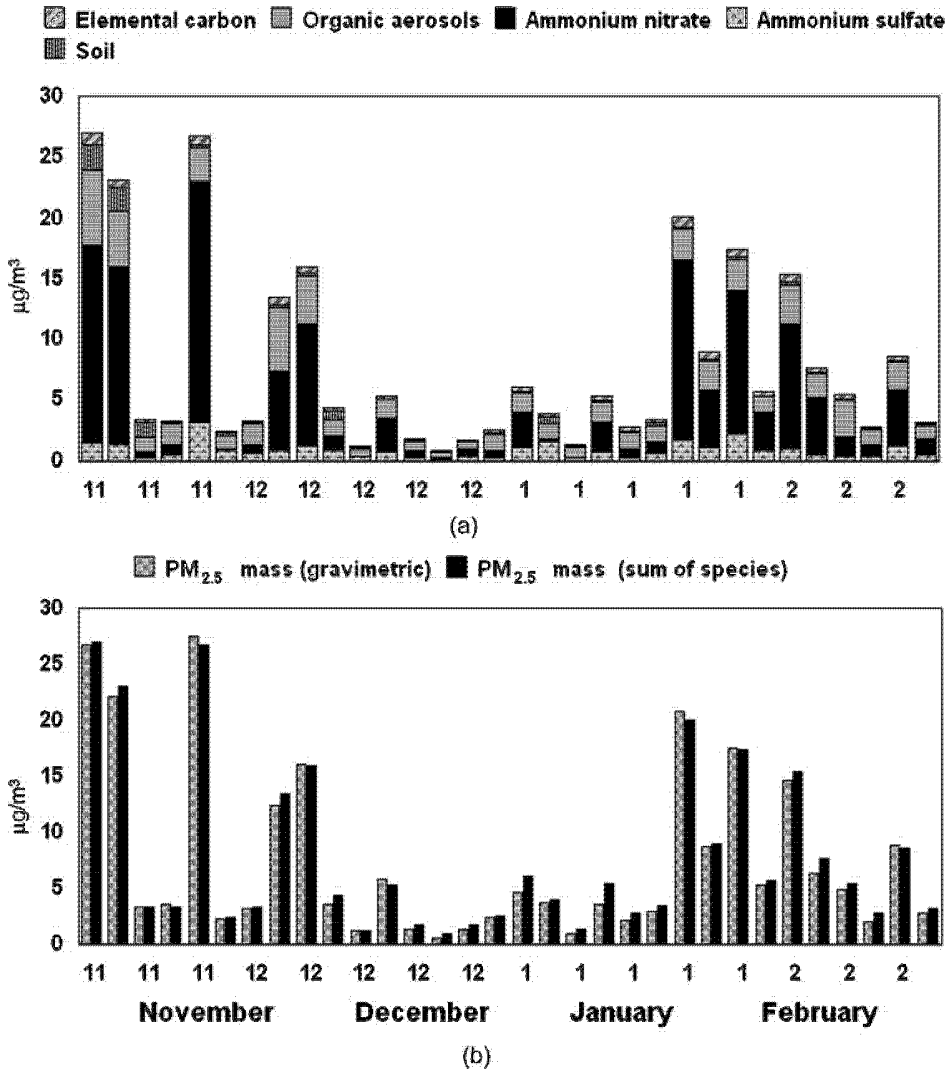

FIG. 8. (a) and (b) showing $PM_{2.5}$ mass closure and major species.

clear that a comparison of the IHD mortality, 1989–1991 versus 2003–2007, shows a major reduction, roughly 30%, that occurs in 2003–2007 for the counties north of Bakersfield (Figure 6). The trend for the northern half of the Central Valley is similar, while Bakersfield in Kern County is only slightly reduced. Thus, the question arises as to the causes for the improvement in the IHD rate.

The compositional analysis of Central Valley aerosols dates back to the early 1970s, including an innovative program of UC Davis for the California Air Resources Board (CARB), 1973–1977 (Cahill et al. 1974; Flocchini et al. 1976; Barone et al. 1978; Motallebi et al. 1990a, 1990b). A total of 14,100 daily aerosol measurements were taken in three size modes (15–3.5 μm, 3.5–0.50 μm, and 0.50–0.0 μm) and analyzed for elemental content by particle-induced x-ray emission (PIXE) (Cahill 1995) at about fourteen separate sites, including the valley sites of Chico, Sacramento, Visalia, (100 km NNE of Bakersfield), and Bakersfield. Bakersfield had one of the highest levels of vanadium and nickel aerosols in California, but port areas (Oakland, Richmond, and Los Alamitos) were also high (Figure 7).

Neither vanadium nor nickel was seen in sizes above 3.5 μm diameter. The radically different vanadium/nickel ratios occurred when winds came from the western (Taft, 40 km SW) or northern (Oildale, 5 km N) oil fields periods of stagnation, giving the highest pollution levels, favored sources in the much closer northern oil fields, some of which were within Bakersfield itself (Motallebi et al. 1990b). In addition, there was an oil refinery in Oildale, with potentially different emissions than the crude oil burned for enhanced oil recovery (EOR). Also it is noteworthy that while the vanadium and nickel concentrations can vary by over an order of magnitude, the lead levels were relatively

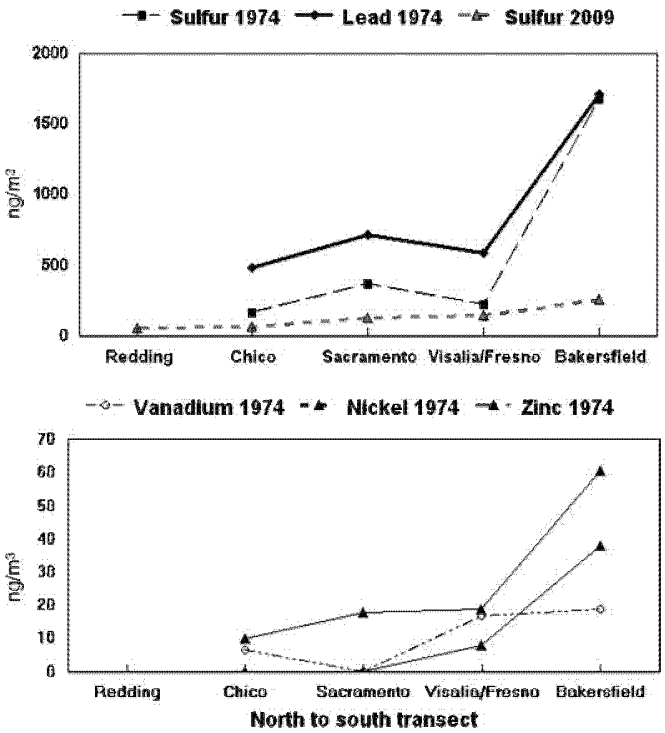

FIG. 9. Lead and sulfur, 1974–1976, versus sulfur, 2009, and vanadium, nickel, and zinc 1974–1976. Visalia lies between Bakersfield and Fresno.

constant, indicating a continuous impact of traffic-derived aerosols at Bakersfield.

Recent compositional analysis of the $PM_{2.5}$ aerosols in the southern San Joaquin Valley also became available through the IMPROVE site at Sequoia National Park (NP) starting in 1992 (Malm et al. 1994). The Sequoia NP Ash Mountain site was at low elevation, near 600 m, and thus received aerosols from the valley floor whenever the inversion lifted to that level.

IMPROVE had anticipated the value of $PM_{2.5}$ mass and full speciation, using quality assurance protocols of "integral redundancy" to measure major parameters by two or more independent methods. Sulfur from PIXE on Teflon in Channel A (Cahill 1995) is compared with sulfates after a denuder on Nylon filters in Channel B. Organic matter measured by combustion from tandem quartz filters in Channel C is compared to organic matter estimates by nonvolatile hydrogen of Teflon in Channel A (Cahill et al. 1989). Iron was measured by both PIXE and x-ray fluorescence (XRF) on the Teflon filters of Channel A. Thus, the gravimetric mass can be directly compared to the sum of all species (Figure 8b) and all major components (Figure 8a).

Figure 8 shows periodic incursions of high aerosol levels throughout the winter whenever the valley inversion rises to the altitude of Ash Mountain. Other than during these incursions, aerosol mass levels are very low, a few $\mu g/m^3$. By choosing an arbitrary concentration of 10 $\mu g/m^3$, we can be assured that we are seeing San Joaquin Valley aerosols diluted by the high inversion levels necessary for the Ash Mountain incursions. Finally, the excellent agreement between the mass of aerosol measured gravimetrically and the sum of species for all three IMPROVE channels (Figure 8a) shows that we are not missing any major component of the $PM_{2.5}$ mass.

Figure 5 showed that the violations of the annual and 24-h $PM_{2.5}$ standards in the San Joaquin Valley are driven by the winter aerosols. The high $PM_{2.5}$ values generally correspond to stable conditions with low inversions, and the clean periods to synoptic rainstorms passing through the Valley. Figure 8b shows that winter composition is dominated by fine $D_p < 2.5$ μm nitrates with smaller contributions from organic matter, wood smoke and vehicular exhaust, and some sulfates (IMPROVE 2010). The IMPROVE data also include fine metals, thus aiding our intercomparisons.

Winter data from the earlier efforts (Cahill et al. 1974, 2003; Flocchini et al. 1976) can be roughly compared with the current work (Cahill et al. 2010) by summing the four finest DRUM stages to obtain <0.56 μm particles (Table 3 and Figure 6).

Addressing the potential health impacts of these data, vanadium and nickel have the highest mortality risk coefficients of seventeen fine particulate matter (FPM) components (Lippmann et al. 2006). The elevated levels seen in 1974–1976 were sharply reduced as early as 1992–1993, using the vanadium and nickel levels in the southern San Joaquin Valley from the Sequoia IMPROVE site, although the Sequoia NP site's $PM_{2.5}$ data are not directly comparable to the valley floor's very fine (<0.5 μm) particle data. These data are shown in Figure 9. For comparison's sake, vanadium and nickel have current annual averages in FPM of 1.9 ng/m^3 across sixty metropolitan areas (MSAs) (Lippmann et al. 2006).

Examining the potential sources for the very fine (in this case <0.5 μm) particles (Table 3 and Figure 6), we see sulfur plus metals associated with crude oil combustion (vanadium and nickel), as well as lead and other vehicular metals. Kern County has very large reserves of crude oil, most of which lie just north and west of Bakersfield, although there was and is some oil extraction within the city itself. The Kern County oil fields have a heavy crude oil that requires EOR techniques such as steam injection to extract. Initially, the steam was generated by burning the crude oil itself, resulting in high pollution levels. In 1979, violations of federal air quality standards required Kern County to apply strict controls on sulfur dioxide, nitrogen dioxide, and particulate emissions, which included metals vanadium and nickel. EOR by crude oil combustion dropped slowly, 1980–1990, and then dramatically with the increasing availability of natural gas, with an immediate improvement in air quality by the early 1990s (CA Almanac). Thus, the population subject to IHD mortality in Bakersfield 1989–1991 had at least two decades of exposure to elevated high levels of very fine to ultrafine transition metals, specifically vanadium and nickel at 10–20 times the current US averages.

Laboratory data on the impact of vanadium and nickel aerosols has become more extensive (Zhang et al. 2009). Thus, we can hypothesize that the effective control of the

TABLE 3
Comparison between January 1974–1976, averaged, and January 2009. The four finest DRUM stages of the 2009 data have been summed to be PM < 0.56 μm to better match the PM < 0.5 μm data of the earlier ARB/UCD aerosol network. The Sequoia NP and Fresno winter 2002–2003 data are of $PM_{2.5}$

	Sulfur	Vanadium	Nickel	Zinc	Lead
Valley transect 2009 [January 2009 (ng/m^3) <0.56 μm]					
Redding	88.8	0.2	1.0	13.9	2.5
Chico	136.9	0.5	0.4	5.2	2.1
Sacramento	246.0	0.4	0.1	6.9	1.6
Fresno	261.4	0.3	0.5	40.3	4.9
Bakersfield	505.0	0.2	2.3	32.0	9.4
Fresno $PM_{2.5}$ (ng/m^3)					
Winter 2002	266.2	0.47	0.22	12.7	1.2
Sequoia NP (~600 m), 10 episodes $PM_{2.5}$ > 10 μg/m^3					
Winter 2002–2003 (ng/m^3)	194	0.2	0.1	4.7	1.0
Winter 1992–1993 (ng/m^3)	562	0.7	0.1	6.0	2.0
Valley transect 1974–1976 [January 1974–1976 (ng/m^3) average, <0.5 μm diameter]					
Redding	na	na	na	na	na
Chico	170	7	1	10	483
Sacramento	375	0	1	18	720
Visalia	225	17	8	19	593
Bakersfield	1685	19	38	61	1714
Port of Los Angeles					
August–September, 2008	2565	16	4	13	6

crude-oil-derived metals in the late 1980s may be responsible for the decreased IHD death rate at sites north of Bakersfield in the 1990s and beyond. This hypothesis is supported by other studies, such as the sharp drop in mortality after a sharp drop in sulfur, vanadium, and nickel in Hong Kong when the sulfur levels in fuels were lowered by edict (Hedley et al. 2002; Lippmann et al. 2006). The presence of high levels of nickel in New York City from residual oil combustion in buildings is hypothesized to be a causal factor in the enhanced mortality associated with $PM_{2.5}$ (Peltier et al. 2009; Peltier and Lippmann 2010).

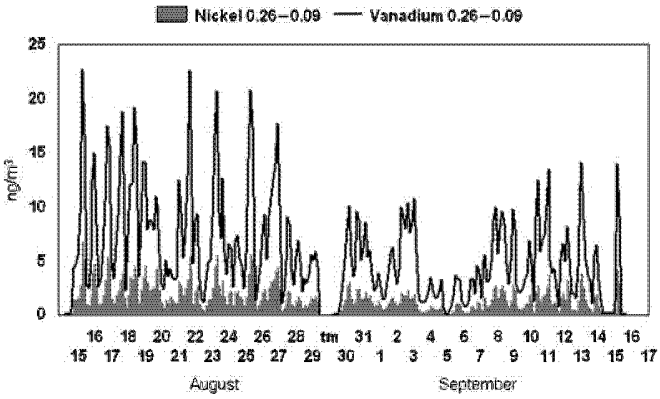

FIG. 10. Very fine ($0.26 > D_p > 0.09$ μm) vanadium and nickel in Wilmington, CA, downwind during daylight hours at the Port of Los Angeles.

The current data also have relevance to the emission of sulfur, vanadium, and nickel by oceangoing ships. Recent data in New York and New Jersey (Peltier et al. 2009), and the Port of Los Angeles (Cahill et al. 2009), show the impacts of oceangoing ships burning residual or bunker oil. In the Los Angeles study, the average concentrations of fine sulfur, vanadium, and nickel in the coastal town of Wilmington in August 2008 were 2565, 16, and 4.4 ng/m^3, respectively (Table 3). Southern winds bring aerosols from the Port of Los Angeles into Wilmington routinely during part of each day (Figure 10). Ultrafine particles were not collected in this study, so the actual values could have been significantly higher than these values. Thus, on the basis of the Bakersfield data, the enhanced rates of IHD are predicted in the area.

CONCLUSION

IHD mortality in the Central Valley of California, corrected for age, race, sex, and smoking, was almost 60% greater at the more polluted southern end of the Central Valley than the less polluted northern end in 1989–1991 despite similar meteorology and land use patterns throughout the Valley. A significant association, $r^2 = 0.56$, is seen between IHD mortality and PM_{10}, but negligible correlation, $r^2 < 0.05$, is seen with stroke mortality. When PM_{10} data are converted to an estimated $PM_{2.5}$ mass

by using more recent measurements, these results are similar to other studies such as the "6 Cities" study (Dockery et al. 1993) in mortality increase per particulate mass; 1.9% mortality increase per $\mu g/m^3$ of $PM_{2.5}$ for "6 Cities," while 1.8% mortality increase per $\mu g/m^3$ of estimated $PM_{2.5}$ for this study, despite major differences in meteorology and pollutant mix. No association was seen between CO and any health impact. Ozone was only weakly correlated with IHD and stroke. However, strong east-west ozone gradients were not corrected for in this work, and thus, these results for ozone must be viewed as merely indicative of the possible impacts.

The sharp reduction seen, when the IHD data were reexamined in the period 2003–2007, was coincident with a reduction in the high levels of vanadium (19 ng/m^3) and nickel (38 ng/m^3) due to oil field operations from before 1974 to after 1990, when new protocols were adopted. The vanadium and nickel levels in 2009 were close to the national average values, both roughly 1.9 ng/m^3. The relatively smaller reduction in IHD rate in Bakersfield itself is associated with the continuing impacts of vehicular very fine and ultrafine metals (Cahill et al. 2010, this issue).

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EXHIBIT 14

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Prenatal Air Pollution and Newborns' Predisposition to Accelerated Biological Aging

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Acquisition, analysis, or interpretation of data: All authors.
Drafting of the manuscript: Martens, Cox, Nawrot.
Critical revision of the manuscript for important intellectual content: Martens, Janssen, Clemente, Gasparrini, Vanpoucke, Lefebvre, Roels, Plusquin, Nawrot.
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Abstract

Importance—Telomere length is a marker of biological aging that may provide a cellular memory of exposures to oxidative stress and inflammation. Telomere length at birth has been related to life expectancy. An association between prenatal air pollution exposure and telomere length at birth could provide new insights in the environmental influence on molecular longevity.

Objective—To assess the association of prenatal exposure to particulate matter (PM) with newborn telomere length as reflected by cord blood and placental telomere length.

Design, Setting, and Participants—In a prospective birth cohort (ENVIRO*N*AGE [Environmental Influence on Ageing in Early Life]), a total of 730 mother-newborn pairs were recruited in Flanders, Belgium between February 2010 and December 2014, all with a singleton full-term birth (≥37 weeks of gestation). For statistical analysis, participants with full data on both cord blood and placental telomere lengths were included, resulting in a final study sample size of 641.

Exposures—Maternal residential $PM_{2.5}$ (particles with an aerodynamic diameter ≤2.5 μm) exposure during pregnancy.

Main Outcomes and Measures—In the newborns, cord blood and placental tissue relative telomere length were measured. Maternal residential $PM_{2.5}$ exposure during pregnancy was estimated using a high-resolution spatial-temporal interpolation method. In distributed lag models, both cord blood and placental telomere length were associated with average weekly exposures to $PM_{2.5}$ during pregnancy, allowing the identification of critical sensitive exposure windows.

Results—In 641 newborns, cord blood and placental telomere length were significantly and inversely associated with $PM_{2.5}$ exposure during midgestation (weeks 12-25 for cord blood and weeks 15-27 for placenta). A 5-$\mu g/m^3$ increment in $PM_{2.5}$ exposure during the entire pregnancy was associated with 8.8% (95% CI, −14.1% to −3.1%) shorter cord blood leukocyte telomeres and 13.2% (95% CI, −19.3% to −6.7%) shorter placental telomere length. These associations were controlled for date of delivery, gestational age, maternal body mass index, maternal age, paternal age, newborn sex, newborn ethnicity, season of delivery, parity, maternal smoking status, maternal educational level, pregnancy complications, and ambient temperature.

Conclusions and Relevance—Mothers who were exposed to higher levels of $PM_{2.5}$ gave birth to newborns with shorter telomere length. The observed telomere loss in newborns by prenatal air pollution exposure indicates less buffer for postnatal influences of factors decreasing telomere length during life. Therefore, improvements in air quality may promote molecular longevity from birth onward.

Telomeres are nucleoprotein structures that cap the end of chromosomes. They can consist of several thousands of tandem-repeated TTAGGG sequences.1,2 With each cellular division, telomeres shorten. Telomere length (TL) has been associated with age-related diseases and mortality and is considered a marker of biological aging.3–8 Telomere length is also associated with environmental and lifestyle factors that influence the oxidative stress

and inflammatory status in humans, such as smoking,9 obesity,10 Mediterranean diet,11 exposure to violence,12 and life stress,13 which underscores the vulnerability of telomeres to reactive oxygen species (ROS). In a 2015 update of the Global Burden of Disease study, ambient particulate matter (PM) was ranked as the sixth most leading risk factor influencing public health worldwide.14 Increased oxidative stress and inflammation are proposed as underlying mechanisms through which PM may influence human health.15,16 Exposure to air pollution during in utero life may have adverse effects on the fetus and neonate.17–19 The ability of PM air pollution to generate ROS has led to the hypothesis that telomere attrition is influenced by air pollution exposure.20 Occupational and population-based studies have described both positive and negative associations between different types of air pollution and TL in adults.21–27 In general, long-term exposure to PM25 and black carbon (BC)24,26 are associated with shorter TL in adults. Because TL is highly variable at birth, 28,29 potential determinants, such as newborn sex,28 paternal age,28 maternal prepregnancy body mass index (BMI),20 maternal stress,30 maternal educational level,31 maternal smoking during pregnancy,32 and maternal residential proximity to a major road,33 have recently been explored for explaining this phenomenon. In this regard, we hypothesized that exposure to PM air pollution during pregnancy may contribute to telomere setting at birth. Because in utero life is believed to be a critical time window in the early programming of diseases later in life,34 unravelling the connection between prenatal air pollution exposure and TL at birth may help to gain new insights in the causes of diseases linked with telomere biological characteristics. In this study, we assessed the association between prenatal exposure to $PM_{2.5}$ (particulate matter with an aerodynamic diameter ≤2.5 μm) and TL at birth.

Methods

Study Population

From the ongoing population-based prospective Environmental Influence on Ageing in Early Life (ENVIR*ON*AGE) birth cohort study, 730 mothers with a singleton full-term birth (≥37 weeks of gestation) were selected.35 These mother-newborn pairs were recruited between February 2010 and December 2014 from noon on Fridays to 7 AM Mondays. The study protocol was approved by the ethical committees of Hasselt University and East-Limburg Hospital in Genk, Belgium, and has been carried out according to the Helsinki declaration. 36 The mother's ability to fill out questionnaires in Dutch was a criterion for selection. Owing to missing exposure data (n = 10), the unavailability of DNA or bad DNA quality for cord blood (n = 12) and placenta (n = 51), and too high a variability of TL measurement between triplicates of cord blood (n = 10) or placental tissue (n = 9), we obtained cord blood TL samples from 698 mother-newborn pairs and placental TL samples from 660. For statistical analysis, we used participants with full data on both cord blood and placental TLs, resulting in a final study sample size of 641.

Mean Relative TL Measurement

DNA was extracted from cord blood buffy coat and placental tissue (details on sample collection are provided in eMethods 1 in the Supplement). Mean relative TL was determined in triplicate with a previously37 described modified quantitative, real-time polymerase chain

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reaction (qPCR) protocol.38 For cord blood, the triplicates of the telomere runs showed a coefficient of variation (CV) of 0.68%, those of single-copy gene runs a CV of 0.41%, and those of T/S ratios a CV of 6.4%. For placental telomeres, the triplicates of the telomere runs showed a CV of 0.70%, those of the single-copy gene runs a CV of 0.45%, and those of T/S ratios a CV of 6.9%.

Exposure Assessment

Based on the mother's residential address, daily mean $PM_{2.5}$ concentrations (in micrograms per cubic meter) were estimated using a high-resolution spatial-temporal interpolation method (kriging)39 in combination with a dispersion model.40,41 This interpolation method uses hourly measured $PM_{2.5}$ pollution data collected at the official fixed-site monitoring stations (n = 34) and land-cover data obtained from satellite images.42 The model chain provides daily $PM_{2.5}$ values on a dense, irregular receptor grid by using data both from the Belgian telemetric air-quality network and emissions from point sources and line sources. In the Flemish region of Belgium, more than 80% (R^2 = 0.8) of the temporal and spatial variability was explained by this interpolation tool.43 For each week of pregnancy from the date of conception onward, a mean $PM_{2.5}$ concentration was calculated using daily mean $PM_{2.5}$ concentrations at the mother’s residence. In case the mother had a gestation of less than 40 weeks, exposure was set at zero for the weeks after giving birth. The number of mothers who changed address during pregnancy (69 of 641 [10.7%]) was taken into account when calculating the weekly exposures. Weekly mean ambient temperatures were calculated based on the daily mean temperatures in degrees Celsius provided by the Royal Meteorological Institute, Brussels, Belgium.

General Study Procedures

At the first antenatal visit (weeks 7-9 of pregnancy), maternal BMI was determined by calculating weight in kilograms divided by height in meters squared. The date of conception was estimated on the basis of the first day of the mother’s last menstrual period combined with the first ultrasonographic examination. After delivery, mothers provided written informed consent and completed the study questionnaires in the post-delivery ward. We collected detailed information about the mothers, fathers, and newborns from questionnaires and medical records. Parity was categorized in mothers having their first newborn, having their second newborn, or having their third or more newborn. Maternal educational level was coded “low” when mothers did not obtain any diploma, “middle” when they obtained a high school diploma, and “high” when they obtained a college or university degree. Maternal smoking status was categorized as “never smoker,” “former smoker” when the mother had quit smoking before pregnancy, and “smoker” when smoking continued during pregnancy. Newborns were classified as white European when 2 or more grandparents were Europeans, and non-European when at least 3 grandparents were of non-European origin. The presence of pregnancy complications was defined as the experience by the mother of 1 or more of the following conditions during pregnancy: gestational diabetes, hypertension, infectious disease, preeclampsia, vaginal bleeding, and hyperthyroidism or hypothyroidism. Perinatal measures, such as birth date, newborn sex, birth weight, and Apgar score were obtained after birth.

Statistical Analysis

We used distributed lag models (DLMs) to model the association between log_{10}-transformed TL and mean weekly $PM_{2.5}$ exposures during gestational weeks 1 to 40. A distributed lag (nonlinear) model (DLNM) is defined through a “cross-basis” function, which allows the simultaneous estimation of an (nonlinear) exposure-response association and nonlinear effects across lags, the latter termed *lag-response association*.44The exposure-response function was assumed to be linear and the lag structure was modeled using a natural cubic spline with 5 *df*, setting the knots at equally spaced values in the original lag scale (1-40 weeks). The number of knots was chosen based on the Akaike information criterion (AIC). 45 We also included a cross-basis for weekly mean temperature in the model. We used a natural cubic spline with 4 *df* for the temperature-TL function and a natural cubic spline with 5 *df* for the lag structure (with knots at equally spaced values in the original lag scale). In addition, we accounted for a priori selected covariates that include known determinants of newborn or adult TL and variables with a potential link with $PM_{2.5}$ and TL, such as date of delivery, gestational age, maternal BMI, maternal age, paternal age, newborn's sex, ethnicity, season of delivery, parity, maternal smoking status, maternal educational level, and pregnancy complications. We calculated cumulative effect estimates for the 3 trimesters of pregnancy (weeks 1-13, weeks 14- 26, and weeks 27-40) and the overall (40-week) cumulative estimate. Final estimates are presented as percentage change (with 95% CI) in TL for a 5-$\mu g/m^3$ increment in $PM_{2.5}$. Details on secondary analyses (ie, average exposure models, effect modification by sex, and nonlinear dose-response models) and sensitivity analyses are provided in eMethods 2 in the Supplement. All analyses were performed with the statistical software R, version 3.3.2 (R Project for Statistical Computing) using the dlnm package.46

Results

Characteristics of the Study Population

Table 1 describes the general characteristics of the study population (n = 641). The newborns, among them 318 girls (49.6%), had a mean (SD) gestational age of 39.4 (1.0) weeks and a mean (SD) birth weight of 3451 (428) g. Most (n = 567, 88.5%) of the newborns were Europeans of white ethnicity. The mean relative TL of newborns ranged from 0.51 to 1.75 in cord blood and from 0.52 to 1.89 for placental tissue. Associations of covariates with newborn TL are reported in eTable 1 in the Supplement. Mean (SD) maternal age was 29.1 (4.6) years, and mean (SD) maternal BMI was 24.3 (4.5). Among the mothers, 351 (54.8%) were primiparous and 224 (34.9%) secundiparous. Mean weekly $PM_{2.5}$ exposure was 13.4 $\mu g/m^3$ (5th-95th percentile, 4.3-32.5 $\mu g/m^3$). eFigure 1 in the Supplement shows the contours of the annual $PM_{2.5}$ exposure in the recruitment area and the places of residence of the mothers during pregnancy.

Association Between Prenatal $PM_{2.5}$ Exposure and Newborn TL

Scatterplots showing newborn TL in association with average $PM_{2.5}$ exposure during the entire pregnancy are shown in eFigure 2 in the Supplement. Lag-specific (weekly) DLM estimates of the association between $PM_{2.5}$ exposure during pregnancy and TL at birth are presented in the Figure. Cord blood as well as placental TL were inversely associated with

$PM_{2.5}$ exposure during midgestation: significant estimates were observed for weeks 12 to 25 in cord blood (Figure, A), with the largest negative association in week 19 and for weeks 15 to 27 in placenta (Figure, B), with the largest negative association in week 21. In contrast, a positive association between $PM_{2.5}$ and cord blood TL was observed for exposure in weeks 32 to 34. The estimated overall (weeks 1-40) change in TL for a 5-$\mu g/m^3$ increment in $PM_{2.5}$ exposure was −8.8% (95% CI, −14.1 to −3.1%) for cord blood and −13.2% (95% CI, −19.3% to −6.7%) for placenta (Table 2). Trimester-specific cumulative estimates were only significant for the second trimester: −9.4% (95% CI, −13.1 to −5.6%) for cord blood and −7.1% (95% CI, −11.6% to −2.4%) for placental TL.

The existence of vulnerable exposure windows (ie, the hypothesis that exposure during some weeks of pregnancy is more critical than during others) was tested by comparing the main DLM model with a DLM model assuming a constant risk during the different weeks of pregnancy (likelihood ratio test on 4 *df).* The main DLM model provided a better fit than the constant-risk model for cord blood (AIC, -1418.4 vs -1407.0, $P = .001$) but not for placental telomeres (AIC, -1173.2 vs -1177.4, $P = .46$). The DLM estimates are corroborated by results from the average exposure models (Table 2). For instance, the change in TL for a 5-$\mu g/m^3$ increment in mean $PM_{2.5}$ over the entire pregnancy was -8.4% (95% CI, -13.5% to -2.9%) in cord blood and -12.5% (95% CI, -18.4% to -6.2%) in placenta. We did not observe a significant modification in the association by newborn sex for cord and placental TL, and we observed a nonlinear dose-response correlation (eTables 2 and 3 in the Supplement, respectively). Assuming constant associations within the strata of lags 1 to 10, 11 to 20, 21 to 30, and 31 to 40 (eFigure 3 in the Supplement), evidence for the positive association between cord blood TL and $PM_{2.5}$ toward the end of pregnancy is less evident. Cumulative estimates from sensitivity analyses were similar to those from the main model (Table 3).

Discussion

To our knowledge, this is the first study reporting an association between $PM_{2.5}$ exposure during in utero life and newborn TL. After adjustment for several covariates and potential confounders, maternal exposure to $PM_{2.5}$ during pregnancy was associated with 8.8% shorter newborn cord blood and 13.2% shorter placental telomeres. By applying distributed lag models based on weekly mean $PM_{2.5}$ exposures, we identified specific vulnerable periods during pregnancy. Both cord blood and placental TLs were negatively associated with $PM_{2.5}$ exposure during the second trimester of pregnancy. The finding that early-life TL might forecast life span, as observed in an animal-based study of zebra finches,47 underlines the importance of the identification of early-life TL determinants. In this regard, our results may have important health consequences later in life because a shorter TL at birth indicates less buffer capacity for postnatal influence of insults (eg, inflammation on TL). Particulate air pollution may generate ROS in a direct manner via the Fenton reaction operating at the particle surface,48 or in an indirect manner via altered mitochondrial and nicotinamide adenine dinucleotide phosphate-oxidase functions or via inflammatory cell activation.49 Telomeres contain a great amount of guanine bases, which are vulnerable to ROS. Reactive oxygen species can induce DNA breakage, leading to increased telomere shortening in addition to cellular replication.50 The major route for airborne particles to enter the maternal organism is via inhalation. Ultrafine particles (UFPs) with a diameter less than 0.1 μm (<100

nm) are able to cross the airway-blood barrier, may enter the bloodstream, and are transported to different body compartments.51–53 Whether particles can cross the placental barrier is still debated because of the rather limited evidence. Nevertheless, it has been shown recently that nanoparticles up to 240 nm can cross the human placental barrier and nanoparticles up to 500 nm may enter the fetal circulation in mice.54,55 An elevated oxidative stress status in both mother and newborn may be a potential explanation for our findings concerning $PM_{2.5}$ exposure observed in the present study. Earlier studies present positive associations between air pollution exposure and placental tissue nitrosative stress56 and mitochondrial oxidative stress.57 We identified the mid-pregnancy period as a critical time window for the association of $PM_{2.5}$ exposure with newborn TL. This finding is in agreement with the development of the placental barrier and maternal-fetal circulation. In the first months of pregnancy, the placental barrier remains thick with no perfusion but becomes thinner during the course of pregnancy concomitantly with increased fetal capillary development until week 10, which from then onward will facilitate an enhanced maternal-fetal exchange of nutrients and waste products.58 Exposure to $PM_{2.5}$ late in pregnancy (from weeks 32-34) is associated with longer telomeres in cord blood, although evidence is not conclusive. This finding may suggest the presence of a potential compensatory or overcompensatory mechanism in response to air pollution exposure in cord that is absent in placenta. Positive associations between leukocyte TL and recent exposure to air pollution have been observed previously in adults.21,22,25 An increase of telomerase activity in lymphocytes and a clonal expansion of subpopulations of lymphocytes with longer telomeres following acute exposure have been suggested as potential underlying mechanisms.21,59,60 Telomere length as assessed in the present study is a result of the combination between shortening and elongating processes prior to the telomere assessment time point. However, owing to the cumulative burden of oxidative stress during the entire pregnancy, overall newborn TL was inversely associated with prenatal exposure to air pollution. The stronger overall influence of PM on placental telomeres compared with cord blood may be due to this potential compensatory mechanism in cord blood, as we observed both positive and negative estimates for $PM_{2.5}$ exposure and cord blood TL during pregnancy, whereas all estimates were negative for placental TL.

Strengths and Limitations

Our study has several strengths. First, we have a large sample size of newborns with matching cord blood and placental tissue to study TL in relation to $PM_{2.5}$ air pollution exposure. Second, we used high-resolution exposure estimates based on the home addresses of the mothers, and we integrated daily concentrations to estimate weekly mean exposure during pregnancy. Compared with the more conventional approach of averaging exposures over relatively large time windows (trimesters or the entire pregnancy), the use of DLM allowed a more detailed investigation of prenatal exposure windows and enabled the identification of midpregnancy as a critical period for the association of $PM_{2.5}$ with TL in cord blood as well as placenta. Third, our findings are generalizable because our study population is representative of the gestational segment of the population at large.35

However owing to spatial variations in $PM_{2.5}$ concentrations, differences in exposure may exist, as our population was recruited in a relatively small area. Our study should also be

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interpreted within the context of its potential limitations. Our results are based on exposure at the maternal residence, and potential misclassification may be present because we could not account for other exposure sources that contribute to personal exposure, such as exposure during a commute, at work, and elsewhere. However, proxies of exposure, such as residential proximity to major roads, have been shown recently to be associated with internal exposure to nanosized particles, reflecting exposure to black carbon.61 The assessment of TL at birth represents a specific snapshot in the gestational period. We were not able to evaluate telomere dynamics throughout the entire pregnancy period, and, in view of our results, the role of telomerase needs further evaluation. Parental TL may be a determinant of the initial telomere length setting of the next generation.28 Because parents exposed to $PM_{2.5}$ may have shorter telomeres, the association between $PM_{2.5}$ exposure and newborn TL may be mediated by parental TLs. Unfortunately, this mediation could not be evaluated in the ENVIR*ON*AGE study because data on parental TLs were not available.

Conclusions

To our knowledge, this study is the first to report an association between prenatal exposure to $PM_{2.5}$ air pollution and TL at birth, both in cord blood and placental tissue. We theorize that biological aging is associated with $PM_{2.5}$ air pollution exposure, even before birth, which may underlie potential adverse health consequences later in life. This study adds to the growing body of evidence that even relatively low levels of prenatal exposure to air pollution contributes to fetal programming at the molecular level and more precisely at the level of telomere biological features. Adequate reduction of environmental fine-particle air pollution levels may promote longevity as from birth onwards and may enhance overall quality of life. Prospective follow-up studies are needed to further elucidate the outcome of $PM_{2.5}$-linked telomere shortening at birth in relation to pediatric and adult health and disease later in life.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Key Points

Question

Is telomere length at birth (a marker of biological aging) influenced by exposure to particulate matter air pollution during in utero life?

Findings

In this birth cohort study of 641 mother-newborn pairs, mothers with higher residential exposure to $PM_{2.5}$ (particulate matter with an aerodynamic diameter ≤2.5 μm air pollution) gave birth to newborns with significantly lower telomere length that could not be explained by other factors including socioeconomic class. For a 5-$\mu g/m^3$ increase in residential $PM_{2.5}$ exposure during pregnancy, cord blood telomeres were 9% shorter and placental telomeres 13% shorter.

Meaning

Improved air quality may promote molecular longevity from birth onward.

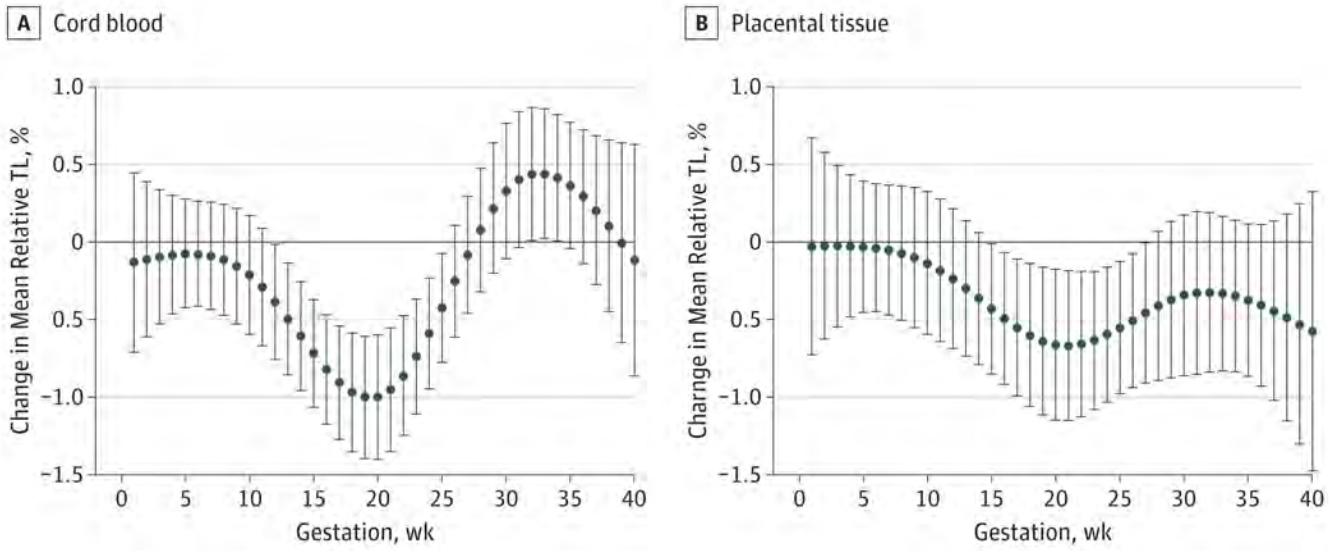

Figure. Cord Blood and Placental Telomere Length (TL) in Association With Week-Specific Prenatal $PM_{2.5}$. Exposure During Pregnancy

Week-specific estimates provided as a percentage change in mean relative TL (with 95% CI) for a 5-μg/m^3 increment of $PM_{2.5}$ air pollution exposure. Models were adjusted for date of delivery, gestational age, maternal body mass index, maternal age, paternal age, newborn sex, newborn ethnicity, season of delivery, parity, maternal smoking status, maternal educational level, pregnancy complications, and ambient temperature. $PM_{2.5}$ indicates particulate matter with an aerodynamic diameter of 2.5 μm or less.

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Table 1
Characteristics of 641 Mother-Newborn Pairs

Characteristic	No. (%)
Newborns	
Birth weight, mean (SD), g	3451 (428)
Females	318 (49.6)
White European	567 (88.5)
Gestational age, wk	
37	33 (5.1)
38	87 (13.6)
39	196 (30.6)
40	242 (37.8)
41	83 (12.9)
Season of birth	
Winter	163 (25.4)
Spring	140 (21.8)
Summer	153 (23.9)
Autumn	185 (28.9)
Apgar score 5 min after birth	
7	11 (1.7)
8	45 (7.0)
9	187 (29.2)
10	398 (62.1)
Mothers	
Age, mean (SD), y	29.1 (4.6)
BMI, mean (SD)	24.3 (4.5)
Educational level[a]	
Low	71 (11.1)
Middle	245 (38.2)
High	325 (50.7)
Smoking status[b]	
Never smoker	401 (62.6)
Former smoker	159 (24.8)
Current smoker	81 (12.6)
Pregnancy complications[c]	73 (11.4)
Cesarean delivery	24 (3.7)
Parity	
1	351 (54.8)
2	224 (34.9)

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Characteristic	No. (%)
≥3	66 (10.3)
Weekly mean $PM_{2.5}$ exposure, $\mu g/m^3$[d]	13.4 (4.3 to 32.5)
Weekly mean temperature, °C[d]	10.7 (−0.2 to 19.4)
Fathers	
Age, mean (SD), y	31.7 (5.3)

Abbreviations: BMI, body mass index (calculated as weight in kilograms divided by height in meters squared); $PM_{2.5}$, particulate matter with an aerodynamic diameter of 2.5 μm or less.

[a] Maternal educational level was coded "low" when mothers did not obtain any diploma, "middle" when they obtained a high school diploma, and "high" when they obtained a college or university degree.

[b] Maternal smoking status was categorized as "never smoker," "former smoker" when quitted smoking before pregnancy, and "smoker" when smoking continued during pregnancy.

[c] Pregnancy complications was defined as the experience by the mother of one or more of the following conditions during pregnancy: gestational diabetes, hypertension, infectious disease, pre-eclampsia, vaginal bleeding, and hyperthyroidism or hypothyroidism.

[d] Presented as mean (5th to 95th percentile) and for the actual pregnancy duration.

Table 2

Association Between Newborn Telomere Length and Prenatal $PM_{2.5}$ Exposure[a]

	Percentage Change (95% CI)	
Exposure Window	**Distributed Lag Model**	**Average Exposure Model**
Cord Blood (n = 641)		
Overall (1-40 wk)[b]	−8.8 (−14.1 to −3.1)	−8.4 (−13.5 to −2.9)
Trimester 1	−2.3 (−6.1 to 1.7)	−0.8 (−4.7 to 3.2)
Trimester 2	−9.4 (−13.1 to −5.6)	−9.8 (−13.3 to −6.2)
Trimester 3	3.1 (−1.8 to 8.3)	2.6 (−1.4 to 6.8)
Placental Tissue (n = 641)		
Overall (1-40 wk)[b]	−13.2 (−19.3 to −6.7)	−12.5 (−18.4 to −6.2)
Trimester 1	−1.4 (−6.0 to 3.5)	−0.8 (−5.5 to 4.1)
Trimester 2	−7.1 (−11.6 to −2.4)	−7.4 (−11.7 to −2.9)
Trimester 3	−5.3 (−10.8 to 0.5)	−4.5 (−9.0 to 0.2)

Abbreviations: BMI, body mass index; $PM_{2.5}$, particulate matter with an aerodynamic diameter of 2.5 μm or less.

[a] Estimates provided as a percentage change in mean relative telomere length for a 5-$\mu g/m^3$ increment in $PM_{2.5}$, estimated by distributed lag models using weekly mean exposures, and by mean $PM_{2.5}$ during specific exposure windows (average exposure model).

[b] In the average exposure models, the overall exposure window of 1 to 40 weeks is the actual pregnancy duration (ranging from 37-41 weeks). Models were adjusted for date of delivery, gestational age, maternal BMI, maternal age, paternal age, newborn sex, newborn ethnicity, season of delivery, parity, maternal smoking status, maternal educational level, pregnancy complications, and ambient temperature.

Table 3

Sensitivity Analyses[a]

Model	No.	Percentage Change (95% CI)	
		Cord Blood Telomere Length	Placental Telomere Length
Main model	641	−8.8 (−14.1 to −3.1)	−13.2 (−19.3 to −6.7)
Unconstrained lag structure	641	−8.4 (−14.0 to −2.5)	−14.0 (−20.2 to −7.3)
Additional adjustment for month of delivery	641	−9.2 (−14.6 to −3.4)	−12.3 (−18.6 to −5.6)
Excluding non-European mothers	567	−8.7 (−14.4 to −2.6)	−11.9 (−18.6 to −4.8)
Excluding mothers with low educational level	570	−10.0 (−15.4 to −4.1)	−13.4 (−19.8 to −6.4)
Excluding current and former smokers	401	−12.1 (−18.8 to −4.9)	−16.2 (−23.5 to −8.2)
Excluding mothers with pregnancy complications	568	−9.1 (−14.7 to −3.2)	−14.3 (−20.7 to −7.4)
Excluding cesarean deliveries	617	−8.7 (−14.1 to −2.9)	−12.8 (−19.0 to −6.1)
Excluding all of the above	281	−14.0 (−21.9 to −5.2)	−13.3 (−22.3 to −3.2)

Abbreviations: BMI, body mass index; $PM_{2.5}$, particulate matter with an aerodynamic diameter of 2.5 μm or less.

[a]Estimates provided as a cumulative (weeks 1-40) percentage change in mean relative telomere length for a 5-$\mu g/m^3$ increment in $PM_{2.5}$. Models were adjusted for date of delivery, gestational age, maternal BMI, maternal age, paternal age, newborn sex, newborn ethnicity, season of delivery, parity, maternal smoking status, maternal educational level, pregnancy complications, and ambient temperature. The season of delivery was removed from the model adjusting for month of delivery.

EXHIBIT 15

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Transition metals in coarse, fine, very fine and ultra-fine particles from an interstate highway transect near Detroit

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ABSTRACT

As one component of a study investigating the impact of vehicle emissions on near-road air quality, human exposures, and potential health effects, particles were measured from September 21 to October 30, 2010 on both sides of a major roadway (Interstate-96) in Detroit. Traffic moved freely on this 12 lane freeway with a mean velocity of 69 mi/hr. with little braking and acceleration. The UC Davis DELTA Group rotating drum (DRUM) impactors were used to collect particles in 8 size ranges at sites nominally 100 m south, 10 m north, 100 m north, and 300 m north of the highway. Ultra-fine particles were continuously collected at the 10 m north and 100 m north sites. Samples were analyzed every 3 h for mass (soft beta ray transmission), 42 elements (synchrotron-induced x-ray fluorescence) and optical attenuation (350–800 nm spectroscopy). A three day period of steady southerly winds along the array allowed direct measurement of freeway emission rates for coarse ($10 > D_p > 1.0$ μm), $PM_{2.5}$, very fine ($0.26 > D_p > 0.09$ μm), and ultra-fine ($D_p < 0.09$ μm) particles. The $PM_{2.5}$ mass concentrations were modeled using literature emission rates during the south to north wind periods, and averaged 1.6 ± 0.5 μg/m^3, versus the measured value of 2.0 ± 0.7 μg/m^3. Using European freeway emission rates from 2010, and modeling them at the I-96 site, we would predict roughly 3.1 μg/m^3 of $PM_{2.5}$ particles, corrected from the 4.9 PM_{10} value by their measured road dust contributions. Using California car and truck emission rates of 1973, this value would have been about 16 μg/m^3, corrected down from the 19 μg/m^3 $PM_{5.0}$ using measured roadway dust contributions. This would have included 2.7 μg/m^3 of lead, versus the 0.0033 μg/m^3 measured. Very fine particles were distributed across the array with a relatively weak falloff versus distance. For the ultra-fine particles, emissions of soot and metals seen in vehicular braking studies correlated with traffic at the 10 m site, but only the soot was statistically significant at the 100 m north site. Otherwise, the 10 m north and 100 m north sites were essentially identical in mean concentration and highly correlated in time for most of the 5 week study. This result supports earlier publications showing the ability of very fine and ultra-fine particles to transport to sites well removed from the freeway sources. The concentrations of very fine and ultra-fine metals from brake wear and zinc in motor oil observed in Detroit have the potential of being a significant component in statistically established $PM_{2.5}$ mortality rates.

1. Introduction

Enormous advances have been made in the past 40 years in reducing particulate pollutants from highway vehicles, including the elimination of lead from gasoline. Additionally, important advances have been made in reducing emissions from diesel trucks by improved engine design, low-sulfur fuels, and especially diesel particulate filters. However, studies show that highways continue to be a source of both coarse and fine particulate matter (PM) including known toxics such as diesel exhaust (Zhu et al., 2002; Karner et al., 2010; Cahill and Cahill, 2013). In addition, particles associated from vehicular wear such as from brake pads and drums are currently roughly equal to tailpipe emissions and are on track to exceed tail pipe emissions in the near future (Denier Van der Gon et al., 2013). Only limited data are available on wear particles by size and composition, but a major source is known to be ultra-fine metals from abrasion of brake pads and drums (Cahill et al., 2014).

In vitro laboratory studies of nanoparticles raise concerns about the health impacts of highway emissions, especially very fine and ultra-fine metals due to their propensity for penetrating to the deepest portions of the lung and diffusing into the circulatory system (Lewis et al., 2005; Chen and Lippmann, 2009; Lippmann, 2009; Oberdorster et al., 2007; Denier Van der Gon et al., 2013). Additionally, epidemiological health studies continue to show that highway emissions are damaging to both pulmonary and cardiovascular systems of people living near highways (Cahill et al., 2011), with reduced lung function in children (Peters et al., 1999a,b); Gauderman et al., 2000; HEI, 2009; Lin and Peng, 2010; Karner et al., 2010). These data have been combined with data on the health impacts of roadway pollutants, including potential cancer impacts largely from diesel exhaust, and used to generate estimated health impacts in models such as Emfac2007 (ARB, 2007).

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A recent European survey noted that wear particles were approaching and would soon surpass exhaust particles near roadways, with uncertain health impacts. Their consensus statement concludes, "In light of the continuous increase of the relative contribution of non-exhaust emission to ambient PM, where it is becoming the dominant emission process for urban transport, it is more than timely to devote greater efforts to properly quantifying non-exhaust emissions and assessing health relevance." (Denier Van der Gon et al., 2013).

The U.S. Environmental Protection Agency (EPA) and the University of Michigan conducted the Near-road Exposures to Urban Air Pollutants Study (NEXUS) – a research project to study the impact of vehicle emissions on near-road air quality, human exposures, and potential health effects. Components of NEXUS include but are not limited to human exposures in near-road residences (Vette et al., 2013), studies of near roadway allergic impacts in mice (McGee et al., 2015). The NEXUS aerosol component reported in this publication was designed and conducted to update our information on highway emissions and their potential human impact with a component on vehicular wear emissions.

1.1. Experimental methodologies

1.1.1. Sampling array

Particles were measured from September 21 to October 30, 2010 on both sides of the Interstate 96 freeway 9 miles west of downtown Detroit. The I-96 monitoring location was established as part of a collaborative research study conducted by the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Transportation Federal Highway Administration (FHWA) (US EPA, 2013). The test section was a 12-lane section of I-96 with an at-grade roadway configuration aligned east to west. Obstructions from vegetation between the test array of four sites, which extended from 100 m south of the highway to 300 m north of the highway, were negligible, as seen in Fig. 1. As part of NEXUS, additional PM monitoring was conducted at these sites.

Particles were collected in 8 size ranges at sites 100 m south, 10 m north, 100 m north, and 300 m north of the highway, while ultra-fine particles were continuously collected at the 10 m north and 100 m north sites. (Table 1)All sampling sites were on the top of trailers or one-story buildings with minimal obstructions (approximately 4 m from ground to inlets). The exception was the 100 m south site that had heavy trees south of the site, which did not obstruct the air flow from the highway.

1.1.2. Weather

Wind direction and wind speed were measured continuously at the 100 m north site (Fig. 2). During most of the study winds were weak, and extensive periods of calms occurred, especially at night. Wind directions were most frequent from the northwest (315°) through north northeast (35°). Given the southeast to northwest orientation of the sampling array, an upwind/downwind analysis of I-96 traffic emissions is best conducted when winds are from the southeast to southwest sector.

Thus, in order to address the prime goal of the study, a small fraction of the entire five-week period was chosen for which there was a clean upwind-downwind profile along the array. Since the goal was to quantify aerosol transport downwind of the freeway, results were limited to periods when the upwind-downwind trajectory was within ±67° of the north-south axis across the east-west freeway with wind speeds >1 km/hr. Periods of extreme wind or rain events were excluded as well as wind trajectories pointing back to strong upwind sources such as the Monroe coal-fired power plant.

In terms of duration, while any 3 h period provides a valid signature in time, the ideal is several days in a row. The reasons include reducing the inherent 1½ hr uncertainty in the elemental data set by the width of the x-ray analysis microprobe to roughly 30 min, which al-

Fig. 1. Monitoring site transect array across I-96 west of Detroit established for the EPA/FHWA National Near Road Study and used as a component of the NEXUS study. I-96 runs east-west and Telegraph Road is the multi lane road running north-south to the west of the sampling sites.

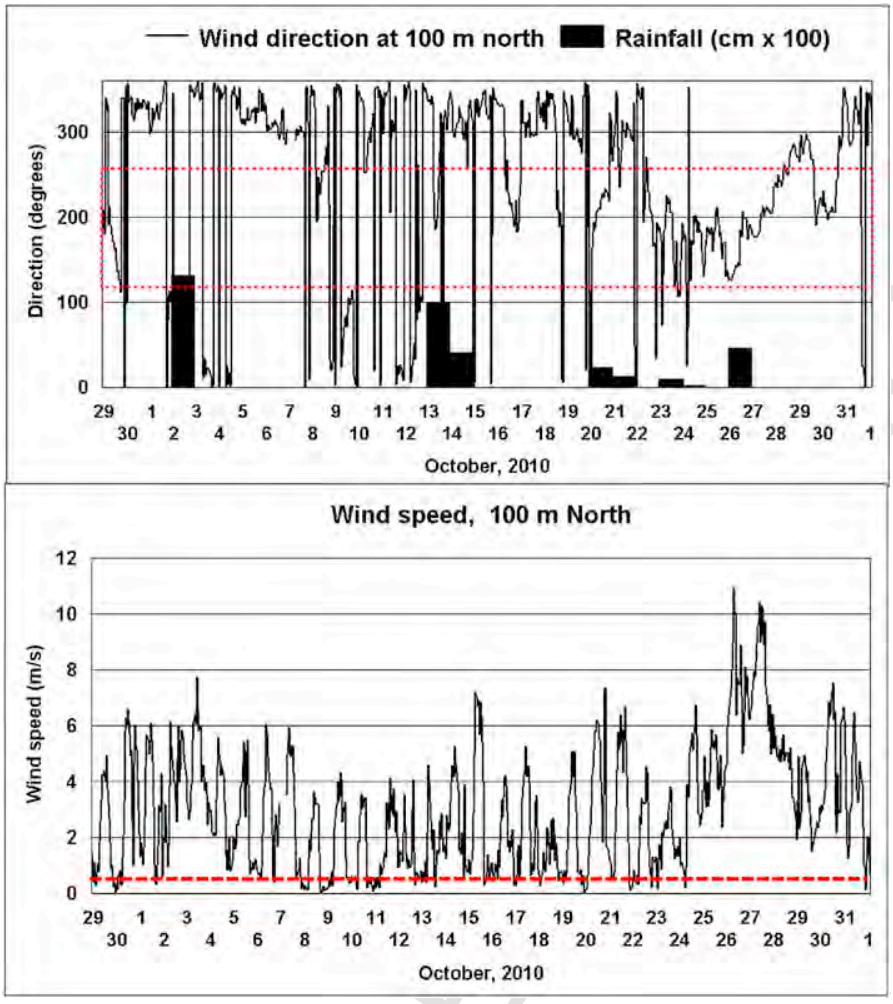

Fig. 2. a) Wind direction and rainfall, and b) wind speed, with the dotted box showing the periods with the wind from the south, 180° ± 67°, measured at the 100 m north site. Data below the dashed line are calm periods with wind speed <1.0 km/hr.

lows better accord with meteorology and traffic patterns. It also allows better sensitivity by summing the periods for averaging actions such as size profiles. Limiting the intensive to week days avoided the complexity of highly variable weekend conditions, especially in terms of the truck traffic.

1.2. Experimental techniques

1.2.1. Sample collection

The primary aerosol collection instrument was the UC Davis DELTA Group rotating drum (DRUM) impactor (Cahill et al., 1985; Raabe et al., 1988;) delivering aerosol samples in 8 size ranges: 10 to 5.0, 5.0 to 2.5, 2.5 to 1.15, 1.15 to 0.75, 0.75 to 0.56, 0.56 to 0.34, 0.34 to 0.26 and 0.29 to 0.09 μm aerodynamic diameter. Samples were impacted at the rate of 4 mm/day onto 168 mm long, lightly greased Mylar foils, which were then transferred to plastic frames for analyses. Excellent agreement ($r^2 = 0.99$, slope = 0.99 ± 0.011, and intercept = 14 ng/m^3) was seen in a side by side comparison of the DRUM mass (summed over all stages including ultra-fines) versus a California Air Resources Board $PM_{2.5}$ Federal Reference Monitor (Cahill et al., 2014; Nichols, 2009, Supplemental Materials A).

For this study, a newly developed continuous ultra-fine stage was added at the 10 m north and 100 m north sites. These allow continuous collection of ultra-fine (<0.09 μm) particles directly after the last stage of the DRUM and keyed to deliver a stretched Teflon filter strip exactly matching in time the rotating drum stages (Cahill and Barnes, 2009).

1.2.2. Sample analysis

Details of the accuracy and precision of the mass, optical, and elemental analyses of the DRUM are included in Supplemental Materials. The measurements were made in 3 h increments using 500 μm wide excitation sources, and included:

- Mass (soft beta ray transmission, Ni^{63} source, MDL = 0.7 μg/m^3).
- Elements sodium through molybdenum, plus lead (Synchrotron-induced X-Ray Fluorescence (S-XRF), MDLs typically ~ 0.1 ng/m^3).
- Diesel soot (optical attenuation, 380–820 nm, 50 nm bites, Ocean Optics spectrophotometer).

1.3. Black carbon data

Measurements of black carbon were also collected at the I-96 sites based on optical absorption (880 nm) using a Magee Scientific rack mount aethalometer (US EPA, 2013) and were compared to the DRUM optical attenuation.

1.4. Traffic data

Traffic volume during the study period showed a highly reproducible weekly pattern (Fig. 3). Weekday traffic averaged 175,000 cars and light trucks/day along with 12,000 heavy-duty trucks/day, or 6.6% trucks. Weekend traffic averaged 110,000 cars and light trucks/day, and about 3% trucks. Traffic data were collected as part of the EPA/FHWA study in 5 min increments individually for each of the 12 traffic lanes and for 6 classes of vehicle by length: 10 ft. (3 m), 30 ft. (9 m), 40 ft. (12 m), 50 ft. (15 m), 60 ft. (18 m), and 70 ft. (21 m) to 80 ft. (24.2 m), the maximum length allowed (US EPA, 2013). Traffic moved freely on the test section during the study, with a mean speed of 69 ± 3 miles/hr (110 ± 5 km/hr), with little braking activity. Below we plot the data reduced to one hour averages over all 12 lanes, using the 10 ft. (3 m) and 30 ft. (9 m) categories for cars and pickup trucks (light-duty vehicles or LDVs, mostly gasoline powered) and 40 ft. (12 m) to 70 ft. (24.2 m) for heavy trucks (mostly diesel). The very strong morning and afternoon peaks seen in the light duty vehicle (LDV) data is much less pronounced in the truck data, which tends to be more uniform all day. Traffic data were not available before Sep. 29.

1.5. Results of the 5-week study

The meteorology encountered during most of the study resulted in aerosol concentrations that, even at the close-in 10 m north site, displayed little or no correlation with the local traffic volume (Fig. 3). In Figs. 4–10 below we show four examples of typically regional particles and three examples of particles likely to have local roadway influence. Regional particles include PM_{10} and $PM_{2.5}$ mass, silicon (soil), sulfur (sulfates) and fine potassium (wood smoke). Particles with known roadway sources include zinc in coarse mode

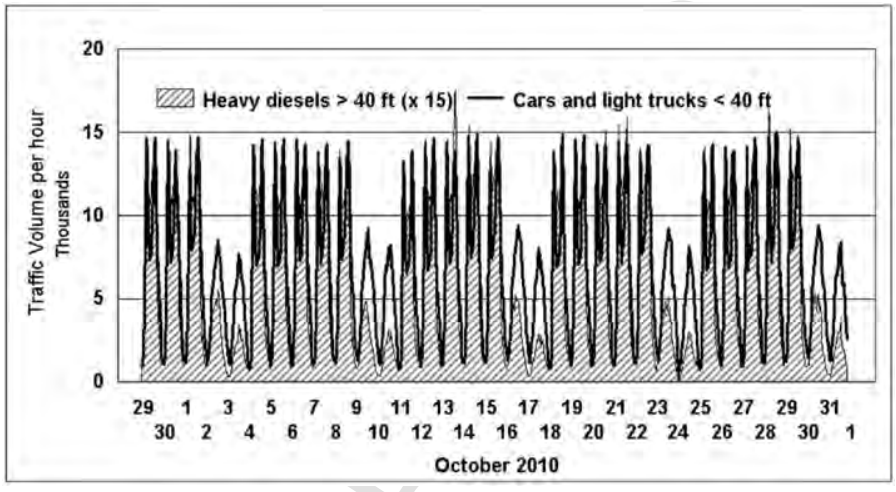

Fig. 3. Traffic measured on I-96 west of Detroit on the EPA/FHWA National Near Road Study site. Heavy diesel truck numbers are scaled by a factor of 15 to facilitate comparison. Weekends occurred on Sept. 25–26, Oct. 2–3, Oct. 9–10, Oct. 16–17, Oct. 23–24, and Oct. 30–31.

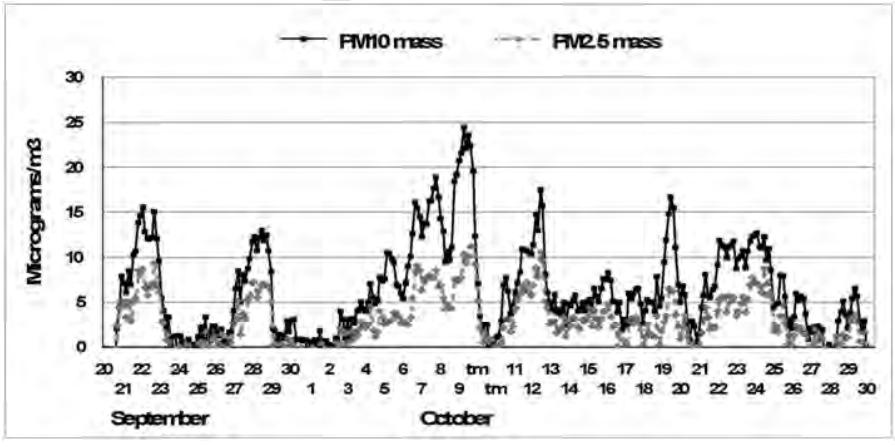

Fig. 4. PM_{10} and $PM_{2.5}$ mass (without ultra-fines < 0.09 μm), at the 10 m north site. Each data point represents a 3 h measurement. The notation "tm" denotes a 6 mm long integral blank for timing and background subtraction validation.

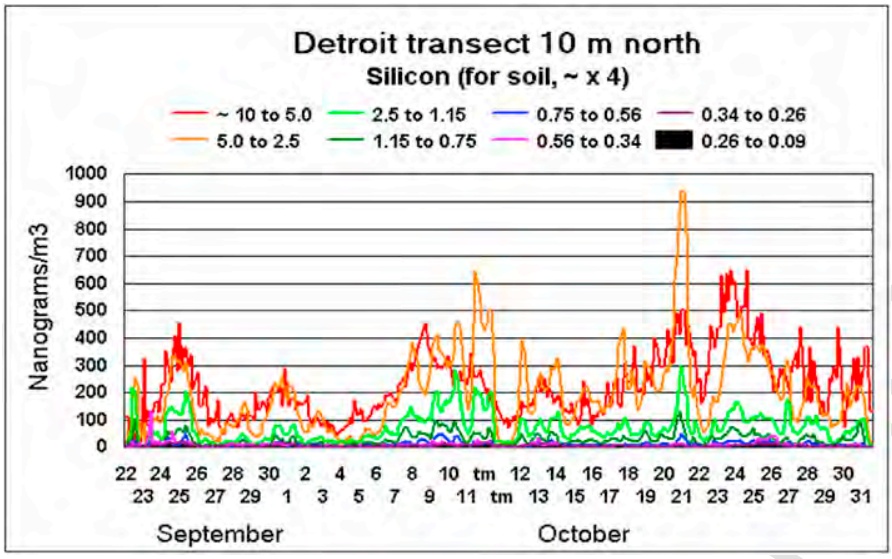

Fig. 5. Silicon from 10 to 0.09 μm derived from soil. The notation "tm" denotes a 6 mm long integral blank for timing and background.

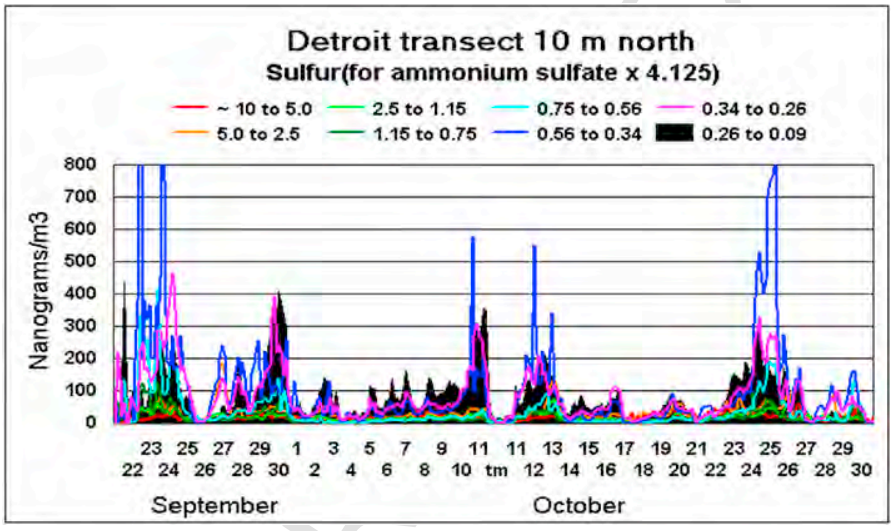

Fig. 6. Sulfur (for sulfate, x 3.0) at 10 m north.

(5.0–1.15 μm) from tire wear, zinc in the very fine mode ($0.26 > D_p > 0.09$ μm) from motor oil combustion, and black carbon (diesel soot) (Malm et al., 1994; Supplemental Materials 1).

Zinc is seen routinely both in transects from the roadway and in the ambient atmosphere. Zinc at the 10 m north site was highly variable in concentration, with highest concentrations typically occurring when the site was upwind of I-96. Note that unlike the potassium in Fig. 7, there are strong sources of coarse zinc not associated with the very fine zinc. Since there were no known sources close to the NEXUS site, the calculated rate of settling favors regional industrial processes with stack emissions.

Optical absorption was measured by two very different techniques, namely light transmission through the DRUM Mylar foils using a multi-wavelength optical spectrometer (Fig. 9), and direct measurement of optical absorption (b_{abs}) from an aethalometer (Fig. 10; data provided by the EPA). The average b_{abs} in units of ng/m^3 of Black Carbon (BC ≅ soot) for the entire period was 648 ng/m^3 at 100 m south, 1014 ng/m^3 at 10 m north, 638 ng/m^3 at 100 m north, 438 ng/m^3 at 300 m north, showing the impact of soot from the freeway.

1.6. Results of the 3-day intensive

The conclusion from the aethalometer data is that even close to the freeway, regional sources are a major factor compared to roadway particles for much of the five week study. Thus, for the remainder of this report, we will focus on those periods during which the criteria for a clean upwind-downwind profile were achieved. The results of the transects can then be compared to the regional particles seen during the entire study, isolating roadway impacts.

In order to identify those periods that met these criteria, nonparametric trajectory analysis (NTA) was performed using the meteorological data collected at the 100 m north site (Henry et al., 2011).

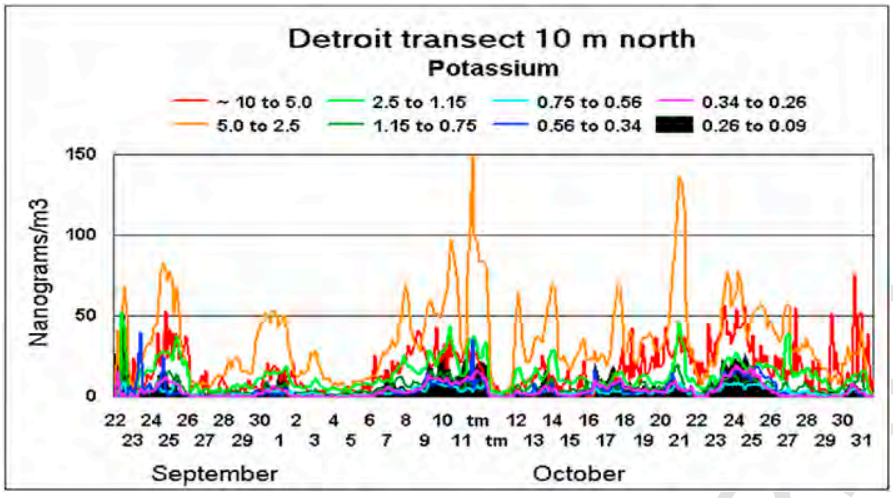

Fig. 7. Potassium at 10 m north, with coarse modes derived from soil and fine modes largely from wood smoke and industrial combustion processes.

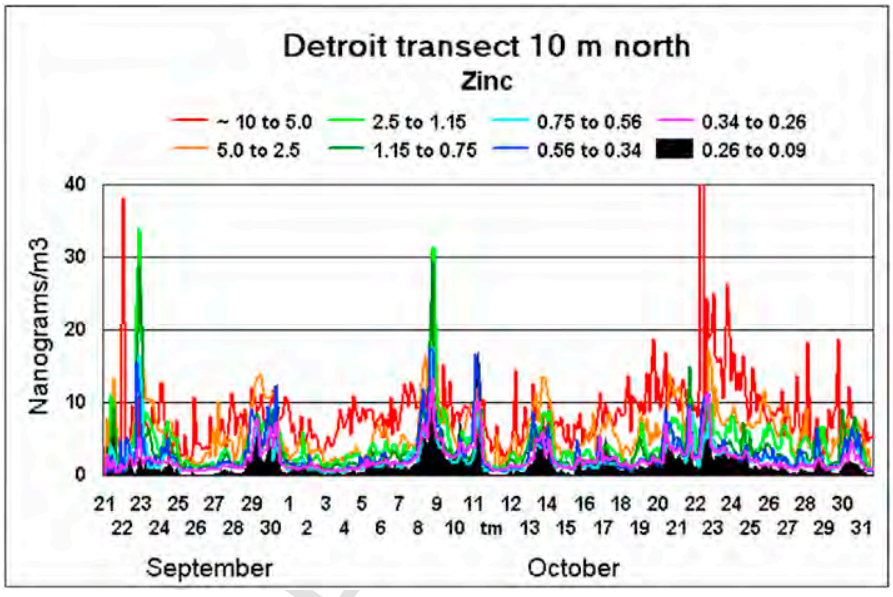

Fig. 8. Zinc from 10 μm to 0.09 μm at 10 m north.

Hourly averaged met data were aggregated into 3 h averages to better match the 3 h aerosol data. Fig. 11 shows the fraction of time in each 3 h period when the wind was blowing across I-96 from the south to the north. Upon early analysis of the data, an additional criterion was added, namely avoidance of sulfur (MDL = 5 ng/m^3) and selenium-rich (Se and As, MDL = 0.1 ng/m^3) particles transported by SSE winds that passed over the Ford Rouge River complex, other industrial sources, and the large Monroe coal fired power plant 34 miles (54 km) south (185°) of the array (Fig. 6). This eliminated the potential October 25 day, while October 23 and 24 were both weekend days and impacted by upwind aerosol sources. October 30 was also eliminated as a weekend day. Although October 8 and 20 met the trajectory criteria, both had extended periods of calm winds making clean upwind-downwind analysis uncertain. A final criterion for the upwind-downwind study was that the 10 m north site should be minimally impacted by Telegraph Road, a multi lane road west of the I-96 sites (Fig. 1). Fig. 12 shows the subset of trajectories for which the 10 m north site was downwind of I-96 and without significant influence from Telegraph Road.

Although there was some influence of Telegraph Road traffic on Oct. 27 and 28 at the 10 m north site, the distance to Telegraph road was much farther than at the 100 m north site and a belt of trees in a residential neighborhood interfered with wind and aerosol transport. (Fig. 1). Also, Telegraph Road traffic volume was a tiny fraction of I-96 traffic volume. For these reasons, the impact should be small, confirmed by the low aethalometer soot readings (Fig. 13 below). The 300 m north site, on the other hand, is much closer to Telegraph Road and was probably significantly impacted by Telegraph Road traffic for much of the study period. The longest period during the NEXUS campaign that met all criteria for a north-south transect occurred from Oct 26 through Oct. 28, 24–3 h periods, shown in the dashed box in Fig. 11.

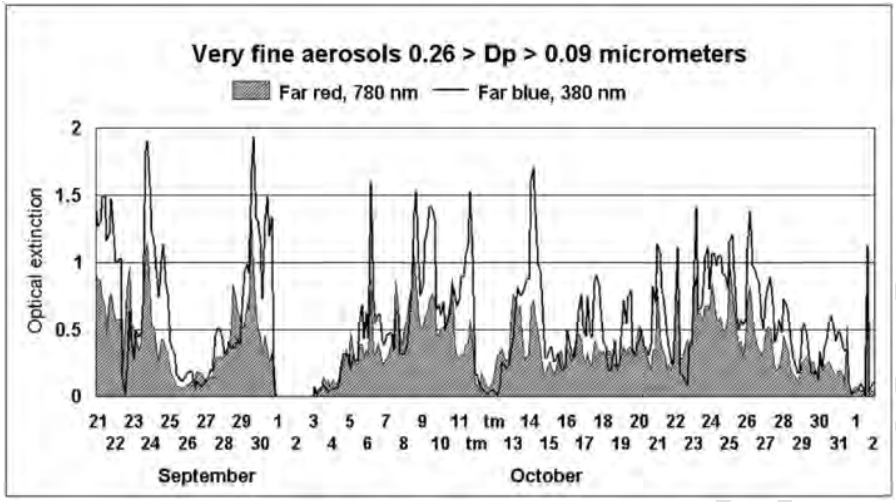

Fig. 9. Optical extinction at two wavelengths for very fine particles at the 10 m north site.

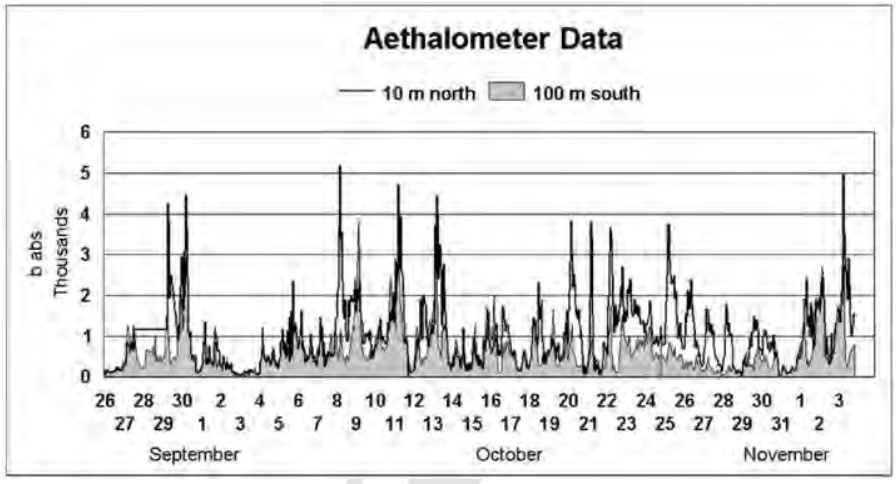

Fig. 10. Optical absorption (b_{abs}) from an aethalometer at both 10 m north and 100 m south.

The wind speed for the 3-day intensive averaged 10.7 ± 3.0 km/hr, and the average direction was SSW, 208 ± 43°. However, the 10 m north site was in the turbulent mixed zone of the northernmost lane of the freeway, as evidenced by the winds from passing trucks. Thus, this site was impacted by one lane of the freeway under most wind conditions, representing only a small fraction of all traffic volume on the 12 lane freeway.

1. Validation of the meteorological analysis

Validation of the Oct. 26–28 choice for the upwind-downwind study was obtained by correlation of soot and typical roadway particles with the daily daytime traffic maxima as shown in Figs. 13 and 14.

The days chosen for the intensive are in the dotted box area. Data are from the 10 m north site.

During the intensive period, the calcium (roadbed abrasion) and iron (vehicle "wear") particles (Fig. 14a and b) are correlated with traffic volume (Fig. 14d), with daytime peaks and nighttime low values, unlike during most of the prior sampling period. Both elements are strongly enhanced over Earth crustal average, calcium by a factor of 5, and iron by a factor of 10, suggesting resuspension of roadbed concrete erosion and vehicle "wear" particles by wind and vehicular turbulence. There was almost no braking of vehicles during the study, so concentrations of the very fine Fe, Ni, Cu and Zn particles characteristic of braking (Cahill et al., 2014) are limited.

Highway zinc coarse particles (Fig. 14c) are enhanced by the zinc in tires and brake wear, while fine and ultra-fine zinc are observed in both brake wear and the burning of the zinc thiophosphate stabilizer used in many motor and lubricating oils, including diesels (Zielinska et al., 2003).

2. Size profiles of the elements

Fig. 15a, b and c plot particle size distributions during the intensive for crustal species (a), transition metals and lead (b) and sulfur (c). The mean size distributions for crustal elements peak in the supra-micron particles, indicating a mechanical source, such as mechanical wear and resuspension of contaminated soils. Iron is very interesting, as it peaks in the 2.5–5.0 μm mode but in concentrations far in excess of what would be expected in soil.

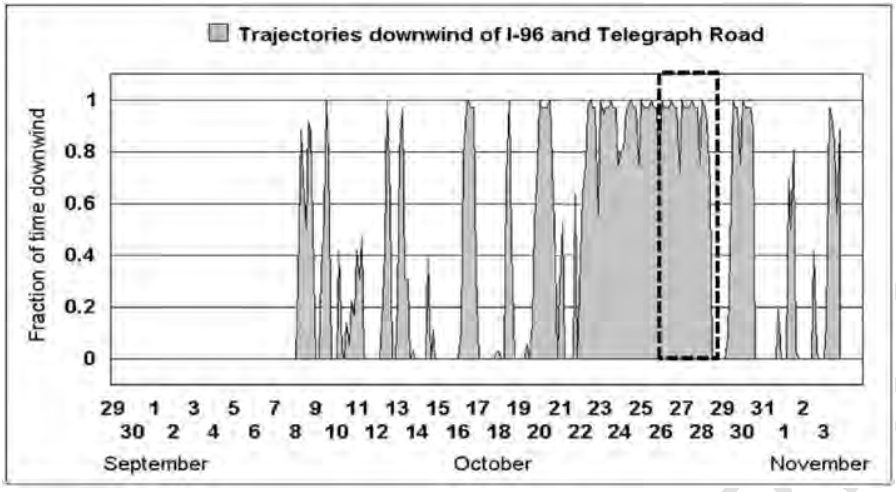

Fig. 11. Trajectory analysis for the 100 m north site isolating those periods when the northern sites were approximately downwind of I-96 and the 100 m south site was a clean upwind background site. The period chosen for the intensive is shown in the dashed box, October 26 through October 28.

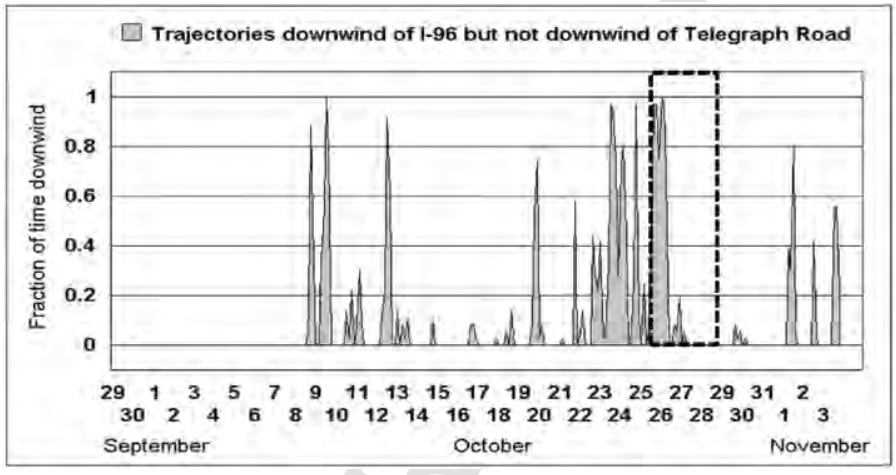

Fig. 12. Trajectory analysis isolating those periods when the 100 m south site was a clean upwind background for 100 m north. The 10 m north site had less Telegraph Road interference.

Size distributions for transition metals (Fig. 15b) also peak in the supra-micron range. Iron (brake drums and rust), copper (brake pads), zinc (stabilizing agent in lube oil, tire wear), and lead ("legacy lead" from past emissions) are known to be associated with traffic (Cahill et al., 2011). Note that in addition to a coarse mode (re-suspended road dust), zinc, lead and copper also exhibit an ultra-fine mode. Very fine and ultra-fine zinc is most likely associated with lubricating oil.

A very different profile is shown for sulfur (Fig. 15c). Typically the accumulation mode around 0.5 μm represents regional ammonium sulfate, while very fine and ultra-fine sulfate has local combustion origins, including from diesel combustion in trucks and cars.

3. Transects in the three day intensive: Coarse ($5.0 > D_p > 2.5$) particles – experimental

For the time-resolved coarse particles, we used only part of the distribution since the time resolution of the coarsest DRUM stage, 10 to 5.0 μm, was large enough to blur the day/night differences. (Supplemental Materials B).

Results of the highway transect (Fig. 16) show highest concentrations at the near freeway site at 10 m north, supporting traffic-derived sources. Concentrations fall off from the roadway to 100 m north, but concentrations of the coarsest particles increase again at 300 m north, especially for crustal species. The presence of the heavily traveled Telegraph Road approximately 380 m west of the 300 m site (Fig. 1) as well as local exposed soils near the site might be contributory factors. In addition, the sampler inlet cut point may have been raised by an estimated 10% due to a non-standard, slightly wider inlet slot. This effect disappeared for the $PM_{2.5}$ particles which are not influenced by coarse local soils.

4. Transects in the three day intensive: Coarse ($10\ \mu m > D_p > 1.15\ \mu m$) particles – theoretical

I-96 traffic during the intensive was typical of the entire 5 week period (Fig. 2). For modeling purposes, traffic data for the intensive was broken into two periods: daytime (6 a.m. through 9 p.m.), and nighttime (9 p.m. through 6 a.m.). Daytime traffic averaged 10,479

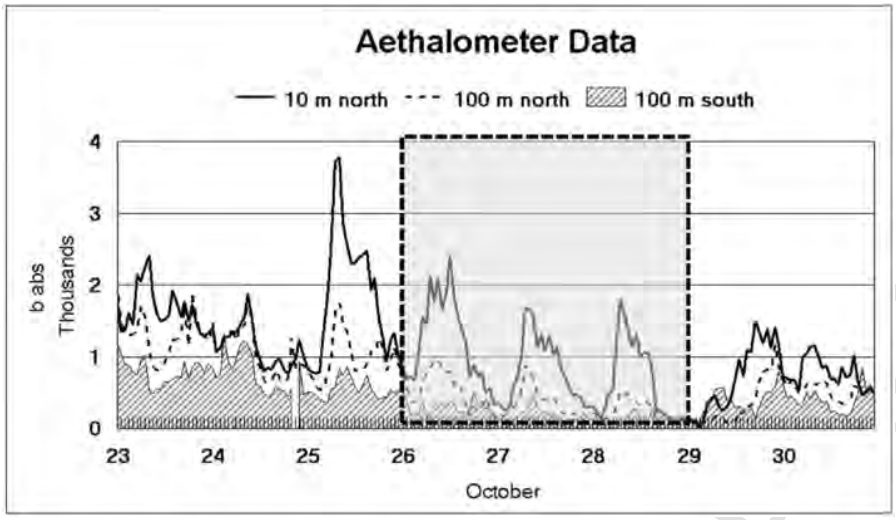

Fig. 13. Aethalometer data on optical absorption (~soot) from the EPA/FHWA National Near Road Study. The days chosen for the intensive are in the shaded area. October 25 and earlier days were rejected because of substantial upwind aerosol pollution seen in Figs. 5–7.

cars and light trucks/hr, and 824 heavy trucks/hr, while the numbers at night were 3874 and 187 vehicles/hr respectively.

For the theoretical analysis of the data, all coarse particles from 10 to 1.15 μm were used so as to allow comparisons to other work. We used a Sliding Box Model Estimate of the I-96 10 to 1.15 μm mass emission rate for the 3-day intensive. The "sliding box model" (Cahill and Feeney, 1973, Feeney et al., 1975; Courtney et al., 1978) is a well-tested way to measure roadway emissions when one has access to both upwind and downwind information on pollutants, a flat terrain, and a lateral wind across the roadway. The dimensions of the box are set by the roadway width, including lateral turbulence, and the top of the mixed zone, set by vehicle height and velocity. The latter is the greatest uncertainty, but extensive data on the height of the mixed zone were taken in Los Angles in 1973 and used in several studies. The length of the box is arbitrary, and we use 1.6 km, which was needed since the project accepted winds at ± 45° from normal and still had to meet the line source assumption even 300 m downwind. The box so defined represents a volume into which pollutants are uniformly mixed by vehicular turbulence. The box then slides laterally across the freeway while vehicles are emitting into the box. A new box takes its place upwind in a smooth transition and the process repeats.

The model was validated with data taken in 80 two-hr upwind-downwind periods of lead transport from five freeway sites in 1972 (Cahill and Feeney, 1973; Feeney et al., 1975). Since accurate traffic data and meteorology were available and emissions of automotive lead were precisely known from the literature (Habibi, 1973), the sliding box model gave a roadway edge prediction at the at-grade freeway section of 4.0 ± 0.4 μg/m^3 for 5000 vehicles/hr. The three day average measured at the at-grade site was in excellent agreement, 4.0 ± 0.15 μg/m^3. The sliding box model was also successfully applied in General Motors test facility studies of sulfur from catalytic converters (Courtney et al., 1978)

Sliding box model calculations were run separately for daytime, 6 a.m. to 9 p.m., and nighttime, 9 p.m. to 6 a.m., keyed to the traffic flow. Traffic flow, wind velocities were also separated in the analysis. It was assumed that trucks had 10 times the emission rates as cars (Gertler et al., 2003). Table 2 below shows the analysis for cars and trucks for calcium, and then the net result for calcium, iron, and zinc.

Coarse calcium and iron are enhanced by enrichment factors 5 and 10 times Earth crustal averages respectively (Fig. 14a and b), likely a consequence of the erosion of the concrete highway and iron-rich debris from vehicles. The transition and heavy metals, vanadium, copper, zinc, and lead, are enormously enhanced compared to Earth crustal averages and represent vehicular debris, including brake pads, brake drums and tire wear.

In this analysis, the unknown emission rates were calculated by matching the predicted concentrations to the measured concentrations at the 10 m north site after correcting for concentrations at the 100 m south site.

In Table 2, the emission rates in mg/km were fit to the NEXUS background corrected concentrations (μg/m^3) at 10 m north (Fig. 14a–c). Matching the upwind-corrected data at the 10 m north site for freeway impact to the predicted concentrations, emission rates of 1.5 mg/km for calcium, 2.8 mg/km for iron, and 0.09 mg/km for zinc are calculated, with truck emission rates 10 times these values.

Direct comparisons are possible to similar analyses in Los Angeles in 1972 from an at-grade concrete freeway. The NEXUS freeway-sourced calcium level in the mixed zone, 0.24 μg/m^3, is about 1/5 of that seen in 1973, 1.13 μg/m^3. Note that the Los Angeles freeway had not seen rain in over 2 months, while rain fell about once/week in the NEXUS study. For iron, which has both a concrete component and one associated with vehicle wear, the NEXUS values are 0.52 μg/m^3, versus 1.43 μg/m^3 in Los Angeles. For zinc, the NEXUS level of 0.017 μg/m^3 is far less than the 0.22 μg/m^3 seen in Los Angeles in 1973. The California data (Cahill et al., 2003) for $15 > D_p > 5.0$ μm particles from tire wear were run through the sliding box model of Table 2 and yielded 120 ng/m^3 of zinc, about 10 times what was observed in NEXUS for < 5.0 μm particles (Fig. 14c). However, the upper cut point for the Los Angeles particles was ~15 μm, which increased the numbers, while better high mileage tires and aerosol size differences reduce the NEXUS value.

A very similar protocol (upwind-downwind samplers, rotating drum impactors, x-ray analysis) was utilized in Switzerland (Bukowiecki et al., 2010) for an extensive series of measurements to separate vehicular wear from exhaust emissions. The Swiss results showed most vehicular wear particles in the 10 to 1 μm range. The vehicular wear results were 50 ± 13 mg/km per vehicle for light duty

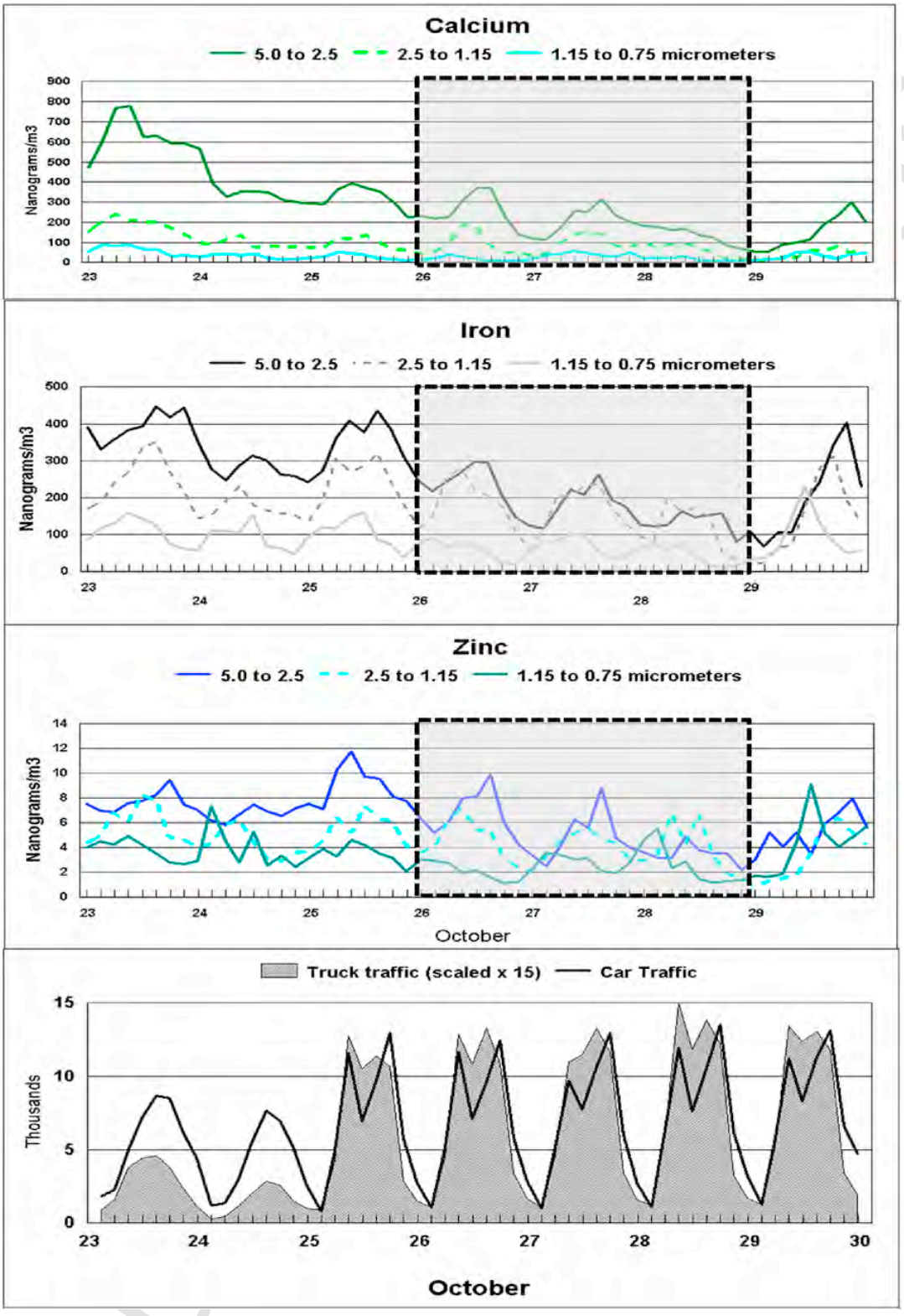

Fig. 14. a, b, and c. Typical roadway particles during the Oct. 26 through Oct 28 intensive (in shaded box). d. Traffic from Fig. 3 on the same time scales (trucks x 15).

vehicles, 288 ± 72 mg/km for heavy duty vehicles, with 3% brake wear, 56% suspended/abraded road dust, and no evident tire wear. This gives roughly 3.2 mg/km brake wear, assuming 6% trucks in their mix. If the NEXUS iron and zinc were all from brake wear, it would amount to roughly 5.2 mg/km, similar to the Swiss results. This is an overestimate, since the NEXUS iron value should be re-

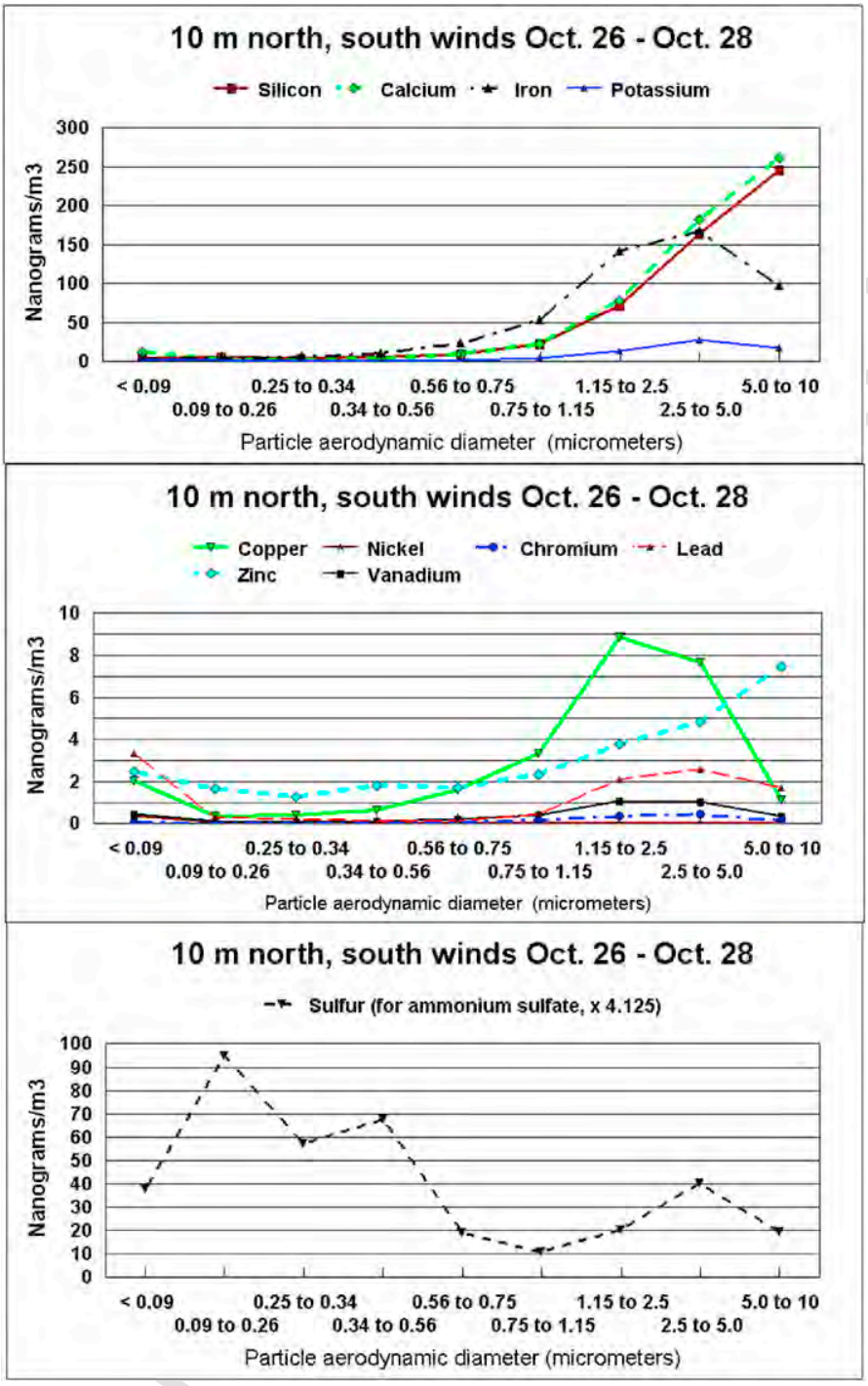

Fig. 15. Size distributions of a) crustal species; b) transition metals and lead; and c) sulfur at the 10 m north site during the NEXUS intensive.

duced due to iron from vehicle debris and roadbed wear.

5. Transects in the three day intensive: Fine $PM_{2.5}$ particles – experimental

Fig. 17a and b shows transects for fine crustal species and fine transition metals and lead, respectively, during the Oct. 26–28 intensive. Fine crustal species, like coarse, show a near-freeway enhancement, especially for iron, enhanced by a factor of 20 over typical soils. The fall-off versus distance is slower than with coarse species, with aluminum and silicon being essentially the same at the 10 m north and 100 m north sites The 300 m north site is almost identical to the 100 m south site, consistent with a regional background.

The data clearly show the impact of highway derived particles. First, the aluminum and silicon have about the correct ratio for Earth's crustal averages, and therefore represent crustal materials either in the roadway aggregate or the surrounding soils. The parking

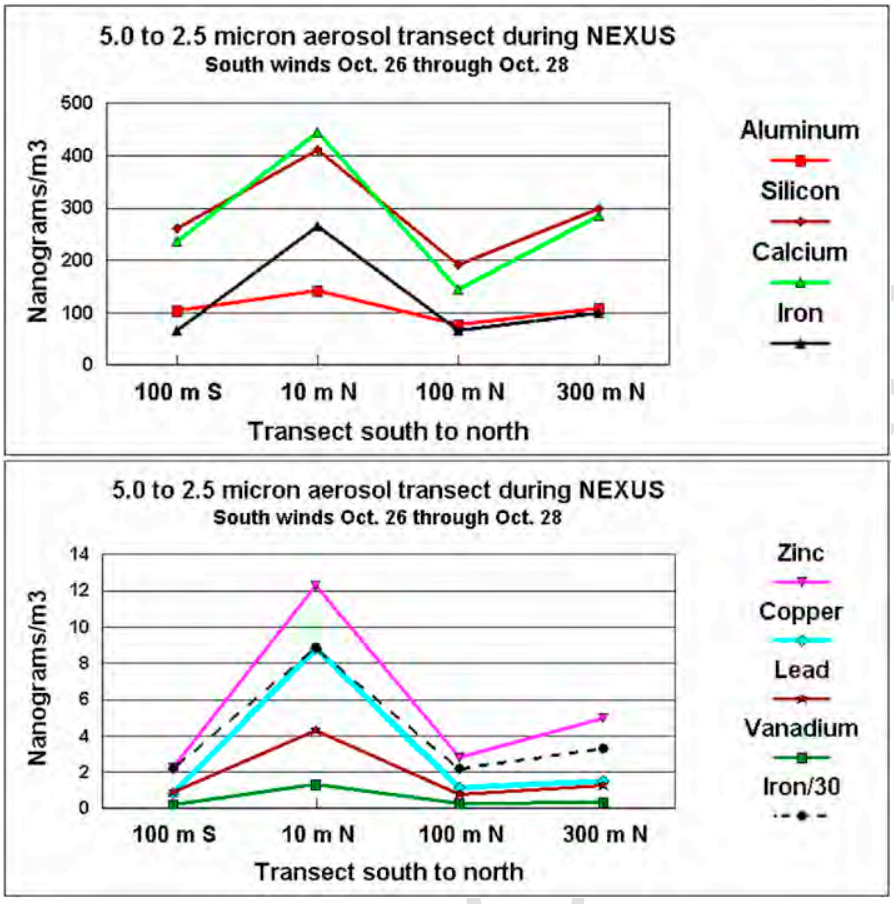

Fig. 16. Coarse aerosol transect during the Oct. 26–28 intensive: a) crustal species; b) transition metals and lead.

Table 1
Distance of samplers from roadway median and nearest active traffic lane of the 10 lane freeway. We also include the relative roadway impacts on cancer from the widely used model Emfac2007 (ARB, 2007).

Site	Distance from median	Distance from closest traffic lane	Relative cancer impact
100 m south	92 m south	71 m south	0.13 upwind
10 m north	26 m north	10 m north	1.00 downwind
100 m north	142 m north	100 m north	0.25 downwind
300 m north	332 m north	270 m north	0.10 downwind

area just upwind of the 100 m north site may also be a source of such materials. Calcium, however, is enhanced by a factor of about 3 over Earth's crustal average, and is consistent with roadway abrasion from the concrete highway. Iron is enhanced by a factor of about 10, which is consistent with brake wear and resuspended rust in a region where road salting is a common source of vehicle degradation. Fine copper (Fig. 17b) also shows enhancement, possibly from brake pads. In summary, fine concentrations of these resuspended soil and vehicular wear particles are about ½ of the observed mass, similar to European estimates that "wear" particles are about equal to tailpipe emissions (Denier Van der Gon et al., 2013).

All the non-crustal elements as well as zinc show a near freeway enhancement during the Oct. 26–28 intensive. All are strongly enhanced over what would be expected from soil, suggesting roadway pollution. The iron is about 16× the copper, while the iron/copper ratio from braking is only about 3. Thus, most of the iron is not from brake drums and pads, but probably represents re-suspended rust particles from degraded cars and trucks. Recall that little vehicular braking occurred in this freeway section. The 300 m north site is almost identical to the 100 m south site, establishing a small regional background. The fall-off versus distance for zinc is much slower, and the upwind value elevated, showing regional fine zinc aerosol sources. The enhanced zinc at 10 m north may be due to the zinc thiophosphate oil additive.

6. Transects in the three day intensive: Fine $PM_{2.5}$ particles – theoretical

In the sliding box model, we assumed an I-96 $PM_{2.5}$ mass emission rate (row labeled "Source $PM_{2.5}$ mass" in Table 3) based on recently measured car and truck emission rates for $PM_{2.5}$ in the eastern US (Gertler et al., 2003). The sliding box model was then used to calculate $PM_{2.5}$ values downwind of the freeway which were compared to measured $PM_{2.5}$ concentrations.

The results shown in Table 3 can be compared to the PM concentrations measured at the 10 m north site which was just on the edge of the lateral turbulence zone. The 24 h average $PM_{2.5}$ estimated for the 3 day intensive was 1.6 ± 0.5 μg/m^3, versus the measured 2.0 ± 0.7

Table 2
Sliding box model of coarse ($10 > D_p > 1.15$ μm) particles for daytime periods during the NEXUS 3 day intensive. LDV = Light duty vehicles, cars and light trucks (Class 1, 2); HDV = Heavy duty vehicles, trucks (Class 3–6).

Site		I-96 Detroit	I-96 Detroit	**I-96 Detroit**	**I-96 Detroit**	**I-96 Detroit**
Date	October 26–28, 2010	Calcium	Calcium	**Calcium**	**Iron**	**Zinc**
Time	15 h blocks	Days 6–21	Days 6–21	Days 6–21	Days 6–31	Days 6–21
Vehicle type	Classes	LDV	HDV	**Total cars and trucks**	**Total cars and trucks**	**Total cars and trucks**
Fit to data	**mg/km**	1.5	15.0	**1.5, 15**	**2.8, 28.3**	**0.09, 0.90**
Box dimensions	height m	5	5	**5**	**5**	**5**
	width m	54	54	**54**	**54**	**54**
	length m	1000	1000	**1000**	**1000**	**1000**
Box volume	x 1000 m^3	270	270	270	270	270
Traffic	vehicles/hr	10,479	824	**11,303**	**11,303**	**11,303**
Speed	mi/hr	69	69	**69**	**69**	**69**
Speed	km/hr	110.4	110.4	**110.4**	**110.4**	**110.4**
vehicles in box	# vehicles	95	7	**102**	**102**	**102**
Emissions	mg/min	142	112	**254**	**480**	**15.3**
Concentration in box per minute	μg/m^3	0.53	0.41	**0.94**	**1.78**	**0.057**
Wind velocity	m/second	3.1	3.1	**3.1**	**3.1**	**3.1**
Sliding box translation	Seconds	17.4	17.4	**17.4**	**17.42**	**17.4**
Sliding box translation	Fraction of minute	0.29	0.29	**0.29**	**0.29**	**0.29**
Calculated concentration at 10 m north	**μg/m^3**	0.153	0.120	**0.273**	**0.517**	**0.0164**
Measured concentrations 10 m north	**μg/m^3**			**0.242 ± 0.050**	**0.516 ± 0.05**	**0.0169 ± 0.008**
Los Angeles 1972						
5.0–15 μm	mg/mi			6.2, 62	8, 80	1.2, 12
Concentration in mixed zone	**μg/m^3**			**1.13**	**1.43**	**0.22**

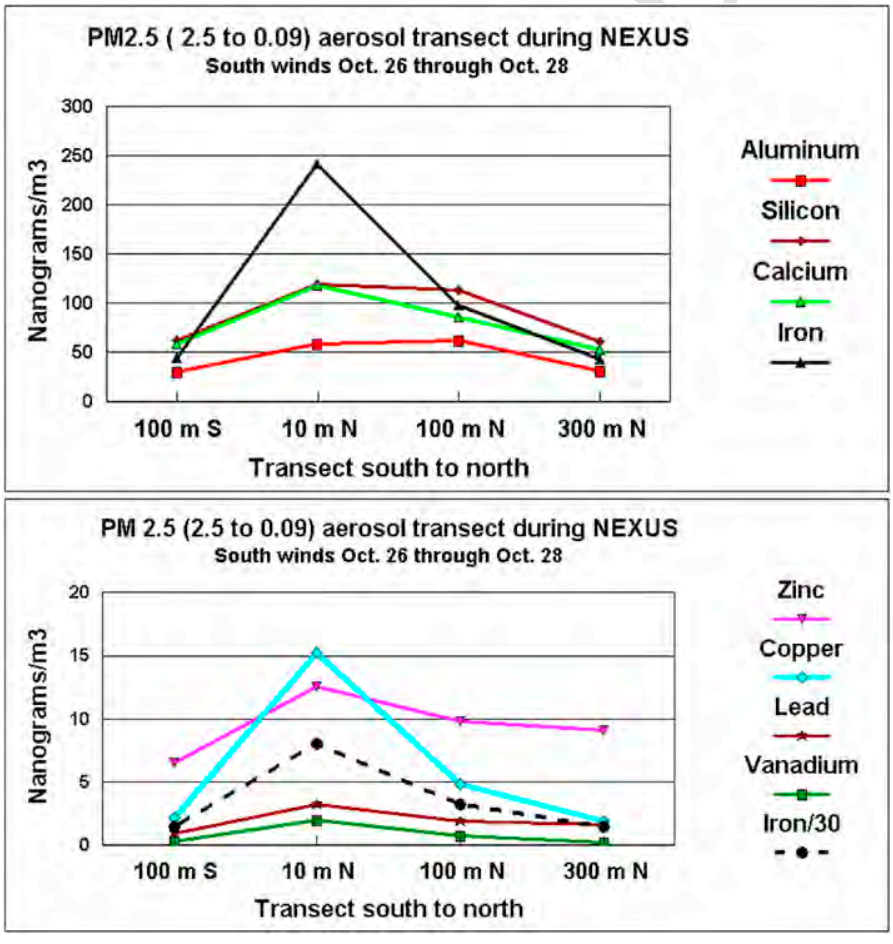

Fig. 17. Fine aerosol transect during the Oct. 26–28 intensive: a) crustal species; b) transition metals and lead.

Table 3
Sliding box model of the three day intensive, when meteorological and traffic conditions were suitable. Also shown are the Swiss data (2010) and Los Angeles data (1973) estimated from measured values.

Emission rate estimates		Gertler et al., 2003 eastern US	Gertler et al., 2003, eastern US	Gertler et al., 2003, eastern US	Bukowiecki et al., 2010, Swiss freeways	Cahill and Feeney, 1973, LA freeways
Time	15 h increment	Daytime 6 to 21	Daytime 6 to 21	24 h average	24 h average	24 h average
Vehicle type	Classes	LDV	HDV	All vehicles	All vehicles	All vehicles
Source $PM_{2.5}$ mass	mg/km	14	135	14/135	50/288	1056
Box dimensions	height m	5	5	5	5	5
	width m	54	54	54	54	54
	length m	1000	1000	1000	1000	1000
Box volume	x 1000 m^3	270	270	270	270	270
Traffic	vehicles/hr	10,479	824	7682	7682	7682
Speed	km/hr	110	110	110	110	110
vehicles in box	# vehicles	95	7	70	70	70
Emissions	mg/min	1329	1008	1528	4538	17,636
Concentration in box per minute	$\mu g/m^3$	4.9	3.7	5.7	16.9	65.3
Wind velocity	m/second	3.1	3.1	3.1	3.1	3.1
Sliding box translation	Seconds	17.4	17.4	17.4	17.4	17.4
Sliding box translation	Fraction of minute	0.29	0.29	0.29	0.29	0.29
Calculated $PM_{2.5}$ Concentration	$\mu g/m^3$	1.43, 1.08	0.53, 0.25	**1.6 ± 0.5**	**4.9 ± 1.2**	**19.0 ± 3**
Size ranges	$\mu g/m^3$	$PM_{2.5}$	$PM_{2.5}$	$PM_{2.5}$	PM_{10}	$PM_{5.0}$
Measured $PM_{2.5}$ Concentrations (some estimated)	$\mu g/m^3$			**2.0 ± 0.7**	**3.1 ± 1(est)**	**16 ± 2 (est)**

$\mu g/m^3$. Note that the Gertler et al., 2003 emission values were for California cars and fuels.

Table 3 also includes estimates of the 10 m north concentrations based on the Swiss (Bukowiecki et al., 2010) and Los Angeles (Habibi, 1973; Cahill and Feeney, 1973) freeway emission rates. The Swiss study gave PM_{10} emission rates of 50 ± 13 mg/km for light duty vehicles, and 288 ± 72 mg/km for heavy duty vehicles. Applying these emission rates to the NEXUS configuration, one would predict about 4.9 $\mu g/m^3$ PM_{10} mass at the freeway edge, slightly less than the 10 $\mu g/m^3$ to 19 $\mu g/m^3$ $PM_{2.5}$ values reported as the traffic-impacted Central European average (Denier Van der Gon et al., 2013). The Swiss data included about ½ roadway crustal particles, which would likely reduce their 4.9 $\mu g/m^3$ PM_{10} values to around 3.1 $\mu g/m^3$ of $PM_{2.5}$.

The right hand column of Table 3 is the predicted 24 h $PM_{5.0}$ mass at the 10 m north site using the emission rates from the 1973 Los Angeles study (Habibi, 1973). The mean estimated $PM_{2.5}$ mass concentration of 19 $\mu g/m^3$, would also have included 2.7 $\mu g/m^3$ of lead. Making the correction for presumed coarse roadway wear particles, the 1973 $PM_{5.0}$ data would be reduced to roughly 16 $\mu g/m^3$ equivalent $PM_{2.5}$ in the NEXUS configuration.

7. Transects in the three day intensive: Very fine (0.26 μm > Dp > 0.09 μm) particles

Very fine particles (Fig. 18) were less impacted by distance from the freeway compared to fine and coarse particles. These results reinforce the behavior seen in the Los Angeles I-710 studies (Fig. 19, Zhu et al., 2002) in which very fine and ultra-fine components extended both upwind and downwind from the array with little change in concentration with distance from the freeway once one was farther away than about 150 m (see Fig.19).

1.7. Ultra-fine particles

The development of a means to measure ultra-fine particles as a function of time allows for the first time the ability to match compositionally-resolved ultra-fine particles to potential sources and meteorology. Two such units were built and tested to run behind the DELTA 8 DRUM, which has a validated lower cut point of 0.09 μm. Thus, for this study, ultra-fine particles are particles having aerodynamic diameters <0.09 μm. These two units were placed at the 10 m north site and the main site at 100 m north, and ran for 5 weeks to match the 8 DRUMs.

The ultra-fine data did not have an upwind site, but the agreement between the 10 m north and 100 m north sites is confirmation of a regional distribution. The major exception to this pattern was optical attenuation (Fig. 13), which in the $0.26 > D_p > 0.09$ μm size mode is almost entirely soot, largely from diesel trucks. We did not measure soot in the DRUM ultra-fine mode.

An examination of the 3 day intensive period at 10 m north showed that, of the four elements known to be present in the ultra-fine size ranges from traffic, zinc and iron show some modest correlation with daytime traffic peaks (Fig. 21). Recall, however, that relatively little braking occurs on this stretch of I-96.

Ultra-fine particles at the 100 m north site showed essentially no correlation with daytime traffic, in accord with the factor of ~10 reduction seen in previous studies (Cahill and Feeney, 1973; Zhu et al., 2002; Emfac2007). For diesel-generated ultra-fine sulfur, (Zielinska et al., 2004), the freeway contribution is largely lost in high levels of ultra-fine sulfur associated with upwind sources possibly including the Monroe coal-fired power plant.

2. Discussion

The particles in the NEXUS study ranged from coarse concrete erosion and resuspended roadway particles contaminated with tire and brake drum debris, to very fine and ultra-fine particles generated by traffic and diverse regional sources.

The behavior of the particles during the three day transect intensive was roughly as expected, with coarser particle concentrations declining rapidly downwind while fine and especially very fine particle concentrations dropped more slowly, as shown in Figs. 16–18.

The agreement between the predictions of the sliding box model and the observed near-roadway $PM_{2.5}$ concentrations (Table 3) gives confidence that literature emission rates used in the model must be close to reality. The results also highlight the enormous improvement in vehicle tailpipe emissions in the past 40 years.

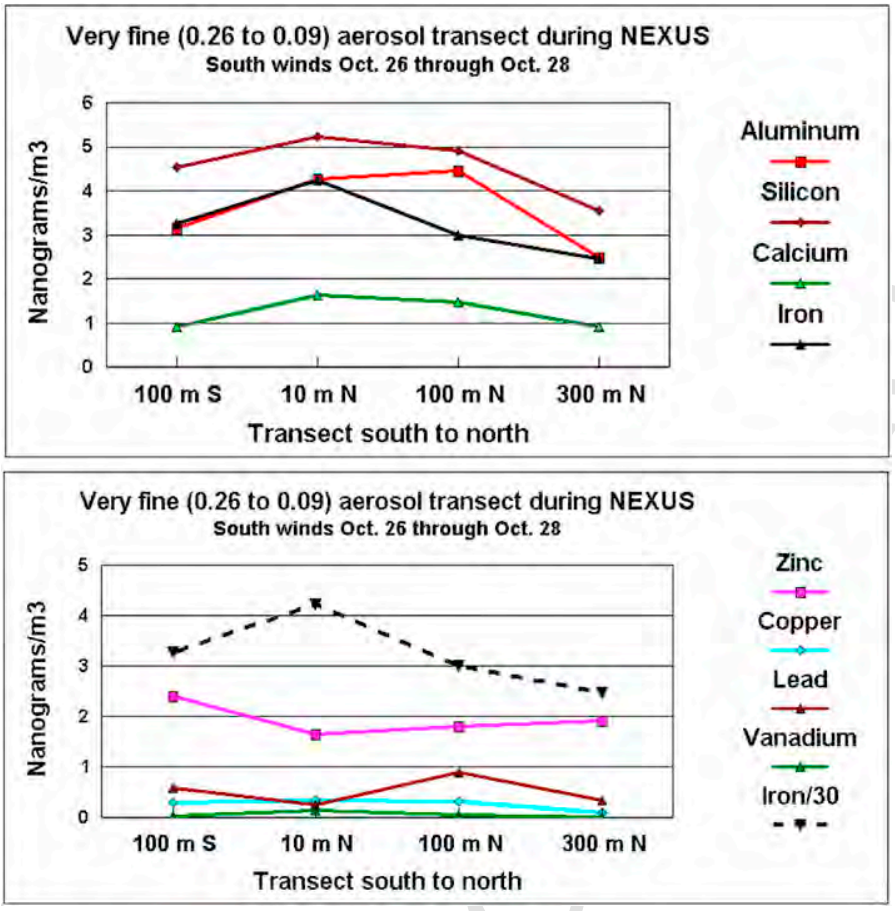

Fig. 18. Very fine aerosol transect during the Oct. 26–28 intensive. a) crustal species; b) transition metals and lead.

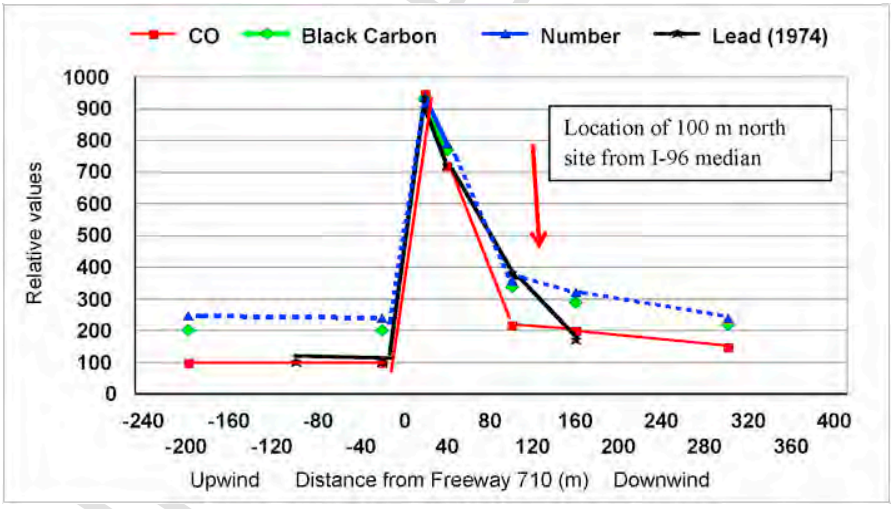

Fig. 19. Transect of Interstate 710 in Los Angeles from Zhu et al. (2002). Superimposed are lead data from 1973 (Cahill and Feeney, 1973; Feeney et al., 1975). The arrow marks the distance of the 100 m north site from the I-96 median in the present study.

The situation with the ultra-fine particles, on the other hand, indicates a dominance of regional concentrations little affected by the nearby freeway traffic with the striking exception of optical absorption (diesel soot) as seen in both optical spectroscopy from the DRUM finest stages and the aethalometer data (Fig. 13). The ultra-fine particles have elemental signatures consistent with brake wear and zinc in motor oil, but the concentrations are small, consistent with little braking on that section of I-96 during the 3 day intensive.

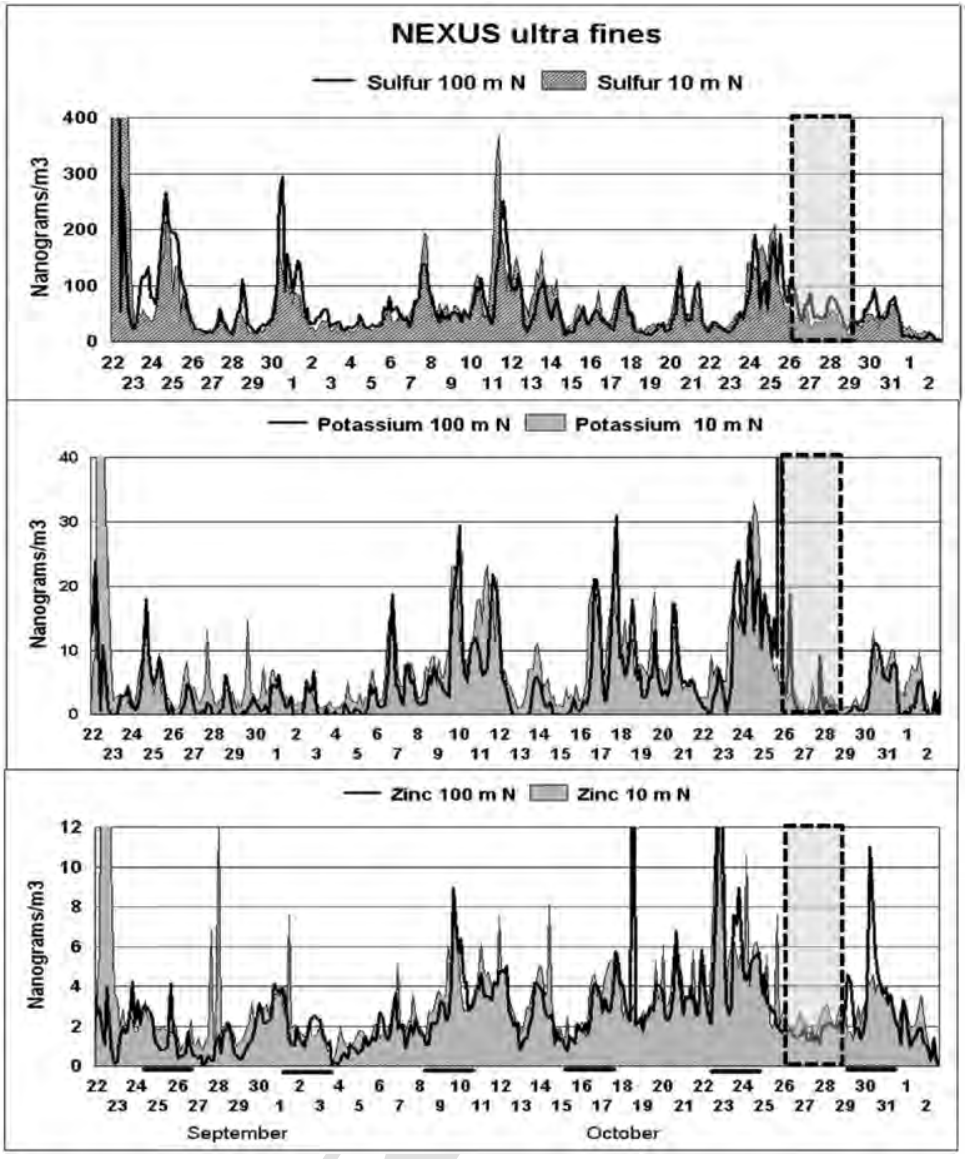

Fig. 20. Ultra-fine sulfur, potassium, and zinc at the 10 m N and 100 m N sites. The large ultra-fine sulfur peaks on October 24 through 25 were likely from the Monroe coal fired power plant. The Sept. 30 and Oct. 12 plumes were from a source to the north. Black lines above the dates in the zinc plot are weekends.

These three days were selected when there was minimal impact from Telegraph Avenue which had extensive stop and go periods. The ultra-fine data are a more extreme case of the behavior seen in the very fine particles, which had large regional sources and fell off slowly downwind.

The potential exposure and human health implications of these particles can be estimated by comparison with recent work tying roadway-derived ultra-fine particles to ischemic heart disease in the California Central Valley (Cahill et al., 2011). An increase in IHD mortality of ~30% at Bakersfield, CA, was associated with elevated levels of very fine and ultra-fine roadway-derived transition metal particles, mostly from brake drums and pads (Table 4 below). However, the concentrations in Detroit were generally far lower than those measured in Bakersfield.

As shown in Table 4, ultra-fine concentrations measured at the 10 m north and 100 m north sites are similar to those at Watt Avenue (Spring) in Sacramento, CA measured 20 m downwind of a 65,000 vehicles/day secondary street, at a stop light, during non-inversion conditions (Cahill et al., 2014). In both cases, little influence was seen from the nearby roadway, and the ultra-fine particles were regionally distributed. However, there was only very limited braking and acceleration during the NEXUS intensive, thus limiting concentrations of brake wear particles. Nevertheless, if the observed ultra-fine metallic particles see in the NEXUS experiment extend over large numbers of people, it could potentially enhance the ischemic heart disease death rate in the same manner seen in Bakersfield, CA (Cahill et al., 2011).

3. Conclusions

Important differences in the behavior of particles of different sizes were observed during this study. For coarse species, the fall-off in concentration versus distance was rapid, roughly in accord with cur-

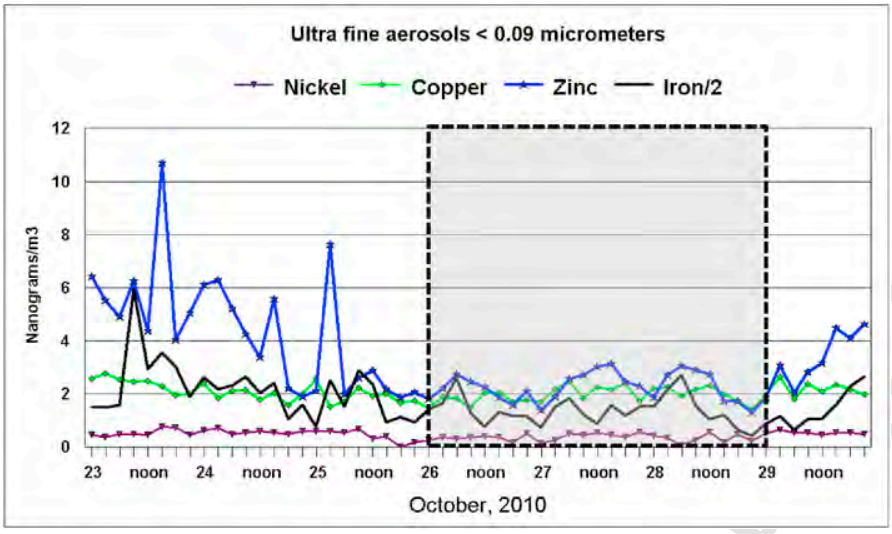

Fig. 21. Ultra-fine nickel, copper, iron and zinc at 10 m north during the 3 day intensive.

Table 4
Comparison of ultra-fine (D_p < 0.09 μm) traffic-derived particles measured in NEXUS versus Watt Ave. in suburban Sacramento, CA during spring non-inversion conditions (Cahill et al., 2014). NEXUS concentrations are 5-week averages. na = not available. For comparison, winter values which are impacted by strong surfaced-based inversions in the California Central Valley are included. The sources of the high nickel values seen at Watt Avenue in winter were totally absent 500 m upwind, so they must be associated with Watt Avenue traffic. Such levels, however, have never been seen in our other studies.

Ultra-fine elements (ng/m^3)	S	P	Fe (non-soil)	Ni	Cu	Zn	Pb
Non-inversion conditions							
Detroit							
10 m n	68.1	10.5	3.4	0.5	1.9	3.2	2.9
100 m n	61.4	9.5	3.4	0.5	1.8	2.6	3.3
Watt Ave (Spring)	129	na	4.8	0.3	0.4	2.0	1.4
Strong inversions conditions							
Watt Ave (Winter)	42.8	na	29.3	12.1	9.3	13.7	1.6
Sacramento (Winter)	52	4.0	14.3	0.6	na	14.3	2.5
Bakersfield (Winter)	242	10.5	27.7	1.6	na	12.3	2.6

rent models such as Emfac2007. Concentrations were strongly affected by meteorology such as wind velocity and rain fall. For the $PM_{2.5}$ particles, the fall off versus distance was still close to the models, reaching a 90% reduction in freeway-derived particles in the 200–250 m range. Very fine particles, 0.26 > D_p > 0.09 μm diameter, persisted all the way to the 300 m downwind site, with only a modest reduction in concentrations. Ultra-fine particles were only measured at two sites, 10 m north and 100 m north, and the concentrations at both sites were almost identical indicating a very slow fall off and/or strong upwind sources. The persistence of ultra-fine particles in urban areas away from freeways was also observed in the Los Angeles data (Zhu et al., 2002).

A 3-day period of southerly winds provided an opportunity to conduct an upwind-downwind highway transect to assess the impact of roadway emissions. For $PM_{2.5}$, the transect yielded a measured near-roadway $PM_{2.5}$ concentration of 2.0 ± 0.7 μg/m^3 versus a value of 1.6 ± 0.5 μg/m^3 predicted from recent California vehicle emission rates and ~3 μg/m^3 using current European freeway data. Thus, measured $PM_{2.5}$ concentrations at the near-road site showed excellent agreement with predicted $PM_{2.5}$ concentrations assuming recent published emission rates. By contrast, using 1973 emission rates one would predict roughly 16 μg/m^3 of $PM_{2.5}$, thus illustrating the dramatic progress that has been made in reducing roadway emissions in the US during the past four decades.

The NEXUS and European estimates of the contribution of brake drums were also similar, although numerous assumptions are needed to make the comparison. The European value is roughly 3.2 mg/km brake wear, assuming 6% trucks in their mix. The NEXUS iron values were strongly enhanced over soil concentrations, indicating roadway sources including brake wear. The fine and very fine zinc particles were too fine in size to be from tire erosion. With these assumptions, the expected emission rate from brake wear is roughly 5.2 mg/km, similar to the European values especially after some iron reduction from vehicle debris and roadbed wear.

For ultra-fine particles, there was a dramatic increase in diesel soot, closely tied to traffic volumes, but only a modest increase in traffic-correlated zinc and other transition metals during the 3 day intensive. For the rest of the 5 week study, mean elemental concentrations were essentially identical at the 10 m and 100 m north sites and highly correlated in time. Further, this correlation existed independent of wind direction, including having both the 10 m north and 100 m north sites upwind of the freeway. From these results, we conclude that most of the time the freeway was a negligible enhancement of a regional ultra-fine background of transition metals.

The regional ultra-fine species closely resembled those seen in a recent study of stop-and-go traffic on a heavily traveled secondary road with heavy braking (Cahill et al., 2014). These particles are similar in composition to debris from brake pads, drums, and the zinc additive in motor oil (Cahill et al., 2011). These results reinforce the behavior seen in the Los Angeles I-710 studies (Zhu et al., 2002) for ultra-fine particle number and black carbon, e.g., these components extended well upwind of the freeway and were soon reestablished at the same concentrations downwind beyond 150 m, thus showing a regional distribution of ultra-fines well away from the local freeway.

The NEXUS data also support the conclusions of Zhu et al. (2002) that little coagulation or particle size growth was seen in ultra-fines from freeways, as both Zhu's ultra-fine soot and particle number data were essentially identical versus distance with non-reactive CO.

The conclusion from this study is that for traffic on a freely flowing, high speed freeway with little braking and acceleration, almost all ultra-fine particles except for diesel soot, and most of the very fine particles, are generated from diverse vehicular and industrial sources

in the region and are not directly associated with local freeway traffic.

Uncited reference

Acknowledgements

The authors gratefully acknowledge the assistance in meteorological models of Ron Henry, as well as the detailed aethalometer, meteorological and traffic data of the US EPA/FHWA study (US EPA, 2013). The United States Environmental Protection Agency through its Office of Research and Development funded and collaborated in the research described here under contract EP-12-D-000219 to the University of California, Davis. It has been subjected to Agency review and approved for publication.

Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.atmosenv.2016.09.023.

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From: Amanda Johnson <eden900573@gmail.com>
Sent: Monday, September 9, 2024 10:23 AM
To: PER-CEQA <CEQA@saccounty.gov>
Subject: Upper Westside Specific Plan draft

Hello,

Here are my comments with regards to the Upper Westside Natomas plan.

I HATE IT!!!

20-1

Urban sprawl often leads to increased traffic congestion, longer commutes, and a higher cost of living. I don't want Sacramento to become Roseville or Elk Grove. Rather than expanding into our precious farmland, we should focus on building walkable, mixed-use neighborhoods. Only 38% of the world's land can be used for farmland. Sacramento is "farm to fork" and you want to get rid of our farms?

20-2

Preserving green spaces should also be a top priority. Green spaces improve our mental and physical well-being and offer vital habitats for animals. This is a flood zone, I know because I live here, this isn't the place to build more suburban development. By protecting these areas from development, we safeguard our environment, contribute to climate resilience, and provide sanctuary for wildlife that is increasingly displaced by unchecked growth.

20-3

Suburban developments once they are completed are the best they are ever going to be. After that they decay, they cost the city more because they never adapt or grow. Never allowing more people to move into a neighborhood. Encouraging mixed-use zoning for current existing areas would allow for affordable housing options that are sorely needed, especially for low-income residents who are often priced out of traditional suburban developments. Why expand when we can do better and make Sacramento less like Elk Grove and Roseville and more like downtown.

20-4

I ask you to protect Natomas' farmland and instead prioritize urban planning strategies that emphasize walkability, mixed-use development, affordable housing, public transportation, and environmental conservation. Let's create a city where people and nature thrive together, rather than one where unchecked development diminishes the quality of life for all.

Thank you,

Amanda Burnitt

Letter 21

From: Mark D'Elicio <mdelicio@mac.com>
Sent: Tuesday, September 10, 2024 10:08 AM
To: PER-CEQA <CEQA@saccounty.gov>
Cc: Karina Talamantes <ktalamantes@cityofsacramento.org>; Supervisor Serna <SupervisorSerna@saccounty.gov>
Subject: Opposition to Upper Westside Specific Plan (UWSP)

To whom it may concern,

I am writing to express my strong opposition to the Upper Westside Specific Plan (UWSP). As a resident of Sacramento County, I am deeply concerned about the significant and unavoidable impacts this project would have on our community. 21-1

The Draft Environmental Impact Report (DEIR) has clearly identified numerous areas where the UWSP would cause irreversible damage. These impacts include:

- Aesthetics
- Agricultural resources
- Air quality
- Cultural resources
- Noise
- Tribal cultural resources

21-2

The fact that the county itself acknowledges these unavoidable impacts is alarming. It is unacceptable to sacrifice the well-being of our community and environment for the sake of development.

In addition to the concerns raised in the DEIR, I am also deeply troubled by two critical issues: 21-3

1. The increased traffic generated by the UWSP will only exacerbate existing congestion, leading to longer commute times, increased air pollution, and a decline in overall quality of life.
2. The land slated for development serves as a crucial spillway, designed to alleviate flooding in the event the Sacramento Weir is opened to protect the city. Building in this area not only compromises its intended function but also significantly increases the risk of property damage and potential loss of life during major flood events. The development would essentially constrict the natural flow of water, potentially exacerbating flooding in other areas and

21-4

undermining the effectiveness of the Weir system. 21-4 cont.

Beyond these specific issues, I believe the UWSP is fundamentally flawed. It prioritizes short-term gains over long-term sustainability. It disregards the voices of residents who have expressed their opposition. It sets a dangerous precedent for future development projects in our county. 21-5

I urge you to protect our community from this harmful project. I believe that together, we can create a future for Sacramento County that is both prosperous and sustainable. 21-6

Thank you for your time and consideration.

Sincerely,

-Mark D'Elicio
3060 Edgeview Drive
Sacramento, CA 95833
(415) 912-9546
mdelicio@mac.com

Letter 22

From: Albert Plantilla <aplantilla@gmail.com>
Sent: Tuesday, September 10, 2024 9:26 AM
To: PER-CEQA <ceqa@saccounty.gov>
Subject: Comment on Proposed Project County Control PLNP2018-00284

Good morning,

I support this development project. Sacramento has growing needs for housing with a growing population. It appears to have high density housing which will help to keep the market rate for housing down by increasing supply. The county should look for means to improve transit options to reduce traffic load as more population moves out of the central Sacramento area. 22-1

Alberto Plantilla

--
"The brightest light is invisible. It shines through your deeds. And warms the universe."

From: Marvin Fontanilla <mfontanilla@gmail.com>
Sent: Wednesday, September 11, 2024 6:12 AM
To: PER-CEQA <CEQA@saccounty.gov>
Subject: Support for Upper Westside Plan

Dear Sacramento County Planning Commission,

I am writing to express my support for the Upper Westside Specific Plan. While I acknowledge the environmental challenges outlined in the Draft Environmental Impact Report, I believe this development is crucial for addressing our housing needs and creating sustainable communities. This plan undoubtedly will attract affluent residents, potentially leading to improved schools and increased community safety, much like the successes seen in Elk Grove and Roseville. These developments make our region more attractive to families and individuals looking for vibrant, well-rounded communities. 23-1

Sacramento is changing. It's time to recognize that and lean in—to the future.

Thank you for considering my support for this important project.

Sincerely,

Marvin Fontanilla

September 12, 2024

Sacramento County, Department of Community Development, Planning and Environmental Review Division
Attn: Environmental Coordinator
827 7th Street, Room 225
Sacramento, CA 95814

RE: Upper Westside Specific Plan (State Clearinghouse 2020100069, County Control PLNP2018-00284)

Position: Oppose

Dear Planning Commission, Supervisors, CEQA Review Team, County Officials, et al,

I am a homeowner and proud resident of the Gateway West neighborhood that borders the proposed project site. I strongly oppose this development because it will significantly harm wildlife, local farms, and the existing community. 24-1

Habitat Conservation
This region provides vital habitat for wildlife including migratory and resident birds, mammals, reptiles and insects. Consider protecting these lands as part of a mitigation bank rather than developing, to maintain open space and support Swainson hawk, VELB, western pond turtle and other threatened species. This area provides contiguous habitat along the Sacramento River and Bypass Wildlife Areas that should be protected. Open space bordering our Garden Highway levee provides flood protection for greater Natomas, and permeable surfaces promote groundwater recharge. 24-2

Prime Farm Land
The existing farms on these lands feed our community and people around the world. My family enjoys watching the tomatoes, sunflowers, pumpkins, and corn grow in the fields down the street, and shopping at the Cuevas stand on El Centro for the freshest produce. Sacramento prides itself on being the Farm-to-Fork capitol. Please don't pave over these iconic family farms. 24-3

Impacts to Locals
The 49er Travel Plaza is also a cornerstone of our community, serving travelers and truckers for more than 50 years. Their proximity to the I-5 and I-80 junction and being just offset from residential tracts is ideal. Don't build around them and force them out. 24-4

I do not want the added noise and air pollution, strain on our infrastructure and utilities, increased traffic, loss of wildlife, loss of existing community & tradition, and destruction of natural resources. Open space is precious and disappearing quickly. Let the developer go elsewhere to get rich. It's already a nightmare trying to get homeowner's and flood insurance in this area. Build somewhere else. Please protect these farms that are the symbol and heart of Sacramento, and the reason I chose to live here. 24-5

Thank you,

Amy Rodrigues
23 Alcanon Ct
Sacramento, CA 95833

From: Rod <whiskeyrodjohn@gmail.com>
Sent: Tuesday, September 24, 2024 10:46 AM
To: Clerk of the Board Public Email <boardclerk@saccounty.gov>; PER-CEQA <ceqa@saccounty.gov>
Subject: Natomas Upper West Side Public Comment

To County Supervisors,

I live in Natomas and oppose the Upper Westside Specific Plan. This area is not vacant, neglected lots in need of rehab. It is family farms and productive working lands. I'm not making plans for what to do with your wife after you're out of the picture, don't insult our landowners by making plans for what to do with their soil after they've been pushed out. 25-1

Emotions aside, the Upper Westside Specific Plan does not align with the City of Sacramento's 2040 General Plan and I urge you to scrap it and protect our farms. 25-2

Highlights from the 2040 Plan to keep in mind: 25-3

Sustainable and Responsible Growth lists as its #1 objective “Concentrate new growth within Sacramento’s existing footprint to promote a compact development pattern that supports efficient delivery of public services and infrastructure, while protecting surrounding open space lands.” Appendix A, Vision and Guiding Principles

The Upper Westside Specific Plan falls within an area the City identifies as a “Special Study Area” currently composed of "Prime Farmland" and "Other Farmland." 3-3 p61 25-4

Land Use and Placemaking highlights Sacramento’s “1.5million acres of some of the most fertile farmland in the United States,“ and as such, “planning efforts are guided by ‘smart growth’ principles that aim to promote a compact development footprint, helping to minimize urban sprawl and pollution.” 3-2 p60 25-5

The Community Issues and Opportunities section of the plan notes that “North Natomas has some of Sacramento’s biggest opportunities for infill and redevelopment,” pointing out that “vacant and underutilized properties along the I-5 corridor, Del Paso Road, and Truxel Road are opportunities for infill development that make use of existing infrastructure and community resources.” 11-NN-5 p367 25-6

The 2040 Plan does not endorse expanding the urban services boundary or rezoning 25-7

agriculture to residential or commercial use.

25-7 cont.

When mentioning the proposals for the Upper Westside and Grandpark Specific Plans, community feedback showed “North Natomas residents want to see preservation of natural areas, including wildlife habitats and corridors within the unincorporated area consistent with the HCP; and want new development to have a compact form, integrated with existing development within the city so as to minimize traffic impacts and utility demand, and take advantage of opportunities for improved bicycle and pedestrian connectivity.” 11-NN-5 p367-8

25-8

Environmental Resources and Constraints objective #2 is “Thriving rivers, wildlife, and natural open spaces that contribute to public health, livability, and protection of the environment for future generations.” 6-3 p131

25-9

Sprawling beyond the City's current boundary to pave over food production and destroy wildlife habitat is not what we want. The Upper Westside Specific Plan is a direct contradiction to the goals and wishes of our community.

25-10

Stop this nonsense. Your time and resources are better spent elsewhere.

25-11

Thank you,
R.J.

From: Ashley Cajigas <ashleycajigas@gmail.com>
Sent: Thursday, October 3, 2024 8:02 PM
To: Clerk of the Board Public Email <BoardClerk@saccounty.gov>
Cc: PER-CEQA <ceqa@saccounty.gov>; Supervisor Serna <SupervisorSerna@saccounty.gov>
Subject: Natomas is OPPOSED! No to the Upper Westside Specific Plan!

Greetings,

I am sending this email in opposition to the Upper Westside Specific Plan that threatens our environment, wildlife habitat, and our community. As the Draft Environmental Impact Report clearly states, the project would result in **SIGNIFICANT** and **UNAVOIDABLE** impact on the aesthetics, agricultural resources, air quality, cultural and historical resources, noise, population and housing, transportation, and tribal cultural resources. It will further impact climate change, geology, soils, hydrology, drainage, water quality, public services, and water supply to name just a few of the impacts on our region and community. 26-1

As a homeowner on Garden Highway, my family and neighbors have already seen the destruction of habitat, increased traffic, noise, impact on our water supply, and pollution resulting from the levee project. We have seen public safety response times decrease in addition to increased crime. I am deeply concerned about the additional pressure and burdens placed on our community if the Upper Westside Specific Plan moves forward. 26-2

Those of us who live in and around Natomas enjoy living in close proximity to locally owned and operated farms and farm stands, such as Cuevas Garden Hwy Gardens and Nick & Ray's Pumpkin Patch, formerly known as Goblin Gardens Pumpkin Patch at Bastiao Farms, that have been operating for generations. THIS is what community looks like; not some overly modernized grid developed by greedy developers. 26-3

The Upper Westside Specific Plan is a bad proposition for the public and our community; designed only to profit developers and increase the tax base, at the expense of the rest of us and our environment.

I urge you to reject this proposal.

Sincerely,
Ashley Cajigas
Garden Hwy Resident

Letter 27

Sacramento County
Community Development, Planning and Environmental Review
827 7th St, Room 225
Sacramento, CA 95814

RE: **Public Comment on Draft EIR for Upper Westside Specific Plan (SCH No. 202100069)**

Dear Sacramento County Planning Commission,

As a coalition of residents living in Natomas' Gateway West, Sundance Lake, Willow Creek, Natomas Crossing, Westlake, Creekside, Village 7 and Natomas Park communities, we are submitting the following comments in opposition to the Upper Westside Specific Plan (UWSP) in Natomas as proposed in the Draft Environmental Impact Report (DEIR). As concerned residents and advocates for responsible development and environmental conservation, we urge you to reconsider the long-term environmental and social impacts that this project would impose on the Sacramento region.

1. Impact on Vernal Pools and Wetlands

The Upper Westside area is home to vernal pools, wetlands, and unique ecosystems that support a wide array of native species, including several threatened and endangered species such as the Vernal Pool Fairy Shrimp and Giant Garter Snake. The DEIR acknowledges significant impacts on these sensitive habitats, yet the mitigation measures proposed do not adequately ensure the preservation of these fragile ecosystems. These ecosystems serve critical ecological functions, including water filtration, flood control, and providing habitat for migratory birds. 27-1

It is essential that development in this area be halted or scaled back to protect these vital wetland habitats. There are insufficient guarantees that the mitigation banking proposed will fully offset the habitat destruction caused by the UWSP. Once these ecosystems are lost, they're gone.

2. Flood Risks

The Natomas Basin is highly flood-prone, and the area identified for the UWSP sits within a FEMA-designated floodplain. Although the DEIR discusses levee improvements, the increased urbanization of this area would exacerbate flood risks and strain existing infrastructure. Climate change is expected to intensify the frequency and severity of extreme weather events, which could lead to catastrophic flooding, particularly as the Sacramento River and its tributaries swell. 27-2

Increased development in a flood-prone area runs counter to the region's commitment to climate resilience and puts both future residents and current taxpayers at risk, as levee failures or extreme floods would require significant public funding to mitigate the damage.

3. Increased Traffic and Air Pollution

The proposed UWSP would lead to an increase in vehicle traffic, contributing to greater air pollution and greenhouse gas emissions. The DEIR suggests that roadway improvements and 27-3

public transportation will address these issues, but realistically, the majority of residents will rely on personal vehicles. With climate change already affecting California, adding thousands of new car trips per day will only exacerbate the region's air quality problems and hinder the state's ability to meet its emissions reduction goals under SB 32.

27-3 cont.

4. Water Supply and Sustainability Concerns

The region is already experiencing significant water supply challenges due to prolonged droughts and over-extraction of groundwater. The Upper Westside Specific Plan would place additional stress on water resources, further threatening the long-term sustainability of the Sacramento Valley's water supply. The DEIR's analysis of water resources fails to adequately address how the proposed development will impact both surface and groundwater in the long term, particularly in light of recent droughts and climate forecasts predicting decreased water availability in the region.

27-4

5. Inconsistent with Regional Conservation and Smart Growth Principles

The UWSP is inconsistent with the Sacramento Area Council of Government's (SACOG) Blueprint for Smart Growth, which emphasizes compact, transit-oriented development that conserves open space and minimizes environmental impacts. The vast scale of the proposed development contradicts these principles and sets a dangerous precedent for unchecked urban sprawl, threatening not only natural habitats but also agricultural lands in the region.

Instead of encouraging suburban sprawl, Sacramento County should focus on infill development and increasing density within existing urban areas, where infrastructure can be more sustainably managed, and impacts on natural landscapes are minimized.

27-5

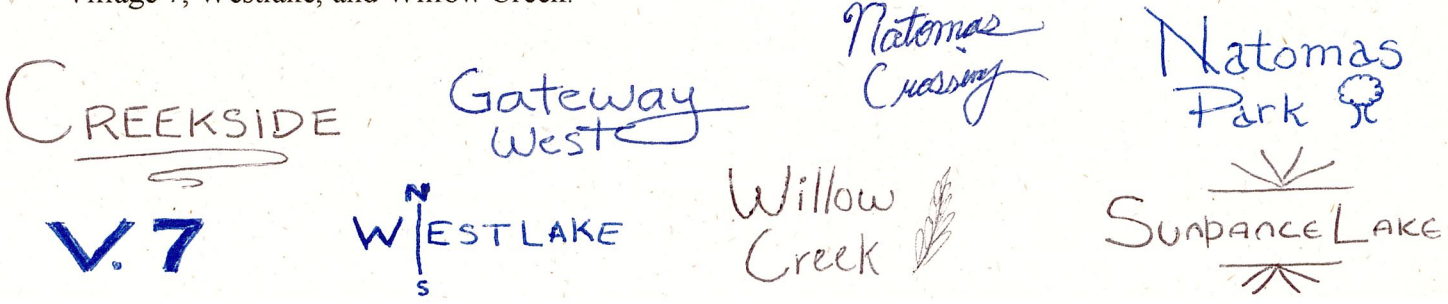
Conclusion

For the reasons outlined above, we strongly urge Sacramento County to reject the Upper Westside Specific Plan in its current form. The irreversible damage to vernal pools and wetlands, increased flood risks, traffic congestion, and strain on water resources pose significant threats to the environment, public safety, and regional sustainability. We respectfully request that the County explore alternative approaches that prioritize environmental preservation, smart growth, and long-term resilience to climate change.

Thank you for your attention to these important matters. We trust that the County will carefully consider the lasting impacts of the Upper Westside Specific Plan and act in the best interests of both the environment and future generations.

Sincerely,

Residents living in Creekside, Gateway West, Natomas Crossing, Natomas Park, Sundance Lake, Village 7, Westlake, and Willow Creek.



From: Lisa Boyle <grandmalezah@gmail.com>
Sent: Friday, October 4, 2024 10:21 AM
To: Clerk of the Board Public Email <BoardClerk@saccounty.gov>
Cc: PER-CEQA <ceqa@saccounty.gov>; Supervisor Serna <SupervisorSerna@saccounty.gov>
Subject: Natomas is OPPOSED! No to the Upper Westside Specific Plan!

Greetings,

I am sending this email in opposition to the Upper Westside Specific Plan that threatens our environment, wildlife habitat, and our community. As the Draft Environmental Impact Report clearly states, the project would result in **SIGNIFICANT** and **UNAVOIDABLE** impact on the aesthetics, agricultural resources, air quality, cultural and historical resources, noise, population and housing, transportation, and tribal cultural resources. It will further impact climate change, geology, soils, hydrology, drainage, water quality, public services, and water supply to name just a few of the impacts on our region and community. 28-1

As a homeowner on Garden Highway, my family and neighbors have already seen the destruction of habitat, increased traffic, noise, impact on our water supply, and pollution resulting from the levee project. We have seen public safety response times decrease in addition to increased crime. I am deeply concerned about the additional pressure and burdens placed on our community if the Upper Westside Specific Plan moves forward. 28-2

Those of us who live in and around Natomas enjoy living in close proximity to locally owned and operated farms and farm stands, such as Cuevas Garden Hwy Gardens and Nick & Ray's Pumpkin Patch, formerly known as Goblin Gardens Pumpkin Patch at Bastiao Farms, that have been operating for generations. THIS is what community looks like; not some overly modernized grid developed by greedy developers. 28-3

The Upper Westside Specific Plan is a bad proposition for the public and our community; designed only to profit developers and increase the tax base, at the expense of the rest of us and our environment.

I urge you to reject this proposal.

Sincerely,
Lisa Boyle

Garden Hwy Resident

October 7, 2024

Sacramento County Department of Community Development
Planning and Environmental Review Division
827 7th Street, Room 225
Sacramento, CA 95814

Subject: Opposition to the Upper Westside Specific Plan Draft Environmental Impact Report

To Whom It May Concern:

I am writing to express my strong opposition to the Upper Westside Specific Plan as outlined in the Draft Environmental Impact Report (DEIR), dated August 2024. The project presents significant and unacceptable environmental and community impacts that cannot be sufficiently mitigated. Specifically, I am concerned about the increase in traffic, deterioration of air quality, irreversible loss of agricultural land, destruction of critical habitat for endangered species, and disruption of migratory bird patterns. 29-1

1. Unacceptable Increase in Traffic

The proposed development will result in a substantial and unavoidable increase in traffic congestion. The DEIR's acknowledgment of traffic impacts, including the projected rise in vehicle miles traveled (VMT), is deeply concerning. The existing infrastructure is ill-equipped to handle the dramatic increase in population and vehicular traffic, particularly along critical roads like El Centro Road and West El Camino Avenue. This will lead to worsened commute times, increased air pollution from vehicle emissions, and heightened risks of accidents. 29-2

The mitigation measures outlined in the DEIR, such as improvements to local roads and intersection upgrades, are inadequate given the scale of the development. No amount of roadway expansion can fully address the significant traffic burden this project will impose. I strongly oppose the project on the grounds that it will create unmanageable traffic conditions, further degrading the quality of life for existing residents.

More specifically, as a resident of Swallows Nest (at the corner of Garden Highway and Orchard Lane), I travel Garden Highway frequently. It is a narrow two-lane road that cannot be widened. The impact on Garden Highway alone should be significant cause for concern. Cars already exceed the 40 MPH speed limit and unsafely pass other cars on a regular basis. The significant increase in traffic on Garden Highway because of this project will surely lead to an increase in fatal accidents. 29-3

The other significant impact will be the overpass of West El Camino Avenue at Interstate 80. It sounds as though the mitigation measure in the DEIR may or may not happen. The overpass is also a two-lane roadway that is already bumper to bumper on a regular basis. If this project is approved, widening of this key overpass should be a requirement prior to beginning development. 29-4

2. Detrimental Impact on Air Quality

The construction and operation of the Upper Westside Specific Plan will lead to a sharp increase in air pollution, exacerbating already poor air quality in the region. The DEIR acknowledges significant emissions of particulate matter (PM2.5), nitrogen oxides (NOx), and other harmful pollutants. The nearby residential communities, particularly vulnerable populations such as children and the elderly, will suffer the health consequences of this increased pollution.

The proposed mitigation measures, while helpful, are not sufficient to protect public health or meet the necessary air quality standards. The scale of development is simply too large for effective mitigation, and I oppose this project due to its unacceptable risks to air quality and public health.

29-5

3. Irreversible Loss of Farmland

The Upper Westside Specific Plan will result in the permanent conversion of 1,372 acres of valuable farmland to urban uses. This represents a tragic and irreversible loss for Sacramento County's agricultural industry, a key component of the local economy. The mitigation measures proposed in the DEIR, such as the 1:1 farmland preservation ratio, do not compensate for the destruction of prime agricultural land that has sustained our community for generations.

Sacramento County's farmland is a finite resource, and this project's large-scale urban sprawl will permanently destroy it. This loss is unacceptable, and I oppose the project for its unsustainable consumption of irreplaceable agricultural land.

29-6

4. Destruction of Habitat for Endangered Species

The project will have devastating effects on critical habitats for several endangered and threatened species, including the giant garter snake and Swainson's hawk. Despite the mitigation measures outlined in the DEIR, the destruction of habitat will lead to a decline in these species, undermining years of conservation efforts in the region.

Urbanization on such a large scale is incompatible with the preservation of sensitive ecosystems. Habitat corridors and conservation easements are insufficient to counteract the profound disruption this development will cause to wildlife. I oppose the project because of its irreversible harm to endangered species and their habitats.

29-7

5. Disruption of Migratory Bird Patterns

The project area serves as a crucial stopover for migratory birds protected under the Migratory Bird Treaty Act (MBTA). The DEIR outlines significant risks to nesting and migratory patterns, which are vital to the survival of many bird species. The loss of open space and wetlands will severely impact these birds, whose populations are already in decline.

29-8

The seasonal restrictions on construction and other mitigation measures mentioned in the DEIR are inadequate to protect the migratory bird populations. I oppose the project because it will cause significant and irreversible harm to these important avian species.

29-8 cont.

Conclusion

In conclusion, I strongly oppose the Upper Westside Specific Plan. The project will have severe, long-lasting, and irreversible impacts on traffic, air quality, agricultural land, endangered species, and migratory birds. The proposed mitigation measures are insufficient to address the scale of harm this project will cause. I urge Sacramento County to reconsider and ultimately reject this unsustainable development.

29-9

Thank you for considering my opposition to the project. I hope that the County will prioritize long-term environmental and community health over short-term development interests.

Sincerely,

Liz Bergeron
2301 Wailea Pl
Sacramento, CA 95833

From: linnhom@winfirst.com <linnhom@winfirst.com>
Sent: Saturday, October 12, 2024 2:54 PM
To: PER-CEQA <ceqa@saccounty.gov>
Subject: Opposition: Upper Westside Specifc Project

October 12, 2024

Chair Christopher and members of the Natomas CPAC
700 H Street
Sacramento, CA 95814

Re: Upper Westside Specific Project

Dear Chair Christopher and members of the Natomas CPAC,

I oppose the Upper Westside Plan. This project greatly threatens our environment, wildlife habitat and our community. As the draft Environmental Impact Report states that this project would result in **significant** and **unavoidable** impact on the aesthetics, precious resources (such as agricultural, cultural, historical and tribunal), air quality, noise, population, and transportation. 30-1

I object to the paving over farmland which will increase traffic congestion on Interstate 5 and 80 and its connecting roads, along with increasing the poor air quality from cars and trucks. 30-2

Another threat of this project is to public safety because it increases flood danger to current residents. 30-3

I urge the members of the CPAC to **reject** this project.

Linn Hom

Josh W. Harmatz
4171 Garden Hwy
Sacramento, CA, 95834
joshharmatz@gmail.com
916-284-2507

October 13, 2024

Sacramento County Board of Supervisors
827 7th Street, Room 225
Sacramento, CA 95814

Subject: Comments on the Draft Environmental Impact Report for the Upper Westside Specific Plan (Control Number: PLNP2018-00284)

Dear Members of the County Board of Supervisors,

I am writing to submit my formal comments on the Draft Environmental Impact Report (EIR) for the Upper Westside Specific Plan (UWSP). As a resident of the area, I have serious concerns regarding the traffic impacts, road safety issues, and quality of life reductions that the proposed development will impose, specifically related to Garden Highway, Powerline Road, and West side of Del Paso Road.

Traffic Impacts and Roadway Conditions

The roads in question, including Garden Highway, are currently narrow, single-lane roads that do not meet current county standards, with lane widths ranging from 8 feet to 10 feet. According to the Local Transportation Analysis (March 2022), these roads are already at or near capacity in peak travel times, and the additional traffic from the proposed 25,000 new residents, heavy commercial vehicles, and workers commuting to the commercial spaces at Metro Air Park will severely exacerbate the existing problems. 31-1

The Draft EIR acknowledges the requirement to widen Garden Highway to 12 feet in each direction, with a 6-foot shoulder. However, the current development proposal does not provide adequate solutions for how this widening will be funded or executed. Recent improvements to the levee system along Garden Highway, including setback levees and power pole relocations, have already been completed without considering the road widening necessary for this project. Additionally, neither the U.S. Army Corps of Engineers nor the Central Valley Flood Protection Board have been consulted regarding these modifications, which are crucial to ensure both traffic safety and flood protection. 31-2

Recommendation: I strongly urge the Board to delay approval of the Upper Westside Specific Plan until the necessary road improvements are fully funded and coordinated with the U.S. Army Corps of Engineers and the Central Valley Flood Protection Board. This coordination is 31-3

essential to prevent conflicts with existing flood protection measures and to ensure that these roads can safely accommodate the additional traffic load. 31-3 cont.

Request for Updated Freeway and Local Road Impact Study

The current traffic analysis does not adequately address the potential for freeway congestion along highways I-5 and 99 to divert traffic onto local roads such as Powerline Road and Garden Highway. During peak congestion, vehicles, including heavy trucks, often reroute through these roads to access I-80 or downtown Sacramento. With future developments such as 3 million square feet of commercial space at Metro Air Park, the Watt EV project, Sacramento Airport expansion, Airport South Industrial Project, and the Upper Westside development, freeway congestion and traffic rerouting will worsen significantly and were not adequately modeled in the 2022 traffic study. 31-4

Recommendation: A revised comprehensive freeway impact study should be commissioned to evaluate the rerouting effects during peak traffic times. The study should assess how increased traffic from these developments will impact Powerline Road and Garden Highway and provide mitigation measures to prevent traffic volumes from exceeding road capacity. It is critical to address these freeway impacts before development moves forward.

Sand Cove Park and Beach – Environmental Impact on Salmon Population

Sand Cove Park, located at 2005 Garden Highway, will likely experience a sharp increase in visitors due to the 25,000 new residents joining the Upper Westside community. The EIR fails to address how this increased activity will impact the park's resources, such as parking, trash management, and safety, as well as the environmental impact on the Sacramento River and its protected salmon populations.

The Sacramento River is home to several protected salmon species under federal and state regulations. Increased human access to the river through the park could lead to pollution, illegal fishing, and habitat disruption, potentially harming these vulnerable species. 31-5

Recommendation: I urge the County to conduct a thorough study on the expected increase in visitors to Sand Cove Park, other riverside beach access areas, and its impact on the river’s salmon population. This study should also include a plan for increased funding for trash management, parking, and enforcement of fishing regulations to protect the ecosystem. The potential harm to native fish populations due to increased human activity needs to be fully assessed and mitigated.

Class 1 Bike Path on Garden Highway Setback Levee

The proposed Class 1 bike path along the Garden Highway setback levee raises concerns. A Class 1 bike path must meet specific standards, such as providing an 8-12 foot wide paved right-of-way for exclusive bicycle and pedestrian use, with a 2-foot shoulder on each side. 31-6

However, the Draft EIR lacks details on funding, the construction timeline, and coordination with the Central Valley Flood Protection Board and the U.S. Army Corps of Engineers to remove existing barriers like power poles and steel barriers.

Recommendation: The County should require a fully developed plan for the Class 1 bike path, detailing how it will meet Sacramento County's design standards. This plan must include specific funding sources and commitments from the Central Valley Flood Protection Board and the U.S. Army Corps of Engineers to remove existing obstacles. Additionally, the timeline for the bike path's construction should align with the overall development project to ensure that it is built in a timely manner.

31-6 cont.

Safety Concerns for Pedestrians and Residents

The increased traffic, particularly from large commercial vehicles (over 7 tons) that the project will bring, will pose significant safety risks to pedestrians, cyclists, and local residents along Garden Highway, Powerline Road, and West Del Paso Road. These roads are currently not suitable for high-traffic volumes, and the narrow widths, lack of proper shoulders, and deteriorating conditions make them dangerous for both motorists and non-motorists.

The Draft EIR acknowledges that operational deficiencies and potential safety issues at key intersections will remain significant and unavoidable, even with proposed mitigation measures. However, the plan does not provide adequate detail on how safety improvements will be implemented or who will fund these measures.

Recommendation: I urge the County to require the developer to provide detailed safety mitigation measures, including specific funding commitments and timelines for road widening, signage upgrades, and pedestrian infrastructure. Additionally, there should be traffic calming measures to slow down vehicles and protect non-motorists.

31-7

Impact on Emergency Response Times

The increased traffic and congestion from this development will also affect emergency response times. Garden Highway is a critical access route for emergency services, and increased congestion could significantly delay response times for fire, medical, and law enforcement services. The relocation of the primary fire station that serves the area compounds this concern.

Recommendation: The County should require an updated traffic study that addresses emergency vehicle access and response times under increased traffic conditions. This analysis should ensure that emergency services can maintain current response times, particularly during peak congestion periods.

31-8

Quality of Life and Long-Term Impacts

The projected traffic increases will not only affect road safety and emergency services but will also significantly reduce the quality of life for existing residents. Increased noise levels, air pollution, and the constant flow of large vehicles will make the area less livable and more hazardous for residents. The lack of current infrastructure to support this level of development will worsen congestion, leading to longer commute times and decreased property values.

Recommendation: The County should require a more current and detailed transportation study that takes into account post-pandemic traffic conditions, and the project should be delayed until all necessary infrastructure improvements are fully funded and approved. Additionally, any future development should include provisions for mitigating long-term impacts on air quality, noise, and local traffic congestion.

31-9

Conclusion

In conclusion, the Upper Westside Specific Plan, as currently proposed, will have severe and unavoidable impacts on traffic, safety, emergency services, and the overall quality of life for existing residents. These issues are not adequately addressed in the Draft EIR, and there is a clear need for more comprehensive planning and coordination before this project can proceed.

I respectfully urge the Board of Supervisors to delay approval of the project until the following conditions are met:

1. Completion of a fully funded and detailed plan for widening Garden Highway to County standards (12 feet wide lanes with 6-foot shoulders) in coordination with the U.S. Army Corps of Engineers and the Central Valley Flood Protection Board.

2. Commissioning of a revised freeway impact study to analyze rerouting effects from post-pandemic traffic and nearby developments in the approval and development process, and their impacts on Powerline Road and Garden Highway.

3. Implementation of clear and specific safety measures for pedestrians, cyclists, and motorists, with funding commitments from the developer.

4. Completion of a current, updated urban road traffic study that takes into account post-pandemic traffic patterns and ensures that the roadways can handle the projected traffic volumes.

5. Coordination with emergency services to ensure that response times are not adversely affected by increased traffic and congestion.

31-10

6. A comprehensive study on the environmental impacts to Sand Cove Park and the Sacramento River to assess increased human activity's effects on the protected salmon population, with mitigation measures to address trash management, fishing regulations, and park infrastructure.

7. A fully developed plan for the proposed Class 1 bike path, detailing the design, funding sources, and agency commitments necessary to remove existing barriers.

31-10 cont.

Thank you for your consideration of these critical issues.

From: Angie S. <angiek.studios@gmail.com>
Sent: Sunday, October 13, 2024 1:45 PM
To: PER-CEQA <CEQA@saccounty.net>; Sac.Plan <sacplan@saccounty.gov>
Subject: Written Public Comment for: Upper West Side Specific Plan: PLNP2021-00177

Re: Upper West Side Specific Plan, **PLNP2021-00177**

To Whom It May Concern,

I am writing to express my strong opposition to the Upper Westside Specific Plan as currently proposed. While I recognize the need for urban development, the proposed project fails to adequately address the significant environmental concerns posed by its proximity to the Natomas Basin and Fisherman's Lake, critical habitats for several protected species, including the **Swainson's Hawk (Buteo swainsoni)** and the **Giant Garter Snake (Thamnophis gigas)**. Both species are listed as threatened under California and federal laws, and this project poses severe risks to their populations, as well as to the broader ecosystem of the region. 32-1

1. Inadequate Buffer Zones and Encroachment on Habitat

The proposed development plans to extend dangerously close to the boundaries of the Natomas Basin and Fisherman's Lake. For species like the Swainson's Hawk and the Giant Garter Snake, maintaining appropriate buffer zones is critical for minimizing disturbances. The Swainson's Hawk relies on open grasslands for nesting and foraging, and the close proximity of residential and commercial development will drastically reduce the available habitat and increase the risk of disturbance. Urban encroachment within **0.5 miles** of Swainson's Hawk nesting sites can lead to nest abandonment and population decline, yet the plan does not offer adequate setbacks from known nesting areas. 32-2

Similarly, the Giant Garter Snake depends on wetland habitats, and the project's proximity to these sensitive wetlands risks both habitat destruction and fragmentation. Current research indicates that this species requires extensive wetland corridors for foraging and migration, and buffer zones of at least **300 feet** from wetland edges are necessary to preserve this habitat. The Upper Westside Specific Plan fails to provide sufficient protection for these wetland areas, leading to potential habitat loss and further population declines. 32-3

2. Long-term Construction Disturbance and Habitat Degradation 32-4

The multi-year construction process associated with a development of this scale will have a prolonged and cumulative impact on the wildlife in and around Fisherman's Lake. Noise, light pollution, and physical disturbances caused by heavy machinery will disrupt the natural behaviors of both the Swainson's Hawk and Giant Garter Snake, particularly during critical periods such as nesting, foraging, and migration. Continuous construction activities may lead to nest abandonment for the hawk, and could displace or even kill Giant Garter Snakes during their active season. 32-4 cont.

3. Traffic Congestion and Infrastructure Strain

The DEIR acknowledges that the introduction of thousands of housing units and commercial space will increase traffic in the area, yet the mitigation strategies outlined in the report are insufficient to address the scale of the congestion that will follow. The surrounding freeway systems, including major interchanges, are already heavily trafficked, and the addition of this development will exacerbate an already strained infrastructure. Without significant upgrades to these systems and the development of alternative transportation solutions, traffic congestion will become a major quality-of-life issue for both existing and new residents. 32-5

The DEIR does not adequately account for the impact on nearby interchanges, particularly those connecting to the I-5 and I-80 corridors, which will experience heightened congestion as a direct result of this project. Further evaluation and traffic impact studies need to be conducted to provide a more realistic picture of how this development will affect commuting patterns and regional traffic flows. 32-6

4. Noise Pollution from Sacramento International Airport

The proximity of this development to Sacramento International Airport introduces a significant noise pollution risk that has not been fully addressed in the DEIR. The noise generated by airport traffic, including both passenger and cargo flights, will have detrimental effects on residents' health and quality of life, particularly in the absence of appropriate mitigation measures. 32-7

Despite recognition of noise as a potential issue, the DEIR does not offer robust solutions for how to mitigate airport noise for the thousands of new residents expected in the area. Sound insulation and other building standards need to be enforced to ensure that homes are adequately protected from constant aircraft noise. Additionally, establishing more comprehensive buffer zones between the airport and residential areas is critical. I urge Sacramento County to ensure that all possible measures to minimize noise pollution are fully considered and implemented before any further development takes place.

5. Recommendations

Given the numerous environmental risks posed by this project, I urge the County of Sacramento and all relevant stakeholders to: 32-8

- Increase the size of buffer zones to **at least 0.5 miles** for Swainson's Hawk nesting sites and **300 feet** for wetlands critical to the Giant Garter Snake.
- Conduct further studies on the long-term impacts of construction and post-construction habitat degradation on these sensitive species, and revise the 32-9

DEIR to reflect these findings.

- Implement stronger, locally-focused mitigation measures, including on-site habitat restoration and enhancements, rather than relying on off-site mitigation banks.
- Address the projected traffic impacts more comprehensively, focusing on the major freeways and interchanges affected by the new developments.
- Enforce soundproofing measures in buildings near the airport and implement larger buffer zones to mitigate the adverse effects of noise pollution.

In conclusion, the Upper Westside Specific Plan, as currently proposed, presents significant risks to the Swainson's Hawk, Giant Garter Snake, and other wildlife that depend on the habitats within and around Fisherman's Lake. The environmental impacts of this development are far-reaching and potentially irreversible. The plan also fails to provide sufficient solutions to the significant increases in traffic and noise pollution. For these reasons, I strongly urge you to reject this plan or substantially revise it to prioritize the protection of the sensitive ecosystems, mitigate traffic concerns, and implement robust noise pollution controls before proceeding.

Sincerely,

Angie Sawaya

32-9 cont.

32-10

32-11

32-12

32-13

Letter 33

From: Kaushal Sharma <kaushalsharma29264@gmail.com>
Sent: Thursday, October 17, 2024 2:10 PM
To: PER-CEQA <CEQA@saccounty.gov>
Subject: Comments & Concerns regarding the Upper Westside Specific Plan

---

Hello,

I am a Natomas resident and here are my concerns/comments regarding the Upper West Side Project.

1. Traffic: Since this development will tremendously increase the flow of traffic, what are the plans to overcome that congestion? 33-1

2. Environmental Impact: Are there any native species that will be impacted by the project? If so, how are you mitigating it? Aren't we decreasing the natural habitat for those species? 33-2

3. Flood Impact: Will this project decrease the area for groundwater recharge? Will the project increase the chance of flooding during a high water event? Will more impervious layers create high risk of flooding? 33-3

4. Wildlife Impact: This project will cause significant and long term impact on existing wildlife habitat. 33-4

Regards,
Kaushal
Natomas Resident

Letter 34

From:	Melissa Brown
To:	Clerk of the Board Public Email; SupervisorSerna
Cc:	Don Fraulob; Patrick Tully; GHCA Board
Subject:	Opposition to Upper Westside Plan
Date:	Monday, October 21, 2024 11:07:28 AM

Greetings,

Please accept this communication in opposition to the Upper Westside Plan**.** As a residents and homeowners of the Garden Highway for over 35 years, I have witnessed the gradual degradation of our neighborhood as a result of the levee project. The destruction of habitat is quite apparent. And already, the increased traffic has resulted in accidents, killing of wildlife and pets. This is before the proposed massive increase in population, traffic, pollution, and pressure on public safety that will result from the Westside Plan. Moreover, the project's 20-30 year buildout schedule creates unacceptable noise, dust, air pollution and general area disruption over decades.The EIR fails to consider how current and future residents will be provided with safe mitigation during the decades of construction.

The following are specific comments that we ask you to address.

1. Public hearings on expanding the Urban Services Boundary are necessary. This project is outside the Urban Services Boundary. Before considering any development outside the Urban Services Boundary, the County should pause development applications outside the Urban Services Boundary and hold hearings on whether the Urban Services Boundary should be expanded.and consider the significant negative impacts on the environment and Sacramento County residents far beyond the Upper Westside project area. 34-1

2. This project's urban sprawl is unacceptable. . The County's 2030 General Plan, County zoning, the Urban Services Boundary, the Urban Policy Area, and SACOG's Blueprint for regional development all seek to avoid. The land use strategies and policies of the Sacramento County 2030 General Plan were designed to promote the efficient use of land, encourage economic vitality and reduce urban sprawl and its impacts, preserve habitat and open space, and protect local farming. The Urban Services Boundary was intended to implement that vision and promote orderly growth within the County. The proposed project violates the County's 2030 General Plan, County zoning, the Urban Services Boundary, the Urban Policy Area, and SACOG's Blueprint for regional development.There is no rationale is presented in the EIR, for approving this project outside the Urban Services Boundary. 34-2

3. This project harms the entire Sacramento community because of the loss of open space, and habitat and their associated recreational benefits; the loss of farmland; a significant increase in roadway dangers because of increased traffic on rural roads and increased congestion and conflicts at freeway on and off ramps which may not be able to be mitigated for some time; and a significant increase in area air pollution which has health consequences for the entire Sacramento area. **The EIR fails to recognize that the project reduces Sacramento recreational opportunities,** because increased traffic in the project area, would make it unsafe for individual cyclists and cycling clubs, as well as motorcycle clubs and antique or specialty car clubs that use Garden Highway for recreation**.** 34-3

4. The EIR falsely claims that the project does not violate habitat conservation plans. We agree with the Environmental Council of Sacramento that the proposed project does violate approved habitat 34-4

conservation plans and would lead to the permanent destruction of open space, habitat and wildlife. 34-4 cont.

5. The EIR fails to identify that river corridors are rare and valuable resources to residents of any community, and are particularly valued by Sacramento County residents for recreation, open space, wildlife, and local farmland. The proposed project introduces permanent harms by urbanizing a river corridor, putting urban activity within about 700 feet of Garden Highway and the river. River corridors need to be protected for current and future area residents**.** 34-5

6. The proposed project changes the existing one-mile river corridor protection buffer to 700 feet. Years ago, during County hearings on the Urban Services Boundary, many residents argued for a miles wide protection buffer for the Sacramento River corridor to protect recreation, open space, habitat and local farmland. The County settled on a one-mile buffer. This project would reduce that buffer to a wholly inadequate 700 feet in some areas, up to a maximum of one-half mile. 34-6

7. The proposed project would result in the significant and permanent loss of open space, habitat, already diminished local farmland, and floodplain protections. Once these community resources are gone, they are gone forever. 34-7

8. Mitigation for loss of farmland, wildlife and wildlife habitat would most likely occur beyond the Sacramento area, depriving Sacramento County residents of those benefits. The project applicant says loss of farmland, wildlife, and wildlife habitat would be mitigated outside the Natomas Basin. People in Sacramento value and find benefit in farmland, wildlife, and the open space that serves as wildlife habitat. **The EIR fails to identify the communitywide loss of farmland, wildlife and wildlife habitat resources as community assets.** If the project is approved farmland and wildlife mitigations should be required within the Natomas basin where those resources would continue to benefit community residents. 34-8

9. The EIR fails to identify that the proposed project could result in a total loss of project area farmland. Most of the project area is currently farmland that would be converted to urban uses. In the past 10 years Sacramento has lost more than 14,000 acres of farmland. This project could result in the permanent loss of another 1500 acres or more of high-value, productive local farmland. The project applicant says 534 acres of farmland would remain, but about 130 acres of that is intended as buffer land that will not be useable for farming. The remaining 400 acres of farmland is a long narrow space (some just 700 feet wide), and just 30 to 50 feet from potential urban conflicts, which may make the remaining farmland impractical to use for commercial farming.

The recent pandemic made clear that farmland is important community infrastructure. **The EIR fails to address the loss of area farmland as a community food resource** when there are disruptions to the food distribution system. 34-9

10. The EIR fails to identify that the proposed project could reduce existing floodplain protection. Around the United States, communities are starting to reserve land near waterways to use as open space for flood protection This project puts housing in a floodplain close to the river. While the new Natomas levee is expected to provide 200-year flood protection, climate change increases the chance of extreme flooding. Recent flooding in Asheville, North Carolina is proof of that. Current open space and farmland near the river provides urban areas with an additional level of flood protection. The proposed project would eliminate this protection. 34-10

11. This project has an unacceptably long list of significant and unavoidable impacts, many that are harmful, permanent, and cannot be mitigated, including unplanned growth, urbanization of a rural area, increased traffic and roadway hazards, increased air pollution, increased noise, loss of wildlife, loss of habitat, loss of productive farmland, and the permanent loss of an important landscape for indigenous communities of Sacramento County. 34-11

20. The project significantly and unacceptably increases air pollution, possibly exceeding thresholds of significance for everyone, and posing serious health risks, including an increased risk of cancer. In addition, operation of the proposed project would significantly conflict with and obstruct implementation of the Sacramento Metropolitan Air Quality Management District air quality improvement efforts. 34-12

13. Sacramento does need affordable housing, but **the EIR fails to note that this project makes no commitment to a specific number of very affordable, affordable, and missing middle housing (duplexes, etc.) units** or a specific percentage of affordable housing units. In addition, the buildout of this project will take 20-30 years, and the first phase will take 7 years. So, there would not be housing from this project for many years. If the project is approved it should have specific affordable housing requirements, with a high percentage of affordable housing units in each housing development. 34-13

14. **The EIR fails to adequately address the severe and dangerous impacts project traffic would have on Garden Highway** and existing Garden Highway users. The EIR suggests the project could add 4,000 trips a day to Garden Highway. Garden Highway is a rural 2-lane, undivided road. Garden Highway is an elevated roadway on top of a levee, so widening is not feasible. Garden Highway is half the width it should be for traffic safety. It has blind curves, no shoulders and no guard rails. The project EIR emphasized concerns about traffic safety, including hazardous conditions at Garden Highway intersections. However, the EIR fully failed to address the greatest safety issue on Garden Highway, which is the mixed use of the road by personal vehicles, semitrucks, agricultural equipment, cars pulling boats, golf carts, individual and groups of cyclists, pedestrians, and wildlife, any of which can enter the roadway unexpectedly from farm roads, driveways, and the riverbank. Adding traffic to Garden Highway is unacceptably dangerous. If the project is approved, a new traffic circulation plan should be required and agreed to by the Garden Highway Community Association, that discourages project vehicle traffic on Garden Highway. 34-14

15. The EIR fails to adequately address the impacts from a proposed stadium, which would be close to residences all around the project, including Garden Highway. Stadium traffic, noise, and light do not belong in/near residential areas. Stadium noise can travel miles. County and City Code Enforcement offices and Sacramento stadium operators can confirm stadium conflicts with residential areas. Any stadium should be miles from any residences. We already experience **a**mplified noise, travelling miles with concert events such as Aftershock and the CHP Firing Range across the river in West Sacramento. If the project is approved, no amplified sound should be permitted (except at school sites for emergencies). 34-15

The EIR notes that nighttime lighting would have a permanent impact on the area. But **the EIR fails to adequately address the harmful impacts of nighttime lighting on human health and on wildlife**, including migratory birds using the Pacific Flyway. **The EIR fails to provide adequate light mitigations for humans and wildlife.** If the project is approved, there should be a minimum one-half mile buffer between the project and Garden Highway that includes a minimum 100 foot wide densely planted tree buffer adjacent to the project. The tree buffer must include tall native evergreen trees planted at the beginning of project construction. 34-16

16. The EIR fails to adequately address that project related air pollution and its resulting serious health impacts, as well as construction dust, could be more severe on Garden Highway because of the prevailing wind that blows toward Garden Highway. 34-17

We trust you will carefully consider the negative impact this project will have on our community and reject efforts to greenlight the project until these and other issues are resolved. Those of us in the community are living through the years long levee improvement project which has had significant and negative impact on our well-being. The Westside project adds decades to the disruption of our lives and environment.

Sincerely,

Don Fraulon and Melissa Brown

2517 Garden Highway

Sacramento, CA 95822

County Planning Commission:

The following items are my comments for the County Planning Commission 21 Oct meeting, agenda item 3 (Upper Westside Specific Plan) and for the UWSP DEIR:

1. Agricultural Resources: The loss of local farmland and local produce (1805 acres) is very significant and irreplaceable. Mitigation Measure AG-1 (replacing on a 1:1 ratio) does not guarantee local farmland will be replaced "locally", with similar "prime soil", or even be actively farmed. Does the developer plan on buying currently unused "prime soil" land locally (1:1) and pay farmers to ensure it is actively farmed as it is today? 35-1

2. Cultural Resources: The land planning on being developed in the UWSP was originally part of the watershed for the Sacramento River before the levee was built and was a known area of historical tribal activity and burial site. When any construction on Garden Hwy is planned there is a requirement to investigate "on a parcel by parcel" basis for any historic-era archaeological resources even though all the land on Garden Hwy was elevated by dredging from the river and fill from elsewhere to build the aforementioned levee. Any development in the UWSP will have to excavate into the original watershed to the actual depth (and below) of these culturally significant areas, potentially causing irreparable harm. Is there a plan to investigate via Mitigation Measure CUL-2a and CUL-2b on a "plot by plot" basis based on the size of each new parcel (home/apartment) being built? 35-2

3. Noise: The increased traffic noise on Garden Hwy (and other previously low-use roads) will be substantially increased according to the UWSP DEIR. Speed reductions have been tried before but have not been effective and there is no room for any kind of noise wall / barrier. Other than "rubberized asphalt" how does the developer plan on reducing this new, unacceptable noise? The plan proposal of a stadium in the flat geometry of the previous farm land would greatly increase the noise levels as it travels unhindered across the new project. 35-3

4. Population and Housing: This project envisions population density equivalent to the most crowded parts of New York City of ~18,000 people per sq mile (taking into account most of the housing will be within 1 sq mile), with no real mass transit and a “job geography” that requires most people to drive. The DEIR states they believe a significant portion of residents will work in the project footprint and walk, bike, Uber, or carpool - but that does not reflect the reality of life in California. Directly from page 15 of the agenda proposal, the proposed UWSP "is ultimately inconsistent with SACOG plans, and thus would be considered to directly induce substantial unplanned population growth in the region." This in itself is reason enough to stop this ill-conceived project. The SACOG Blueprint was developed for a reason, stick to it. The County’s Urban Services Boundary document says, “The County shall not expand the Urban Service Boundary unless there is inadequate vacant land within the USB.” There is adequate vacancy inside the Urban Services Boundary for the number of housing units and commercial space the project proposes. Before considering this project, I urge you to hold public hearings on expanding the Urban Services Boundary if truly deemed necessary. 35-4

5. Transportation: The proposed addition of substantial traffic to an already bottlenecked I-5/I-80 via the already sub-par and "landlocked" West El Camino interchange is the Achilles heel of 35-5

this entire project. Based on their “Traffic Conceptual Feasibility Analysis“, this project is already not feasible. It shows going from 16,000 daily traffic on the West El Camino / I-80 interchange (which is already gridlocked at certain times of day) to 69,000 with a LOS (Level of Service) of “F”. Does this even account for all the new housing recently built to the east of the interchange? The DEIR envisions West El Camino being enlarged to 6 lanes (+ bike, pedestrian). This would also require increasing the width of the on/off ramps to 2 lanes, which there does not appear to be room for based on development already completed surrounding the interchange. Furthermore, what is the point of increasing the capacity of an interchange to a frequently gridlocked freeway that can't handle that capacity? All this development would exacerbate the use of surface roads to find alternate access to freeways away from the gridlock. The UWSP DEIR states on page 22-67 that traffic on Garden Hwy from Powerline to San Juan would double from 3300-4700 ADT to 7000-9500 ADT. Many commuters continue down Garden Hwy south of San Juan and thus I believe the additional traffic would constitute all of Garden Hwy from Powerline Rd to the I-5 interchange (near Chevy's restaurant). This is especially so considering all the proposed traffic to Garden Hwy from the new entrances (Radio Rd, Farm Rd [renamed Street 9 since no Farms], and Brytle Bend Rd [by I-80 bridge]) that the UWSP proposes. The DEIR states this volume exceeding 6000 ADT would necessitate a widening of Garden Hwy to conform with current County design standards. This widening could possibly have occurred when the adjacent levee was built in the last 10 years, but the County did not fund it and USACE would not approve it. The USACE has very strict levee guidelines and they would not authorize the new power poles to extend into the new widened levee "foot print" past where they currently are. Hundreds of these poles were removed and replaced in the last 10 years for the widened levee, and without removing and replacing them again (which the USACE won't allow) there is no room to upgrade Garden Hwy to the required County standards. The DEIR also states many of their other "required" transportation mitigation strategies require approval from other various agencies outside of County jurisdiction. Does the County plan on approving the UWSP before approval of all required agencies is assured? If this plan is approved, I believe we are setting ourselves up for Los Angeles style gridlock on our decidedly smaller Sacramento roads.

35-5 cont.

Unless the aforementioned issues can be resolved and a feasible design for the projected exponential traffic increase can be proven and paid for, any further time and money spent on this project is unwarranted.

Thank you for your time,

Arthur Gibson Howell
Natomas Resident

Letter 36

From:	2wingdam33@gmail.com
To:	Clerk of the Board Public Email
Cc:	SupervisorSerna
Subject:	Upper Westside Development
Date:	Monday, October 21, 2024 10:42:06 AM

October 21, 2024
To: Sacramento County Planning Commissioners (BoardClerk@saccounty.gov)
From: Christine Olsen, Garden Highway, Sacramento County
Subject: Upper Westside Development Plan

Hundreds of Sacramento residents, interest groups, experts, and government agencies have come together repeatedly, over many years, and spent thousands of hours in workshops and hearings to tell the County we don't want sprawl. We want planned growth that makes life better for everyone. The Upper Westside development is urban sprawl. 36-1

Sacramento County's 2030 General Plan was designed to promote the efficient use of land, encourage economic vitality and reduce urban sprawl and its impacts, preserve habitat and open space, and protect local farming. The Urban Services Boundary was intended to implement that vision and promote orderly growth within the County. The Upper Westside project unnecessarily violates those County plans as well as the Urban Policy Area, County zoning and other County codes, SACOG's Blueprint for regional development, and agreed upon habit conservation plans. 36-2

On behalf of all the Sacramento County residents who worked to ensure the countywide benefits of planned growth, you are urged to pause consideration of any projects outside the Urban Services Boundary and hold public hearings on whether the Urban Services Boundary should be expanded. If one project is approved beyond the Urban Services Boundary, other developments will surely follow, and the Urban Services Boundary will no longer function as intended to preserve open space, habitat and prime farmland, or to encourage infill development. Changing the Urban Services Boundary will have irreparable negative impacts on the County's environment, and on Sacramento County residents far beyond the Upper Westside project. 36-3

Getting planning right ensures a community we love to live in and a community that works for everyone. The Upper Westside project is the spawl we all want to avoid. The County made a commitment to the people of Sacramento that the County would not expand the Urban Service Boundary unless there was inadequate vacant land within the USB to accommodate the demand for urban uses. There is, today, more than ample land within the Urban Services Boundary for the number of housing units and the amount of commercial space the Upper Westside Project proposes. 36-4

Allowing development outside the Urban Services Boundary harms the Sacramento community outside and inside the Urban Services Boundary. An important achievement of infill development is that it not only advantages residents inside the new development, it adds vitality and benefits to the nearby community, maximizes the cost-efficiency of urban services such as transit, and reduces environmental impacts associated with urban sprawl. The Upper Westside applicant may have no interest in infill development and that is their prerogative, but their proposed project outside the Urban Services Boundary is unnecessary and harmful far beyond the project area. 36-5

If the County does permit development outside the Urban Services Boundary, please at least protect a minimum one-mile-wide river corridor. River corridors are unique and highly 36-6

valued by Sacramentans for recreation, for open space that provides a respite from urban environments, for wildlife and unique wildlife habitats and corridors, for prime farmland, for flood protection buffers, and as important tribal cultural landscapes. 36-6 cont.

With regard to the Upper Westside EIR, the EIR is fundamentally flawed and should be rejected. EIR's are intended, by law, to present the public and decisionmakers with factual, evidence-based information about a project's potential impacts. The Upper Westside EIR identifies changes the project applicant is seeking to the County's 2030 General Plan, County zoning, to the Urban Services Boundary, and to the Urban Policy Area, among others. Then, throughout the EIR, the EIR makes false claims that the project does not conflict with County land use policies. For example, under Agricultural Resources, the EIR says, "the proposed UWSP would not conflict with existing agricultural use and zoning," That is profoundly untrue. The project site is mostly zoned and used for agriculture and would be rezoned for urban uses. The project may totally wipe out local farming because the remaining 400 acres that could be used for farming is a long narrow space (some just 700 feet wide), and just 30 to 50 feet from urban conflicts, which may make the remaining farmland impractical for commercial farming. 36-7

The EIR says the proposed project would not conflict with existing habitat conservation plans. That is also untrue as detailed by the Environmental Council of Sacramento. 36-8

Under Land Use, the EIR says, "the proposed UWSP would not conflict with Sacramento County's Land Use Plans," despite the long list of County land use plans, policies and codes that the project seeks to change. Under Growth Inducement impacts, no rationale is presented for approving urban development outside the Urban Services Boundary and the EIR completely fails to address the growth inducement impacts due to the project applicant's requested changes to County plans, policies and codes. Developers have a right to spin the truth in their communication with Planning Commissioners and County Supervisors, but deceit and spin has no place in an EIR. 36-9

More detailed EIR comments will be submitted to the County. Here I want to highlight serious impacts the project would have on Garden Highway, where I live. The proposed project would come within 700 feet of Garden Highway. The EIR suggests the Upper Westside project could add 4,000 vehicle trips a day to Garden Highway. Intersection improvements on Garden Highway are discussed in the EIR, but there is no discussion of traffic safety impacts on the Garden Highway roadway. Garden Highway is a rural 2-lane, undivided and elevated roadway. Garden Highway is half the width it should be for traffic safety. It has blind curves, no shoulders and no guard rails. The greatest traffic safety issue on Garden Highway is the mixed use of the roadway by personal vehicles, semitrucks, agricultural equipment, cars pulling boats, golf carts, individual and groups of cyclists, pedestrians, and wildlife, any of which can enter the roadway unexpectedly from farm roads, driveways, and the riverbank. Adding traffic to Garden Highway has life safety consequences and should be rejected as unnecessary and too dangerous. 36-10

The EIR does not identify or suggest mitigations that might reduce urban-rural conflicts for a project like Upper Westside and a rural residential area such as Garden Highway. The project proposes a stadium close to residences all around the project, including Garden Highway. Stadium traffic, noise, and light do not belong in or near residential areas. Stadium noise can travel miles. County and City Code Enforcement offices and Sacramento stadium operators can confirm stadium conflicts with residential areas. 36-11

Traffic and noise generating land uses, such as schools and an outdoor pavilion, should be located close to major roadways and commercial uses to reduce all residential impacts. Amplified sound should be prohibited in all residential areas. In the past, developers and the County have determined that amplified sound can be regulated to minimize impacts. That has proven to be untrue. Over time, sound equipment and the location of speakers 36-12

can change and noise makers like bull horns can be introduced, resulting in uncontrolled noise that can easily travel more than 2 miles (based on real life experience). The EIR fails to address impacts from putting urban development within 700 feet of rural residential zoning on Garden Highway and fails to identify mitigations such as requiring that project construction begin closest to existing urban uses, reaching rural areas last.

36-12 cont.

The EIR says nighttime lighting is an impact, but fails to address the harmful impacts of nighttime lighting on human health and on wildlife, including migratory birds using the Pacific Flyway. And the EIR fails to identify possible light mitigations, such as establishing a minimum one-half mile setback between the project and any rural areas (i.e. Garden Highway), with the setback to include a minimum 100-foot-wide densely planted tree buffer of tall native evergreen trees at the western project boundary, with the setback established and the tree buffer installed at the beginning of project construction.

36-13

The proposed Upper West project is unnecessary and harmful. The EIR fails to honestly present impacts from changing County plans, policies and codes. The EIR highlights an unacceptably long list of significant, harmful and unavoidable impacts countywide that cannot be mitigated, including unplanned growth, urbanization of a rural area and a river corridor, increased costs for taxpayers and ratepayers because of the unplanned extension of urban services, increased traffic and roadway hazards, increased air pollution, loss of wildlife, loss of habitat, loss of productive farmland, and the permanent loss of an important landscape for indigenous communities of Sacramento County.

36-14

For the benefit of current and future Sacramento County residents, the County should reject all development outside the Urban Services Boundary, including the Upper Westside project. What is the point of urban development if a project like Upper Westside can violate so many County plans and policies and still be approved.

36-15

From: Amreen Gill <Amreen.X.Gill@kp.org>
Sent: Tuesday, October 22, 2024 1:05 PM
To: PER-CEQA <CEQA@saccounty.gov>
Subject: Upper Westside Project - In support

Hi there,

My name is Amreen Gill and I am a homeowner in Westshore and have been here since 2020. We are so excited about this project and the tremendous value that it will bring to our community. I listened to the public comments that were made yesterday and realized that the majority of those opposing this project are the elderly population who are not ready for change. The voices from our younger generation are really what we should be listening to as this project will probably take about 10-20 years to complete and will be the population frequenting this location.

As a new younger family with a toddler, we are so excited to hear about the schools, parks and housing developments this project will bring. Retail structure in this area would be amazing. It's difficult to find things to do in Natomas so we often find ourselves visiting downtown Sacramento or Roseville for entertainment. We would love to put our money spent back into our own community. We would fully support local business and want to be proud of our community aesthetics and show our friends the beautiful Westside canal and Town Center.

37-1

The infrastructure should be addressed including roadways to support this level of traffic and the levees to prevent flooding. As long as there are solutions for these issues, we are in full support of the Upper Westside Project.

37-2

Thank you so much,
Amreen Gill PA-C. MPH

Letter 38

From: Harriet Steiner <steinerstern@gmail.com>
Sent: Thursday, October 24, 2024 8:47 PM
To: PER-CEQA <CEQA@saccounty.gov>
Subject: Upper Westside Specific Plan and DEIR Comments

I am a resident of Natomas and would like to make the following comments on the DEIR and the Upper Westside Project, in addition to the comments I made at the Planning Commission and at the CPAC.

First, to the best of my knowledge, the DEIR does not analyze the impact of conversion of agricultural lands and conservation lands by this project because it is located outside of the Urban Services Boundary. In addition , there are other projects that also want to develop that are located outside of the Urban Services Boundary , including Airport South Industrial and Grand Park.. All of these developments are inconsistent with existing and long established policies of the County, its general plan; the City of Sacramento and the Natomas Basin Plan. All of these projects need to be analyzed together for their cumulative impact on agriculture, wildlife conservation, the Pacific Flyway, air quality, flooding and traffic. None of these projects should proceed until a separate EIR on modification of the Urban Services Boundaries and the County's General plan are analyzed and the the County has made a decision whether to proceed with any changes to the Urban Services Boundary and the General Plan. Taking any one of these projects separately will not disclose the full cumulative impacts of these projects and will result in piecemeal analysis that underestimates the impact of urbanization outside of the Urban Services Boundaries. 38-1

The DEIR also needs to analyze whether the factual bases for any of the findings in LU-127 can be made. If analyzed it is unlikely that the findings can be made and the Project(s) will then have, at a minimum , additional unavoidable significant adverse impacts that have not yet been disclosed. This analysis could warrant recirculation of the DEIR. 38-2

The DEIR should also analyze the impact of this Project on the Natomas Basin Habitat Conservation Plan and its ability to meet its goals and the goals of the HCP permits and the County's Climate Action Plans. Further, the County has not met the goals of the 30 by 30 Executive Order. Conversion of the land within the Upper Westside project, alone and with the other proposed projects will increase conversion of land to urban uses, could result in urban sprawl, and premature conversion of agricultural lands while still leaving un or underdeveloped lands in the urban areas. Thses facts will result in more unavoidable impacts not yet disclosed in the DEIR. 38-3

To the extent that the Project proposes to mitigate the loss of over 2000 across of farmland with strips of land along the inner land side of the levee, this proposal has not been adequately 38-4

anayzed. The DEIR should analyze whether this land, in the after condition, can be feasibly and economically farmed. If not, then this mitigation land is not feasible and the applicants should be required to provide land that can be farmed. If not, then there should be an alternative plan for the lands and that alternative should be analyzed in the DEIR. In the alternative, the Project should be denied because of the conversion of agricultural lands not needed for the next 20 years of more for urban uses. (See SACOG land estimate for housing referenced above.)

38-4 cont.

The DEIR should analyze the impacts of flooding in the Natomas area if the Upper Westside lands are developed and paved. Sacramento has been lucky that it has not had a major flooding event since the 1986 and 1994 floods. However, regional floods will occur in the future. More that shoring up the levees in needed to be ready for the flooding that is surely coming. We should take climate change, the significant changes to the wildfire season and the lessons of Hurricanes Helene and Milton, among others, for the increased risk of back to back storms, to analyze and determine the flooding risks associated with urbanization of thousands of acres of farmland. Included in that analysis should be work on how saturated the lands within the Natomas Basin are now, their ability to absorb more drainage and the added risks to the developed areas.

38-5

The DEIR should also analyze the impact of development of the Upper Westside project in the County as opposed to the City. Existing policies call for development of urban lands in cities. Here, in Natomas the City provides all urban services, is responsible to the existing roads, for flooding and utilities. If the County moves forward, all new services must be built and maintained, such as were and water services. The impacts of Upper West side will all be felt in the City and there is currently no plan to pay/mitigate the traffic, air quality, aesthetics and other impacts on the city and its residents. Further, annexation to the City should be required as it is inappropriate to have neighbors some in the City and others in this new county area having different obligations for maintenance and public services and structures. The DEIR should analyze and consider the impacts of having this large project developed in the County and should look at the impacts of other projects built in the county that are adjacent to urban lands in the City and whether the past difficulties or servicing urban areas that are surrounded by city lands can be avoided or mitigated.

38-6

Lastly, the DEIR should be revised to review the traffic impacts of this proposed project on the existing roads in Natomas and on the Garden Highway. It is my understanding that the Garden Highway cannot be widened and is already overburdened with traffic. Similarly the roads in the South Natomas, all of which are inside the city, need to be considered and the impacts mitigated. In addition, the interchange at El Camino already appears to be at capacity. I-5 headed in both directions is often just gridlock. The Upper westside Project with a proposed a large shopping area, a community college and the housing will add significant traffic to this area that is already saturated with traffic. further, becuase this Project is not in the County or the City's general Plans for development the traffic generated is not included in any modeling nor are there any plans to provide additional infrastructure to offset the traffic impacts. The DEIR should do a deeper analysis including all the surface streets and the freeways and determine what mitigation is possible. If there is no feasible mitigation the county should deny this project.

38-7

While i fully understand that we have an affordable housing crisis, this project does not address affordable housing. If housing is the justification for this project, then the housing needs to actually provide the housing needed. As noted by SACOG, the region currently has 2.5 times the land needed for the next 20 years of housing growth. Therefore just providing single family and high end rental housing is not needed and does not warrant approving this project.

Please respond to these comments along with the many other comments received in a revised EIR. Given the depth and breadth of the comments, the DEIR should be recirculated.

38-8

Thank you for your consideration of these comments.

Harriet Steiner
2807 Rockaway Lane
Sacramento, CA 95835

I

Edward J. Costa (in pro per)
6929 Larkspur Avenue
Citrus Heights, CA 95610
916-599-2986
tedcosta@tedcosta.com

IN THE MATTER OF UPPER WEST SIDE E.I.R.

DATE: October 28, 2024

DECLARATION OF EDWARD J. COSTA

I Edward J. (Ted) Costa do declare:

1. I am a trustee of the Manuel Costa Trust which owns some 20 acres of property located at 3201 El Centro Rd.
2. The property was purchased by my uncle in 1917 from the Natomas Co. and passed down four generations.
3. On October 21, 2024, I testified before the county Plenning Commission. I told them that in my 83 years being associated and living on this property, I have never seen a Swanson Hawk on the property, and challenged the planning commission and county staff to tell me if they had ever seen a Swanson Hawk on the property. To this date no one has responded.
4. Some people from the audience spoke up and said they had seen Swanson Hawks on the Garden Highway---some one and a half miles away from my property. However, others who live on the Garder Highway, testified that the big trees a-long-side the river where the Swanson Hawks like to hang out were being cut down.

39-1

5. From 1966 to 1969 I worked for the Reclamation district 1000 where among other things, I operated the drag line that was used to clean out the canals. In so doing, I came across thousands of Giant Garden Snakes---all in the water. Knowing this and studding survey research at U.C. Davis, I seriously challenge the methodology used in counting Giant Garder Snakes. I will stop short of saying I have never seen a Giant Garder Snakes non the property, but, if so, no more than a couple, but only in the winter when the ground is wet. 39-2

I declare under penalty of perjury that the foregoing statements are true and correct, and I am aware that if I present any material matter as true which I know false, I may be subject to penalties under the penal code of the State of California.

Executed at Citrus Heights California this 28 day of October 2024

Edward J "Ted" Costa

October 28, 2024

TO: CEQA@saccounty.net

FROM: Christine Olsen, Garden Highway, Sacramento County

SUBJECT: Comments on the UWSP EIR

Issues Throughout the EIR

Falsehoods, Inaccuracies, Misrepresentations

EIR's are intended, by law, to present the public and decision-makers with factual, evidence-based, unbiased information about current circumstances and a project's potential impacts. The UWSP EIR throughout contains false, inaccurate, and misleading statements, raising questions about the truthfulness, completeness and accuracy of the entire EIR document. False statements must be deleted. Misleading statements must be clarified. The EIR does not meet legal requirements or serve the public or decision-makers if it is not reliably thorough and accurate.

The project applicant does not have the necessary entitlements to proceed with the project. The UWSP EIR identifies changes the project applicant is seeking to the County's 2030 General Plan policies, County zoning, to the Urban Services Boundary, and to the Urban Policy Area, among others. But throughout the EIR, the EIR makes false claims that the project does not conflict with County plans and policies. That is not true. If the UWSP project was already consistent with, and had no conflicts with County plans and policies, then the project would not be seeking amendments and other entitlements in order to be compliant.

Under Agricultural Resources, the EIR says, "the proposed UWSP would not conflict with existing agricultural use and zoning." That is untrue. The project site is mostly zoned and used for agriculture and would be rezoned for urban uses, a violation of County policy. Under Land Use, the EIR says, "the proposed UWSP would not conflict with Sacramento County's Land Use Plans." That is inaccurate. There is a long list of County land use plans, policies and codes that the UWSP project seeks to change in order for the project to comply with and not to be in conflict with County policies. 40-1

Under Growth Inducement impacts, the EIR completely fails to address growth inducement impacts directly due to the project applicant's requested changes to County plans, policies and codes.

The EIR is required by law to identify existing conditions and accurately state impacts from a proposed project. The current zoning for the project area is largely agricultural and has not yet changed. The EIR cannot legally assume a proposed project has entitlements it does not have, such as in the Agricultural Resources section where the EIR says, "Because the entitlements requested as components of the proposed UWSP would change the zoning to make it consistent with the proposal, the proposed UWSP would not conflict with zoning for agricultural use within the UWSP area." That statement is grossly inaccurate, violates the legal requirements for an EIR, and it and any similar assumptions in the EIR that the project applicant has entitlements that the project applicant does not have and is seeking, should be removed.

Statements in the EIR must be deleted that say or suggest the UWSP project complies with or is consistent with County land use plans, policies and codes when in fact the UWSP does not currently comply with those County policies and when in fact the UWSP is seeking to change those County policy in order to comply.

Any statement that the project agrees in principle with or agrees with objectives in County plans and policies must be restated to make clear that the project does not in fact comply with County plans and policies, and changes would be needed to County plans, policies and codes for the project to comply and not conflict with County policies.

Mitigation is not Preservation

Throughout the EIR, the County's preservation policies are inaccurately equated with mitigation. The County has policies to preserve habitat and farmland. To preserve means to keep as is, intact. If habitat and farmland that County policy seeks to preserve are lost to urbanization, then there is a significant impact that is not identified in the EIR. Mitigations attempt to replace the loss somewhere else, but that is very different than keeping what exists intact. If the UWSP project is approved, an impact is that the farmland and habitat County policies sought to protect is lost forever. Mitigation may lessen the impact of the environmental harm but does not change the fact that farmland and habitat is not preserved where it currently exists. If I accidentally destroyed a family heirloom you were preserving, I could mitigate the loss by paying you, but the loss would remain.

Impacts Not Identified

The County's stated General Plan, Urban Services Boundary, and Urban Policy Area policies are intended to reduce urban sprawl and its impacts, preserve habitat and open space, and protect local farming. The UWSP project would have significant environmental impacts that conflict with those policies. These impacts should be and are not fully stated in the EIR.

Mitigations Outside Sacramento

The EIR fails to state that when mitigations occur outside Sacramento, Sacramento residents lose the benefits of those resources in their community.

Tables-Charts

The EIR is intended to be a public information document with clearly presented information. As recommended in CEQA guidelines, graphics help decisionmakers and the public rapidly understand the documents. The UWSP EIR would greatly benefit from more charts and tables where existing conditions and proposed changes are easier to see and compare, such as for commercial and retail square footage discussed under Urban Decay, in sections on agricultural acreage, housing units and elsewhere in the EIR where there are presentations of a lot of numbers that should be presented in tables for easy comparison.

40-1 cont.

Comments Specific to EIR Sections

Aesthetics

- The EIR notes that nighttime lighting from the UWSP project would have a permanent impact in the area. But the EIR fails to adequately address the harmful impacts of nighttime lighting on human health and on wildlife, including migratory birds using the Pacific Flyway.

- The EIR fails to identify possible nighttime lighting mitigations, such as establishing a minimum one-half mile setback between the UWSP project and any rural areas (i.e. Garden Highway), with the setback to include a minimum 100-foot-wide densely planted tree buffer of tall native evergreen trees at the western project boundary, with the setback established and the tree buffer installed before the first stage of project construction.

Agricultural Resources

- The proposed UWSP project site is currently primarily farmland classified as prime farmland, farmland of statewide importance, unique farmland, and farmland of local importance. The EIR fails to state clearly that the UWSP project violates County policies that say the County shall protect these types of farmlands located outside of the Urban Services Boundary from the urban encroachment represented by the UWSP project.

- The UWSP is requesting a General Plan amendment to rezone prime farmland for urban use. The EIR fails to state clearly that the UWSP request conflicts with existing County policy which says the County shall not accept applications for General Plan amendments outside the Urban Services Boundary re-designating valuable farmland for urban use.

- The EIR fails to adequately assess impacts from changes the UWSP is proposing to County policies regarding farmland preservation.

- The EIR says, “the proposed UWSP would not conflict with existing agricultural use and zoning.” That is not true and must be deleted. The UWSP would conflict with existing agricultural use and zoning, turning farmland to urban use.

- The EIR says, “Because the entitlements requested as components of the proposed UWSP would change the zoning to make it consistent with the proposal, the proposed UWSP would not conflict with zoning for agricultural use within the UWSP area.” That statement is inaccurate, violates the legal requirements for an EIR, and should be removed. The project does not have requested entitlements. Project impacts must be assessed based on existing conditions.

- The EIR fails to make clear that County policy is focused on farmland rather than on land zoned for agriculture. Land zoned for agriculture may or may not be used for farming. The EIR should more clearly present the current number of acres available for farming, the number acres of farmland the UWSP project would rezone to urban uses, the number of acres of land available for farming if the project is approved, and the number of acres of farmland (land available for farming) that would be lost if the project is approved.

- The UWSP EIR gives the inaccurate impression that 534 acres of the UWSP would remain as farmland. That is not correct. The EIR must make a clear distinction between the acreage of land that can be farmed if the project is approved, and the acreage of agriculturally zoned open space land (buffer) that will not be used for farming.

- The EIR fails to identify that land in the UWSP area that would remain available for farming will be long and narrow, just 700 feet wide in some areas, bisected in 4 places by heavily trafficked project roads, and within 30-50 feet of UWSP urban activity conflicts, which together could make the remaining farmland impractical for any commercial farming. If that happened, it would mean the project would wipe out 100% of the farmland in that area – farmland County policy seeks to preserve.

- If County zoning has setback requirements between farming and urban activity, those setbacks should be clearly identified in the EIR. If the County does not have such setback requirements, the EIR team should contact an appropriate government agency or reputable nonprofit organization that has studied what setbacks should occur between farming and urban activity in order to avoid urban conflicts, and the findings of that research should be included in the EIR next to the proposed setback. The proposed setback of 30-50 feet, basically the width of a rural roadway, seems wholly inadequate.

- In considering impacts, the EIR fails to make clear that farmland provides multiple community benefits such as health benefits associated with open space, wildlife habitat, fresh food produced locally, as a food resource when there are disruptions to the food distribution system such as happened during the pandemic, and as a flood protection area between the Sacramento River and the Sacramento community.

40-1 cont.

Air Quality

- The EIR asserts, with no evidence, that the majority of employment related vehicle trips, and the pollution they create, will be to downtown Sacramento. It is wrong for the EIR to present VMT data as fact when it is not based on evidence. Focusing so much on VMT to downtown Sacramento serves to minimize air pollution generation data. The EIR should have considered VMT more realistically to multiple job centers. While downtown Sacramento is a job center, Sacramento County has more jobs than downtown, as noted in the EIR. Yolo County and Placer County are also job centers.

- The EIR fails to adequately address that project related air pollution and its resulting serious health impacts, as well as project construction dust, could be more severe on Garden Highway because of the prevailing wind that blows toward Garden Highway. Again, this impact could be partially mitigated by

establishing a minimum one-half mile setback between the UWSP project and any rural areas (i.e. Garden Highway), with the setback to include a minimum 100-foot-wide densely planted tree buffer of tall native evergreen trees at the western project boundary, with the setback established and the tree buffer installed before the first stage of project construction.

- The EIR fails to adequately address that project related air pollution and its resulting serious health impacts would directly impact children in UWSP area schools.

Biological Resources

- Sacramento County's 2030 General Plan and Urban Services Boundary explicitly state the purposes of the plans, in part, are to preserve habitat and open space. The UWSP project would violate those County goals. The EIR fails to state those violations clearly and fails to clearly and honestly identify impacts from the UWSP violation of those goals.

- Sacramento County policy says planning and development of new growth areas should be consistent with Sacramento County-adopted Habitat Conservation Plans and other efforts to preserve and protect natural resources. The UWSP project would put urban activity in a habitat conservation corridor in violation of County policy. The UWSP is not currently consistent with the Natomas Basin Habitat Conservation Plan and the Metro Airpark Habitat Conservation Plan. The UWSP conflicts with habitat conservation plans and conflicts with County policy are not clearly identified in the EIR and should be explicitly stated.

- The EIR fails to discuss the UWSP project impacts to the Sacramento River riparian area by putting urban development so close to the Sacramento River and its unique biological resources, habitat, and provision of a habitat corridor.

40-1 cont.

- Sacramento County policy is to actively plan to protect, as open space, areas of natural resource value, which may include but are not limited to wetlands preserves, riparian corridors, woodlands, and floodplains associated with riparian drainages. The EIR fails to point out that the UWSP project area is in the Sacramento River corridor, less than 1,000 feet from the Sacramento River. The EIR says, "No wetlands preserves, riparian corridors or floodplains associated with riparian drainages are present in the UWSP area so none will be affected by the project's development." That is incorrect. The farmland soils, wildlife and other biological resources present within the UWSP area are associated with proximity to the river and are part of the Sacramento River corridor.

- The UWSP EIR falsely equates the County's stated goals of habitat preservation with habitat mitigation. The EIR says the project's approach for habitat and biological resources present within the UWSP area is to provide compensatory mitigation. Mitigation is very different from the County's goal of preservation. Preservation means to keep as is, in place. Mitigation means to make a significant impact, such as loss of habitat, less severe. Making an environmental impact less severe still means there is an impact. The EIR should make clear the distinction between preservation and mitigation. The EIR should also make clear that even with compensatory mitigation, the UWSP project would still have a significant negative impact on existing area habitat and wildlife, and that loss would be permanent.

Hydrology and Water Quality

- Sacramento County policy is to actively plan to protect, as open space, areas of natural resource value, which may include but are not limited to riparian corridors and floodplains associated with riparian drainages. The EIR fails to point out that the UWSP project area is in the Sacramento River corridor, less than 1,000 feet from the Sacramento River. The EIR says, "No wetlands preserves, riparian corridors or floodplains associated with riparian drainages are present in the UWSP area so none will be affected by the project's development." That is incorrect. Farmland soils, wildlife and other biological resources, and tribal cultural resources present within the UWSP area are associated with proximity to the river and are part of the Sacramento River corridor. The EIR fails to provide this information.

- The EIR fails to identify that the proposed UWSP would put new urban development in the Sacramento River floodplain. In addition to exposing new populations to flooding, the impervious surfaces associated with urbanization increase flood risk beyond the project area. While the new Natomas levee is expected to provide 200-year flood protection from the Sacramento River, climate change increases the chance of extreme flooding. Recent flooding in Ashville, North Carolina is proof of that. Around the United States, communities are starting to reserve land near waterways to use as open space for flood protection. Current open space and farmland in the UWSP project area provides an additional level of community flood protection. The EIR fails to indicate that the proposed UWSP project would eliminate this community flood protection.

Land Use

Violations of County Plans and Policies

- Sacramento County's 2030 General Plan was intended to promote the efficient use of land, encourage economic vitality and reduce urban sprawl and its impacts, preserve habitat and open space, and protect local farming. The Urban Services Boundary was intended to implement that vision and promote orderly growth within the County. The EIR fails to state that the UWSP project violates the County's 2030 General Plan, County zoning, the Urban Services Boundary, the Urban Policy Area, and SACOG's Blueprint for regional development. The EIR fails to clearly and honestly identify impacts from the UWSP violation of those goals and fails to identify impacts from proposed changes to County policies.

- The EIR falsely says, "the proposed UWSP would not conflict with Sacramento County's Land Use Plans." That is not true. The UWSP violates the County's General Plan land use policies, as well as the Urban Services Boundary, the Urban Policy Area, and zoning policies. False statements do not belong in the EIR and should be removed.

40-1 cont.

- County policy says planning and development of new growth areas should be consistent with Sacramento County-adopted Habitat Conservation Plans and other plans and policies to preserve and protect natural resources within an existing community. The EIR then falsely says the UWSP proposes development that would be consistent with the County's growth management policies. The UWSP project violates current County General Plan, Urban Services Boundary and Urban Policy Area growth management policies. False statements must be removed from the EIR.

USB Violation

- The UWSP EIR does not present or discuss that Sacramento County has an Urban Services Boundary policy that says the County shall not expand the Urban Service Boundary unless there is inadequate vacant land within the USB to accommodate the projected 25-year demand for urban uses…" The EIR does not state clearly under Land Use that there is adequate vacancy inside the Urban Services Bounday for the number of housing units and commercial space the project proposes.

- The EIR offers no rationale for the County approving urban development outside the Urban Services Boundary.

- One of the goals of the Urban Services Boundary was to encourage infill development. Infill development advantages residents inside the new development and infill development adds vitality and benefits to the nearby community, maximizes the cost-efficiency of urban services such as transit, and reduces environmental impacts associated with urban sprawl. The EIR fails to discuss ways in which allowing development outside the Urban Services Boundary discourages infill development and disadvantages communities inside the Urban Services Boundary.

River Corridor Conflicts

- The UWSP project is within 1,000 feet of the Sacramento River. The UWSP's location in the river corridor should be but is never mentioned in the EIR. River corridors are unique land areas in a community,

providing rich habitat, habitat corridors, farmland, open space, important tribal cultural landscapes, and flood mitigation specifically associated with proximity to the river.

- River corridors are rare and valuable resources to residents of any community, and are particularly valued by residents throughout Sacramento County for the health benefits of open space as a respite from the urban environment, for the opportunity to see wildlife in their community, and for the benefits of locally grown food in soils enriched by centuries of river overflow. The loss of these river corridor benefits are not presented and discussed as impacts in the EIR and should be.

- Current Sacramento County policy has a goal to actively plan to protect, as open space, areas of natural resource value, which may include riparian corridors and floodplains associated with riparian drainages. The EIR fails to point out that the UWSP project area is in the Sacramento River corridor, less than 1,000 feet from the Sacramento River. The EIR says, "No wetlands preserves, riparian corridors or floodplains associated with riparian drainages are present in the UWSP area so none will be affected by the project's development." That is incorrect. False statements should be removed from the EIR. The farmland soils, wildlife and other biological resources, and tribal cultural resources present within the UWSP area are associated with proximity to the river and are part of the Sacramento River corridor.

- The UWSP EIR fails to identify impacts from locating UWSP urban development in a river corridor.

- The EIR fails to identify that river corridor degradation can only partially be mitigated in other river corridor areas. Loss of habitat corridor, loss of existing open space health benefits to local residents, loss of farmland and farm produce for Sacramentans in their community, loss of existing river overflow flood protection, and loss of a tribal cultural landscape will not be mitigated.

- The policies of the County's 2030 General Plan and the Urban Services Boundary protect a one-mile-wide river corridor, protecting river corridor habitat, farmland, tribal resources, and floodway overflow protection. The EIR fails to state that the UWSP would destroy those protections.

40-1 cont.

<u>New Urban-Rural Land Use Conflicts</u>

- Other than changing the aesthetics and rural character of the area, the EIR fails to address impacts from putting urban development within 700 feet of rural residential zoning, changing the expectations for area rural residents choosing to live in a rural residential zone (this is true for Garden Highway rural residential homeowners and homeowners on UWSP area farmland).

-The EIR should and does not identify feasible mitigations that might reduce urban-rural conflicts for a project like UWSP near rural residential areas like Garden Highway, such as requiring that the 20–30-year UWSP project construction begin closest to existing urban uses (i.e. near El Centro road), reaching rural areas last (i.e. Garden Highway), and this impact could be partially mitigated by establishing a minimum one-half mile setback between the UWSP project and any rural residential areas (i.e. Garden Highway), with the setback to include a minimum 100-foot-wide densely planted tree buffer of tall native evergreen trees at the western project boundary, with the setback established and the tree buffer installed before the first stage of project construction.

- If County zoning has setback requirements between rural residential zoning and urban activity, those setbacks should be clearly identified in the EIR. If the County does not have such setback requirements, the EIR team should contact an appropriate government agency or reputable nonprofit organization that has studied what setbacks should occur between rural residential zoning and urban activity in order to avoid conflicts, and the findings of that research should be included in the EIR next to the proposed setbacks.

Noise

- The EIR fails to adequately address the impacts from a proposed stadium, which would be close to residences in and all around the UWSP project area, including Garden Highway. Stadium traffic, noise,

and light do not belong in or near residential areas. Stadium noise can travel miles. County and City Code Enforcement offices and Sacramento stadium operators can confirm stadium conflicts with residential areas. Any stadium should be miles from any homes.

- The EIR fails to adequately address the impacts from amplified sound from the UWSP area, such as at the outdoor pavilion. Amplified sound should be prohibited in all residential areas. In the past, developers and the County have said that amplified sound can be regulated to minimize impacts. That has proven to be untrue. Over time, sound equipment and the location of speakers can change and noise makers like bull horns and portable sound systems can be introduced, resulting in uncontrolled noise that can travel more than 2 miles.

- The EIR fails to identify the health impacts of traffic noise, school and park noise, and amplified noise from the outdoor pavilion and stadium.

- The EIR fails to adequately address that project related noise, as well as project construction noise, could be serious impacts on Garden Highway residents because of the prevailing wind that carries sound toward Garden Highway.

Population and Housing

- The EIR should, and does not make clear that the UWSP has no commitment to a specific number or percentage of the type of housing Sacramento needs, including very affordable, affordable, missing middle duplexes and triplexes, senior housing and handicapped housing all located near transit.

- The EIR should and does not make clear that the UWSP has no commitment to including affordable housing as part of each housing development, so affordable housing is integrated in each phase of development, and not targeted for one area of the project, or built in the last phase of development in 20-30 years.

40-1 cont.

- The EIR should and does not make clear that the UWSP is unlikely to result in the development of any housing for at least 7 years (the projected time for construction of Phase 1). This project will not help with Sacramento's urgent housing needs.

Public Services and Recreation

- The EIR fails to mention that County policy says the County shall not provide urban services beyond the Urban Policy Area (UPA), because it is the intent of the County to focus investment of public resources on revitalization efforts within existing communities. The EIR fails to mention that the UWSP project violates this policy, and the EIR fails to identify impacts from the UWSP's violation of this policy.

- The EIR fails to indicate that the extension of public services to the project area is unanticipated and unplanned.

- The EIR fails to say the UWSP has no control over when some of the services and recreation areas would be available in the project area, which would, at least, increase vehicle trips to access services in other areas.

- The EIR fails to identify harms caused by the unplanned extension of public infrastructure and services to accommodate the UWSP outside the Urban Services Boundary and the Urban Policy Area, particularly the harms to the County's efforts to focus investment of public resources on revitalization efforts within existing communities.

Transportation

- The project EIR says traffic safety is a key consideration. However, the EIR fails to adequately address the severe and dangerous impacts UWSP traffic would have on the Garden Highway roadway and existing

Garden Highway roadway users. The EIR suggests the project could add 4,000 trips a day on Garden Highway. Garden Highway is a rural 2-lane, undivided, elevated roadway. Garden Highway is half the width it should be for traffic safety. It has blind curves, no shoulders and no guard rails. The greatest safety issue on Garden Highway, which the EIR fails to identify, is the mixed use of the road by personal vehicles, semitrucks, agricultural equipment, cars pulling boats, golf carts, individual and groups of cyclists, pedestrians, and wildlife, any of which can enter the roadway unexpectedly from farm roads, driveways, and the riverbank. Adding traffic to Garden Highway has life safety consequences which cannot be mitigated.

- The EIR fails to identify that a mitigation to serious Garden Highway traffic and other rural road safety impacts identified in the EIR is to reroute UWSP traffic to avoid and actively discourage UWSP traffic from using rural roads including Garden Highway.

- The EIR fails to identify that adding traffic to Garden Highway would change the physical safety characteristics and make recreational use of Garden Highway too dangerous for cyclists and for vehicle clubs such as antique car clubs and motorcycle groups, eliminating a valuable Sacramento recreational opportunity.

- The EIR fails to highlight that the UWSP would introduce freeway and rural roadway traffic hazards for Sacramentans for which the project applicant has no ability to compel or control mitigations. That could subject Sacramento roadway and freeway users to increased traffic safety hazards, potentially for many years.

- The EIR asserts, with no evidence, that most employment related vehicle trips will be to downtown Sacramento. It is wrong for the EIR to present VMT data as fact when it is not based on evidence. Focusing so much on VMT to downtown Sacramento serves to minimize VMT. The EIR should have considered VMT more realistically to multiple job centers. While downtown Sacramento is a job center, Sacramento County has more jobs than downtown, as noted in the EIR. Yolo County and Placer County are also job centers.

40-1 cont.

- The EIR fails to consider traffic impacts on the surrounding area from the UWSP stadium, outdoor pavilion, or schools.

- The EIR fails to suggest traffic mitigations such as locating UWSP traffic generating uses (e.g. stadium, outdoor pavilion or schools) near major roadways and commercial uses to reduce traffic dangers, congestion, noise and air pollution in residential areas.

- The EIR fails to mention that County policy says the County shall not provide urban services, such as road improvements and transit, beyond the Urban Policy Area (UPA), because it is the intent of the County to focus investment of public resources on revitalization efforts within existing communities. The EIR fails to present the impacts from the UWSP violation of this policy and the impacts from the changes to this policy proposed by the project applicant.

- The EIR fails to identify impacts caused by the unplanned extension of public infrastructure and services, such as transit and roadway improvements, to accommodate the UWSP outside the Urban Services Boundary and the Urban Policy Area, particularly the harms to the County's efforts to focus investment of public resources on revitalization efforts within existing communities.

Tribal Cultural Resources

- While the UWSP would have a holistic impact on the tribal cultural landscape, the EIR fails to identify priority sites for tribal resource protection within the UWSP area.

Utilities

- The EIR fails to state that the UWSP violates the County's Urban Services Boundary policy which says that the County shall maintain an Urban Services Boundary (USB) that defines the long-range plans (beyond twenty-five years) for urbanization and extension of public infrastructure and services. The EIR fails to identify impacts associated with this violation and UWSP impacts associated with proposed changes to the County's Urban Services Boundary policy.

- The EIR fails to mention that County policy says the County shall not provide urban services beyond the Urban Policy Area (UPA), because it is the intent of the County to focus investment of public resources on revitalization efforts within existing communities. The EIR fails to identify UWSP impacts associated with this violation and impacts associated with proposed changes to the County's Urban Policy Area policy.

- The EIR fails to identify harms caused by the unplanned extension of public infrastructure and services, such as utility services, to accommodate the UWSP outside the Urban Services Boundary and the Urban Policy Area, particularly the harms to the County's efforts to focus investment of public resources on revitalization within existing communities.

Other Resource Topics- Wildfire

- The EIR says the UWSP is outside an area where CalFire establishes fire hazard zones. Then the EIR makes the misleading statement that the project area is not in a fire hazard zone. It is wrong to say, and dishonest to leave the impression that the area has been assessed for fire hazard when it has not been assessed by CalFire or any other fire agency. The EIR should delete incorrect and misleading information and just say the area has not been assessed for wildfire risk and the wildfire risk is unknown.

- The EIR is also incorrect about area conditions that could contribute to a wildfire hazard. There is heavy wooded growth adjacent to the river, less than 1,000 feet from the project area, from Sacramento up into rural wildfire hazard areas in Butte County. There are also at different times of the year dried crops and hay bales on farmland on both the Yolo and Sacramento sides of the Sacramento river that could and have caught fire (hay bales can be seen in EIR photos). A wind driven fire could easily jump the river as it has jumped freeways. The 2017 Tubbs fire burned into the City of Santa Rosa where more than a dozen people lost their lives and more than 2500 homes and one Hilton Hotel were destroyed. Wildfire could happen in the project area.

Cumulative Impacts

- The UWSP projects a 20–30-year buildout. The EIR fails to address ongoing impacts from construction noise, dust, traffic, etc. on area residents over an extensive period of time during which time mitigations the project applicant does not control may not be available to diminish impacts on existing area residents and new project area residents.

Growth Inducement and Urban Decay

- The EIR fails to accurately identify the UWSP project as unplanned urban development. The UWSP is unplanned – not included or anticipated in the County's General Plan, or the Urban Services Boundary, or the SACOG Blueprint for regional development or plans for transit, regional roadway improvements, utility services extensions, or air quality improvement.

- In violation of CEQA, the EIR entirely fails to include in this section the long list of changes the UWSP project would require to County plans, policies, codes, etc., and the growth inducement impacts of changing those County plans and policies and codes.

- Sacramento County's 2030 General Plan and the County's Urban Services Boundary (USB) explicitly state that one of their purposes is to reduce unplanned urban development and its impacts outside the

40-1 cont.

Urban Services Boundary. The EIR fails to clearly state that the UWSP violates the County's policies to prevent urban sprawl.

- The EIR fails to clearly identify all growth inducement impacts from the UWSP's development outside the County's Urban Services Boundary.

- The EIR falsely says, "the proposed UWSP is consistent with Sacramento County General Plan Policy LU-120, which is intended to reduce impacts of many different types – such as growth inducement, unacceptable operating conditions on roadways, poor air quality, and lack of appropriate infrastructure." As stated in the EIR, the UWSP creates unacceptable operating conditions on roadways, poor air quality, currently lacks appropriate infrastructure, and in most cases the project applicant cannot compel, and does not control possible mitigations. False statements should be removed from the EIR.

- The EIR falsely claims the pressure for future development in the area would be reduced because of the need to show consistency with the County General Plan and to receive approval from the Sacramento County Board of Supervisors. Those impediments are not enough to stop the UWSP project applicant. Why would they stop other project applicants? The EIR does not say, and should say, that if the Sacramento County Board of Supervisors approves the project, other similar urban development projects may also be approved using the same criteria.

40-1 cont.

Letter 69

From: Alexandra Reagan <office@ecosacramento.net>
Sent: Thursday, October 3, 2024 10:05 AM
To: Clerk of the Board Public Email <BoardClerk@saccounty.gov>; PER-CEQA <CEQA@saccounty.gov>; Rallanka. Rochelle <rallankar@saccounty.gov>
Subject: Natomas CPAC Agenda Item #1, on October 3, 2024 - Upper Westside Specific Plan

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Dear Members of CPAC,

On behalf of the Environmental Council of Sacramento, I am submitting by way of this email our comments on Natomas CPAC Agenda Item #1, on October 3, 2024 - Upper Westside Specific Plan. Please see the attached letter and respond to this email to confirm its receipt.

Regards,

Alexandra Reagan (she/her)
Director of Operations
Environmental Council of Sacramento (ECOS)
P.O. Box 1526, Sacramento, CA, 95812
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October 3, 2024

Natomas Community Planning Advisory Council

Kyle Christopher, Chairperson
Don Keller
D.E. "Red" Banes
Jill Zito
Alice Montes, Vice Chairperson
Zack Clark
Mian Ali Ahmad Zia
Sent by email to BoardClerk@saccounty.gov

SUBJECT: Natomas CPAC Agenda Item #1, October 3, 2024 - Upper Westside Specific Plan

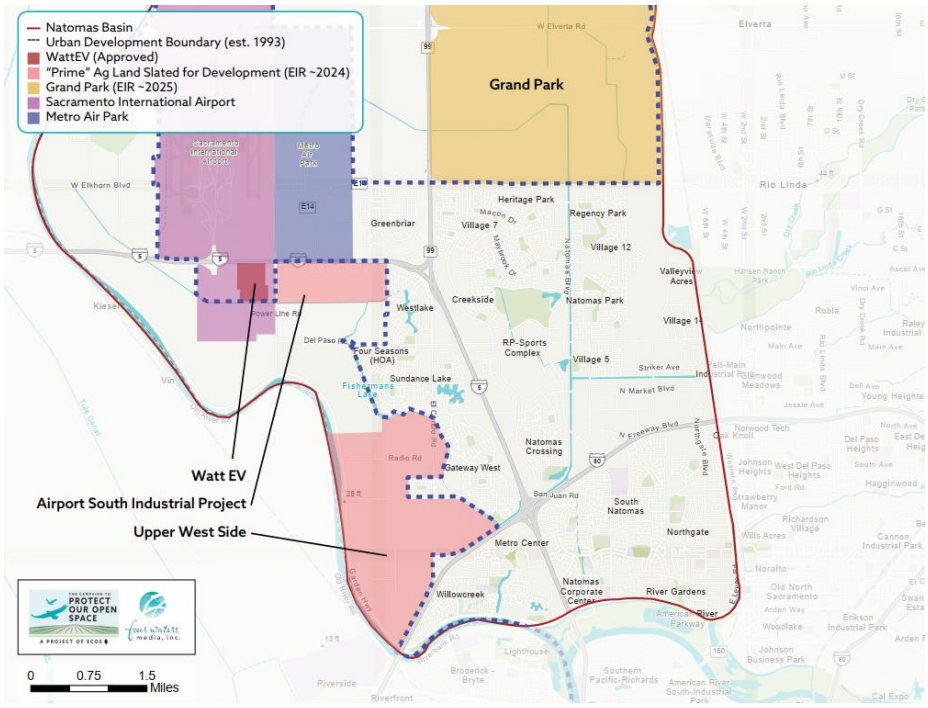
Dear Members of CPAC,

Thank you for serving on the Natomas Community Planning Advisory Council and taking on the responsibility of gathering community responses to proposed projects. The Environmental Council of Sacramento, which includes a number of Natomas residents, asks you to consider the following issues as you review the Upper Westside project and its Draft Environmental Impact Report.

1) **Consider all of the developments currently being proposed.** Review the Upper Westside in the context of the entire 8,000 acres across three projects now proposed for development in the Natomas Basin in Sacramento County.

   The map at right highlights the Upper Westside, Airport South Industrial, and Grand Park projects.

   These projects would dramatically decrease open land in Natomas and present impacts to traffic, air quality, flood control, the Natomas Basin Habitat Conservation Plan, and City services -- all of which should be considered together.

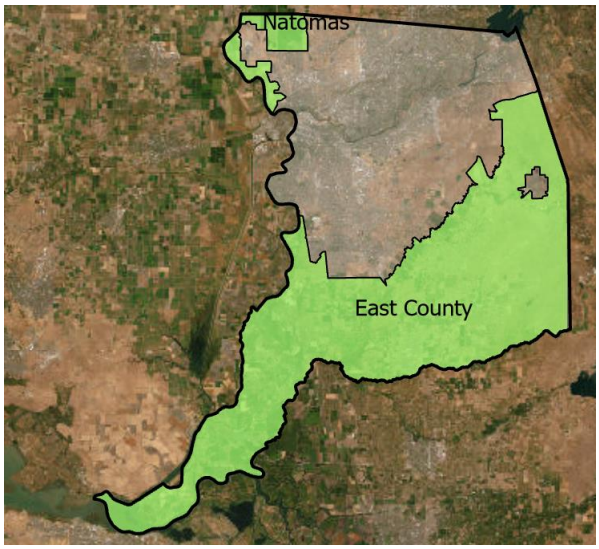


69-1

2) **Consider what it means to break through the Urban Services Boundary (USB).** This boundary, in place for three decades, is based upon jurisdictional, natural and environmental constraints to urban growth and "is intended to be a permanent growth boundary not subject to modification except under extraordinary circumstances."[1]

All three of the projects would break through the USB. Changes to the USB are to be made only for "extraordinary projects" and yet there is nothing extraordinary about Upper Westside except that it is close to the City of Sacramento. What is extraordinary about the area is the deep, prime agricultural soil from many years of overflow from the Sacramento River.

The USB was drawn in 1993 to protect development from the risk of flood and fire, and to preserve agriculture, ranch, and habitat lands. The image below of Sacramento County shows the urbanized area inside the USB, with areas outside of it in GREEN. With climate change, the USB is a bulwark of sustainability for our region.



Consider the requirements in Sacramento County's General Plan Policy LU-127 for projects that propose to break through the USB:

LU-127. The County shall not expand the Urban Service Boundary unless:
• There is inadequate vacant land within the USB to accommodate the projected 25-year demand for urban uses; and
• The proposal calling for such expansion can satisfy the requirements of a master water plan as contained in the Conservation Element; and
• The proposal calling for such expansion can satisfy the requirements of the Sacramento County Air Quality Attainment Plan; and
• The area of expansion does not incorporate open space areas for which previously secured open space easements would need to be relinquished; and
• The area of expansion does not include the development of important natural resource areas, aquifer recharge lands or prime agricultural lands;
• The area of expansion does not preclude implementation of a Sacramento County-adopted Habitat Conservation Plan;
OR
• The Board approves such expansion by a 4/5ths vote based upon on finding that the expansion would provide extraordinary environmental, social or economic benefits and opportunities to the County.

Given the impacts of this project on the region and the Natomas community, the Upper Westside project does not meet most of the listed requirements, nor does it merit a finding of extraordinary benefits and opportunities by 4/5ths of the Board of Supervisors.

69-2

[1] Sacramento County General Plan, Land Use Element

3) **Consider what it means to develop on land not within the NBHCP/MAPHCP Permit Acres.** The NBHCP is basin-wide for important biological reasons. The hatched areas on the Natomas Basin Habitat Conservation Plan (NBHCP) below indicate where development is permitted. Land outside of the NBHCP/MAPHCP Permit Acres "is designated for retention as Agricultural Cropland by the Sacramento County General Plan."[2]

The Upper Westside project (Airport South Industrial and Grand Park as well) is proposed for areas outside of the NBHCP/MAPHCP Permit Acres. It would replace wildlife-supportive agriculture with concrete, vehicles and houses, severely impacting the resident wildlife in the Basin. The protection of resident wildlife in the Basin became a commitment when the City of Sacramento signed a contract with the federal government and approved the NBHCP. Sacramento Area Flood Control Agency (SAFCA) also agreed to protect resident wildlife. The Upper Westside project cannot mitigate for its impacts to resident wildlife as the Natomas Basin is finite – the harm to the Basin's wildlife conservation efforts will be irreparable.

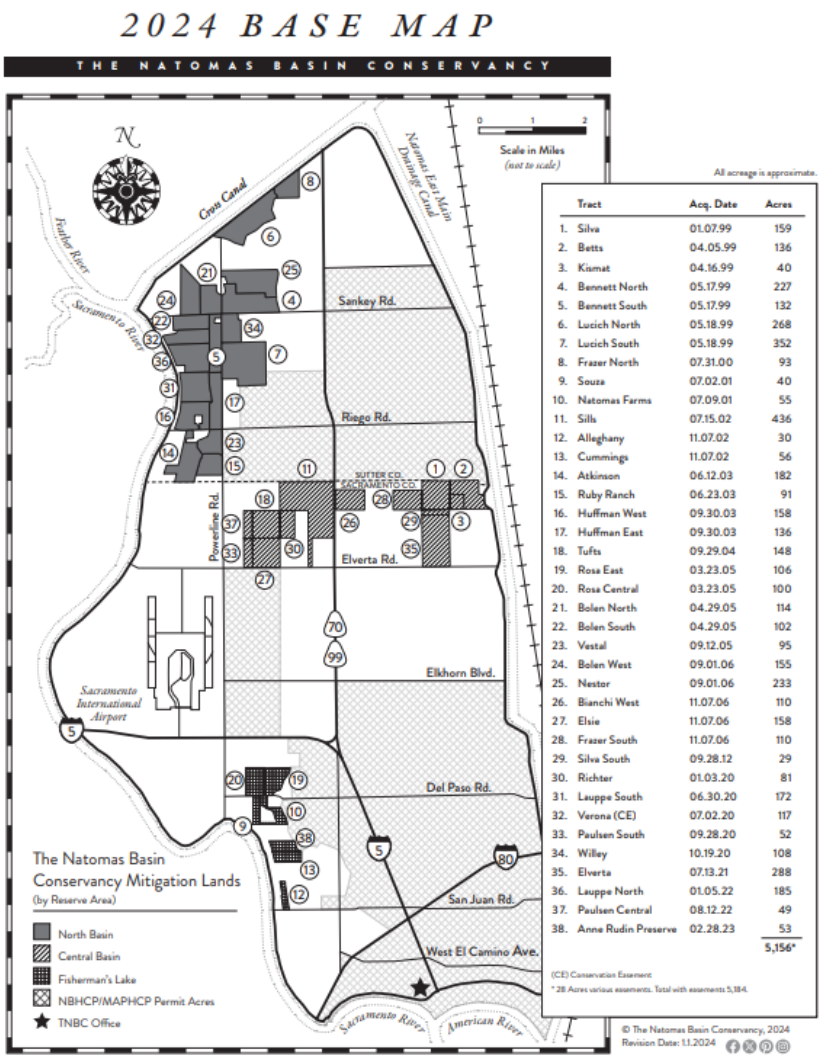
69-3

The Natomas Basin is a deep flood basin. Much of the interior of the Basin is lower than the elevation of the Sacramento and American Rivers, particularly during annual high-water flows in winter and spring.

The Natomas levees were designed for a 200-year storm, as it was understood at the time of design in the late 1990s. Climate change is creating a moving target for flood protection, we no longer can accurately estimate size and frequency of floods.

In a crisis, flood mitigation requires everything to work perfectly – pumps, electricity, detention basins, canals, river levels, and people. Hurricane Helene just provided an example of what happens when systems are overwhelmed by water.

Development in the Natomas Basin should be consistent with the NBHCP.



69-4

[2] https://natomasbasin.org/wp-content/uploads/natomas-basin-habitat-conservation-plan/5nbhcpland_use2006_a11y.pdf, pg III-13

4) **Consider how Upper Westside is inconsistent with the goals of the Blueprint.** On November 4, 2020, SACOG commented on the Notice of Preparation of the Upper Westside DEIR, stating "implementation of the Blueprint vision depends greatly on the efforts of cities and counties through local plans and projects. . . [and] the Upper Westside project and the project area itself are not anticipated for development in either the MTP/SCS or the Blueprint."[3]

This is still true today. SACOG's selected land use scenario for the 2025 MTP/SCS, dated April 2024, does not include the Upper Westside, or Airport South Industrial, or Grand Park – it includes no buildout in the coming decades, as shown in the excerpt at right.

Attachment A

2025 Blueprint (MTP/SCS) Discussion Scenario

April 2024

Jurisdiction/Community Type	Baseyear and Buildout				Spring 24 Discussion Scenario			
	Existing Conditions (2020)		Potential Buildout		2020 - 2035		2020 - 2050	
	Jobs	Housing Units	Jobs	Housing Units	Jobs	Housing Units	Jobs	Housing Units
Sacramento City								
Potential Developing Communities (not yet under construction)								
Panhandle	-	-	-	1,620	-	595	130	1,295
Airport South Industrial Project	-	-	-	-				
Sacramento County Unincorporated								
Potential Developing Communities (not yet under construction)								
Cordova Hills	-	-	3,190	8,000	320	350	600	1,500
Glenborough at Easton	-	-	1,800	3,239	-	-	80	300
South Mather	-	-	940	3,522	-	400	730	1,805
Aerojet	1,600	-	40,180	-				
Elverta	10	50	200	5,627				
Grand Park	20	10	3,010	23,892				
Jackson Township	10	30	900	5,690				
Jackson West	1,240	110	11,210	16,484			-	-
Newbridge	110	10	450	3,075				
Upper Westside	430	60	3,820	9,356				
New Induced Growth Areas	200	500	-	-				

SACOG went on to say "The Upper Westside project . . . raises important policy questions for the region's implementation of the Blueprint. For example, the capacity for growth in existing entitled lands far exceeds expected demand over the next twenty years: collectively, the region's jurisdictions have entitled, or are in the process of entitling **2.5 times the region's projected need for the next 20 years**. More than half of that capacity—387,000 units—is in greenfield areas that are on the edge of existing development."[4] This means there is far more entitled acreage for new homes than the market will bear. Upper Westside is not needed.

69-5

5) **Consider how Upper Westside is inconsistent with General Plans.** The project proposes a change to Sacramento County's General Plan from agricultural to residential/commercial uses. While the project would be in Sacramento County, it would obviously impact the City of Sacramento.

69-6

6) **Consider the project's effect on our Air Quality Plan.** The proposed project would worsen the Sacramento regions ability to meet state and federal air quality standards by interfering with implementation of our Air Quality Plan. The Upper Westside DEIR makes clear that the project's air quality impacts are significant and unavoidable. Failure to honor our Air Quality Plan could result in our area losing access to federal transportation funds.

69-7

[3] MTP/SCS or Blueprint - https://www.sacog.org/planning/blueprint

[4] James Corless, SACOG Ex Dir., November 4, 2020 letter to County Environmental Planning, Notice of Preparation of DEIR for Upper West Side Specific Plan (PLNP2018- 00284, p. 6)

7) **Consider the other areas available for development.** Open land inside the Urban Services Boundary (USB) is available for housing, both in the City of Sacramento and unincorporated Sacramento County – land that is not in a deep flood basin or on prime farmland. In addition, there is enormous capacity for infill development in existing communities, especially around transit stations. Building in communities with existing public infrastructure and services can limit costs to local jurisdictions for maintenance and operations, and it can lower the combined housing-transportation costs to households. While the Upper Westside project proposes the City of Sacramento extend its utilities and services to the project, the City's new 2040 General Plan strongly emphasizes infill development to provide needed housing. 69-8

8) **Consider the land uses being proposed.** We need more housing, but it does not need to be located in the Natomas Basin; and the Upper Westside project does not address our most critical housing need -- for low income households. 69-9

The project proposes three million square feet of commercial space. For comparison, the Westfield Galleria shopping mall in Roseville is 1.3 million square feet. If this commercial space is built, will it take the life out of the 100,000 square-foot shopping mall at West El Camino and Truxel Road? 69-10

The proposed site is on the urban edge, bounded by the Sacramento River. For an educational campus, this means difficult access by automobile, and certainly by public transit. 69-11

9) Consider the traffic impacts. The project proposes 9,000 residences and three million square feet of commercial space, plus the schools. The project will be almost entirely auto-centric. Thousands of auto-trips each day will significantly impact El Centro Road and West El Camino (whose width varies from 2 lanes to 6 lanes between I-80 and Northgate Blvd), as well as Garden Highway and San Juan Road (neither of which can be widened.) 69-12

Traffic will increase throughout South Natomas. The six-lane West El Camino overpass of I-80 and El Centro Road, at the primary gateway to the project, will be especially congested. This junction and the gateway itself, intended to be a "smart growth street", will be bumper to bumper. 69-13

In conclusion, the Upper Westside conflicts with land use planning actions of regional significance including the Blueprint, Urban Services Boundary, and Natomas Basin Habitat Conservation Plan -- each hard won, painstakingly agreed to, and in place for decades. These land use actions are our legacy; they represent our core values; and now, in 2024, they are sustainability bulwarks against climate change. Let's not toss them aside.

Thank you for considering what we have written above. As you carefully review the Draft EIR before making your recommendation, consider it in the context of the entire Natomas Basin. We will provide more extensive comments on the Draft EIR in the days to come. You represent us, the Natomas Community as well as future generations of this community who will live with increasingly extreme weather in our changing climate.

Sincerely,

Heather Fargo

Heather Fargo, Chair
ECOS Natomas Team

Susan Herre AIA AICP
President of the Board of Directors

From: Friends of the Swainson's Hawk [friendsoftheswainsonshawk@gmail.com]
Sent: Wednesday, October 2, 2024 2:42 PM
CC: Friends [friendsoftheswainsonshawk@gmail.com]
Subject: PLNP2018-00284 - Upper Westside Specific Plan Natomas CPAC
Attachments: UWSCPAC10.2.pdf

Categories: Public Comment

Please provide this comment to the Natomas CPAC members regarding hearing Oct 3, 2024 on **PLNP2018-00284 – Upper Westside Specific Plan**

Friends of the Swainson’s Hawk
friendsoftheswainsonshawk@gmail.com
Judith Lamare
James Pachl
916 769 2857 c

www.swainsonshawk.org

October 2, 2024
BoardClerk@saccounty.gov

Send all notices & correspondence to:
Friends of the Swainson's Hawk
8867 Bluff Lane
Fair Oaks, CA 95628
916-769-2857

email: friendsoftheswainsonshawk@gmail.com

Chair Christopher and Members of the Natomas CPAC
700 H Street
Sacramento, Ca 95814

Re: Upper Westside Specific Plan DEIR

Dear Members of the Natomas CPAC:

The County Urban Services Boundary, a part of the County General Plan, is a core public policy protecting agricultural land, and biological resources in the County. The proposed project would change the Urban Services Boundary and effectively remove agricultural and biological resources from 2,000 greenfield acres. The USB undergirds other key countywide public policies and plans for transportation infrastructure, air quality attainment of state and federal standards, and climate action, policies and plans adopted in the public interest.

Among the biological resources protected by the County General Plan's Urban Services Boundary are populations of rare, endangered and threatened species. These include the state listed Swainson's Hawk.

The project would develop an important natural resource area, namely 2,000 acres within the Natomas Basin Habitat Conservation Plan (NBHCP) Swainson's Hawk Zone. The entire project area is prime farmland, as noted in the DEIR. The loss of farmland is noted in the DEIR as significant and unavoidable.

70-1

To approve urbanization within an agricultural area that is part of a federal and state habitat conservation plan is contrary to the County's General Plan conservation policies. 70-1 cont.

The DEIR states that mitigation for these impacts to the Natomas Basin will be mitigated outside the Natomas Basin. This would defeat the purpose of the US Army Corp of Engineers permit condition on Basin flood control projects enabled all development in the Basin, that all development in the Basin be subject to a basin wide habitat conservation plan. The USFWS Opinion, nowhere mentioned in this DEIR, expressly conditions the USFWS approval of the flood control project on a "multispecies habitat management plan for the 55,000 acre lower American Basin" and issuance of Incidental Take Permit from USFWS and Fish and Game Code Section 2081 permit from CDFW. 70-2

Approval of this project will undermine the effectiveness of the Natomas Basin Habitat Conservation Plan, a basin wide plan approved by federal and state wildlife agencies. 70-3

The DEIR states that mitigation for loss of Swainson's Hawk foraging habitat caused by the project will be at an unidentified locations in Yolo County. Yolo County requires a permit for any out of county mitigation projects which Yolo may or may not approve. The mitigation provided for in the DEIR is speculative, deferred to an uncertain permit process in Yolo County, and is inconsistent with the Natomas Basin Habitat Conservation Plan. 70-4

General Plan Land Use Element Policy LU-127 (p. 144, 2022) recognizes the significance of the Urban Service Boundary ("USB"). It requires that the Board make six findings before it approves an expansion of the USB. Alternatively, the Board can, by a 4/5 vote, avoid these findings if it determines that "expansion would provide extraordinary environmental, social or economic benefits and opportunities for the County." This policy sets a much higher bar for moving the USB than normal land use decisions.

The project fails to meet several of those six mandatory criteria for expansion of the USB, as follows:

a. Inadequate vacant land within the USB to accommodate projected 25 year demand for urban uses. The Board cannot make this finding because:
In fact there is more than enough vacant land within the USB, including the cities and Urban Policy Areas, designated for urban development to accommodate projected 25 year demand for urban development, as well as thousands of acres of vacant land designated for urban development in West Sacramento (including Southport) which is very close to job opportunities in West Sacramento and downtown Sacramento. 70-5

b. The area of expansion does not include the development of important natural resource areas or prime agricultural lands. The Board cannot make this finding because: 70-6

In fact the entire project area is prime farmland, as shown on the map titled "Agricultural Component, Figure 1A," General Plan Open Space Element, Amended 2017, p. 7, which precludes including that area within the USB.

The project would develop an important natural resource area, namely the Swainson's Hawk Zone, the biologically-rich mile-wide corridor of habitat and farmland running alongside the inland toe of the Sacramento River levee between the City limit and Natomas Cross-Canal, designated by the Natomas Basin Habitat Conservation Plan to supplement the habitat preserves established by the Natomas Basin Conservancy and to provide opportunity for the Natomas Basin Conservancy to acquire mitigation preserves adjacent to the Sacramento River riparian corridor that is important nesting habitat for the Swainson's Hawk. 70-6 cont.

c. The proposal for expansion can satisfy the requirements of a master water plan as contained in the Conservation Element. The Board cannot make this finding because:

In fact there is no such document in the Conservation Element, and is no discussion of **any** water supply plan in the Application, other than applicant's unsupported assertion that it "could likely demonstrate that it can meet the requirements of a Master Water Plan as contained in the Conservation Element." 70-7

The Natomas Basin groundwater is contaminated with arsenic and other minerals, the proposed project would have no access to City's water rights or supply because the development violates the City's Implementation Agreement for the NBHCP with state and federal wildlife agencies (NBHCP), and the State has not approved Natomas Mutual Water Company, an agricultural water supplier, as a provider of water for municipal and industrial purposes. 70-8

There is no showing that the proposed expansion would provide "extraordinary environmental, social, or economic benefits to the County" that would justify a 4/5 vote of the Board. Thousands of acres – probably <u>at least 9,000 acres</u> - in Natomas Basin which are within the Permit Areas of the NBHCP and Greenbriar remain undeveloped despite being entitled for urban development for years and covered by existing community plans. (Sutter Pointe, Metro Air Park, and City, including Greenbriar and proposed Panhandle annexations.) There is no shortage of land zoned and ready to develop in Natomas or elsewhere in the region. 70-9

We request that NCPAC members recommend a denial of the project based on the significant and unavoidable negative impacts of the project on the County General Plan, air quality, agricultural land preservation, biological resources, and on the public. 70-10

James P. Pachl

Judith L. Lamare

Letter 71

Received at meeting. Natomas CPAC 10.3.24

Subject: Upper West Side Project and Its Impact on Garden Highway Residents

Dear Natomas Community Planning Advisory Council,

The proposed Upper West Side development will bring approximately 25,000 new residents, 9,000 homes, and various commercial spaces to our area. While this project is expected to stimulate growth and provide housing, it also presents significant challenges for the Garden Highway community. As a former District 3 Director for the Garden Highway Community Association, I strongly advocate for additional traffic and environmental impact studies before proceeding with this project.

Key Concerns:

1. Traffic Impact: The Upper West Side project will introduce thousands of new vehicles, exacerbating traffic on Garden Highway, Powerline Road, and the West end of Del Paso Boulevard. Garden Highway, with its single access road for residents, is already facing significant strain from local commuters. The influx of vehicles from the new residents using Garden Highway as a thoroughfare will make the situation untenable.

Request: A full traffic impact report should be conducted, specifically assessing Garden Highway and adjacent roads to determine necessary mitigation strategies, such as road expansions, additional exits, or alternate routes to alleviate congestion.

71-1

2. Environmental and Recreational Pressure: With new residents, there will be increased demand for recreational spaces, such as our beaches, levees, and the river, all of which are already strained. Garden Highway lacks sufficient infrastructure for parking, trash management, and public amenities to handle more visitors, further burdening the county's limited resources.

Request: The environmental impact of increased recreational use on these areas needs a thorough evaluation, with plans for resource allocation to maintain the natural beauty and manage the influx of visitors.

71-2

3. Safety and Law Enforcement: The area has already seen rising crime rates during recent levee projects, and with an influx of contractors and workers, this is likely to increase. The sheriff's department is currently understaffed, with response times as long as 1hr minutes in emergencies. This situation will only worsen with the development's construction and after completion, unless proactive measures are taken.

Request: The county must allocate additional resources to law enforcement and emergency services to ensure safety for Garden Highway residents. Funding for this must be factored into the tax revenue projections of the Upper West Side project.

71-3

4. Long-term Infrastructure Concerns: For over a decade, Garden Highway residents have endured constant construction, with no repair to the damaged roads, destroyed tree lines, and erosion of natural beauty. The levee project left thousands of trees decimated, and current conditions are inadequate to handle increased traffic and recreational demand.

Request: Infrastructure improvements, including road repairs, should be completed as part of the mitigation plan. This should be prioritized before construction begins on the Upper West Side.

71-4

5. County vs. City Responsibilities: While the city of Sacramento will benefit from the increased tax revenue (projected in the tens of millions), Garden Highway and nearby areas remain under county jurisdiction. The burden of road maintenance, law enforcement, and emergency services will fall on the county without clear funding from the tax revenue generated by the project.

Request: The county needs to allocate a portion of the anticipated tax revenue to address the impact on adjacent communities like Garden Highway, specifically in maintaining infrastructure and ensuring safety.

71-5

Conclusion: The Upper West Side development presents both opportunities and challenges. Without careful planning and appropriate mitigation, the Garden Highway community will bear the brunt of the negative impacts. I urge the Natomas Community Planning Council to require comprehensive traffic, environmental, and safety studies and to ensure that Garden Highway residents are considered during all phases of planning and implementation.

71-6

Role of the Garden Highway Community Association: Finally, as the former Director of the Garden Highway Community Association, I request that our association be given an advisory role during the planning and development phases. Our insight into the local infrastructure and community concerns is invaluable, and it is essential for local voices to be part of the conversation.

71-7

JOSH HARMATZ
916-284-2507
4171 Garden Hwy

joshharmatz@gmail.com

(1) INCONSISTENT W/ COUNTY POLICY LU-127 ROB BURNESS TESTIMONY 10/3/24

NOT ADDRESSED IN EIR.

DOESNT MEET MOST OR REQUIREMENTS LAID OUT Received at meeting Natomas CPAC 10-3-24

RE opt-out clause SEE NOTHING EXTRAORD.

72-1

(2) THE CITY SHOULD BE DECIDING THIS PROJECT NOT COUNTY

GRANTLAND JOHNSON - provided this as BASIS FOR DECISION ON ESTAB- ~~EXISTING~~ LISHING EXISTING USB

72-2

(3) IMPACTS & RISKS OF THIS PROJECT ARE QUITE SIGNIFICANT.

OVER 20 S&U IMPACTS IN EIR

& THAT DOESNT INCODE ~~3~~ OTHERS THAT SHOULD BE FOREFRONT NOT EIR REQUIRED

- TRAFFIC CONGESTION (NOT VMT)

  LOOK AT APPENDIX ~~TR~~ TR 3 OVER 100,000 TRIPS/DAY.

  ASK FOR NONTECHNICAL ANALYSIS OF THAT QUANTIFIES CONGESTION levels WITH THIS PROJECT

- NO RISK ANALYSIS OF DRAINAGE SYSTEM FAILURE IN ~~EVEN~~ A MAJOR ATMOSPHERIC RIVER EVENT

  ASK STAFF FOR ~~AN~~ ONE

72-3

Received at meeting.
Natomas CPAC
10.3.24

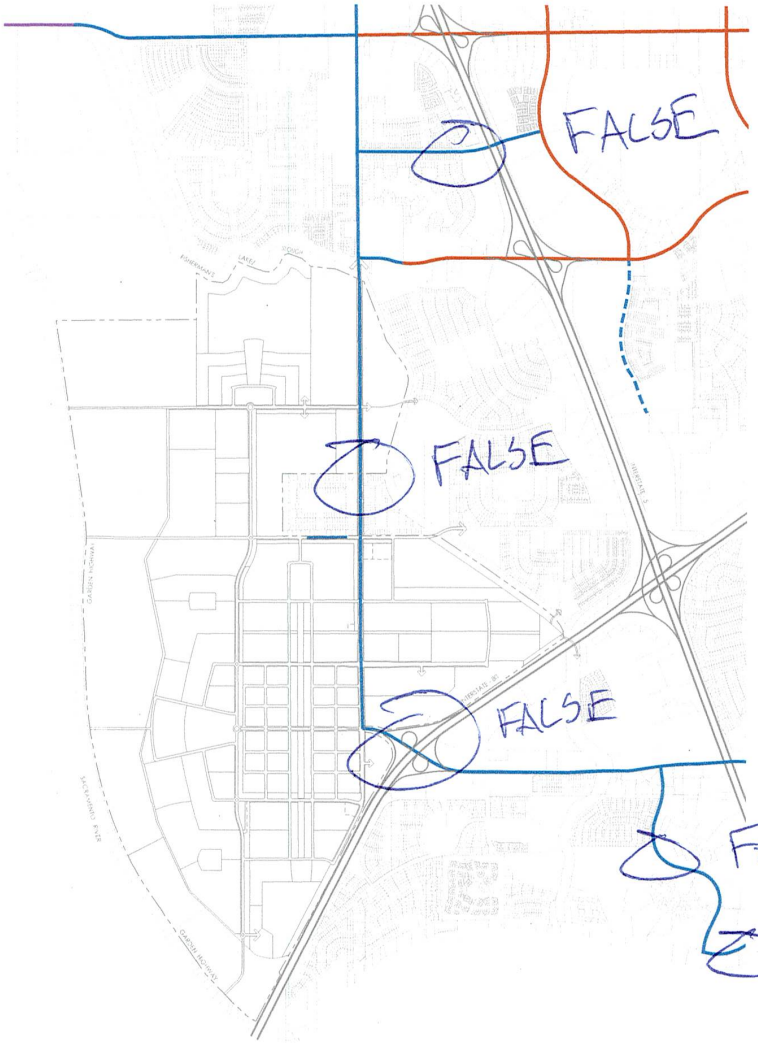
GENERAL PLAN AMENDMENT - CIRCULATION DIAGRAM (ROADWAY + TRANSIT)

UPPER WESTSIDE

COUNTY OF SACRAMENTO, CALIFORNIA

JANUARY 15, 2024

SACRAMENTO COUNTY 2030 GENERAL PLAN - TRANSPORTATION PLAN

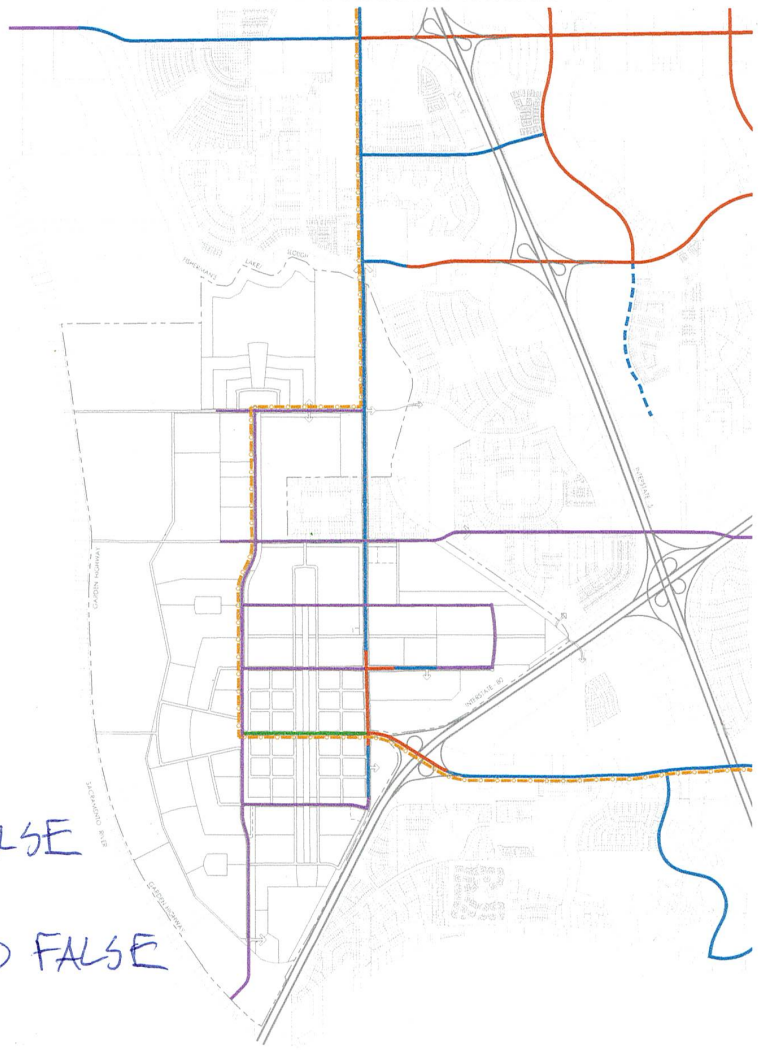


LEGEND

- FREEWAY
- THOROUGHFARE - 6 LANE
- ARTERIAL - 4 LANES
- ARTERIAL - 4 LANES (POST- 2030)
- COLLECTOR - 2 LANES

0 1600 800 3200

UPPER WESTSIDE PROPOSED TRANSPORTATION PLAN AMENDMENT



LEGEND

- FREEWAY
- THOROUGHFARE - 6 LANE
- ARTERIAL - 4 LANES
- ARTERIAL - 4 LANES (POST- 2030)
- SMART GROWTH STREET
- COLLECTOR - 2 LANES
- POST-2030 TRANSIT

WOOD RODGERS
BUILDING RELATIONSHIPS ONE PROJECT AT A TIME
3301 C St, Bldg. 100-B
Sacramento, CA 95816
Tel 916.341.7760
Fax 916.341.7767

From: Rod <whiskeyrodjohn@gmail.com>
Sent: Tuesday, September 24, 2024 10:46 AM
To: Clerk of the Board Public Email <boardclerk@saccounty.gov>; PER-CEQA <ceqa@saccounty.gov>
Subject: Natomas Upper West Side Public Comment

To County Supervisors,

I live in Natomas and oppose the Upper Westside Specific Plan. This area is not vacant, neglected lots in need of rehab. It is family farms and productive working lands. I'm not making plans for what to do with your wife after you're out of the picture, don't insult our landowners by making plans for what to do with their soil after they've been pushed out.

Emotions aside, the Upper Westside Specific Plan does not align with the City of Sacramento's 2040 General Plan and I urge you to scrap it and protect our farms.

Highlights from the 2040 Plan to keep in mind:

Sustainable and Responsible Growth lists as its #1 objective "Concentrate new growth within Sacramento's existing footprint to promote a compact development pattern that supports efficient delivery of public services and infrastructure, while protecting surrounding open space lands." Appendix A, Vision and Guiding Principles

The Upper Westside Specific Plan falls within an area the City identifies as a "Special Study Area" currently composed of "Prime Farmland" and "Other Farmland." 3-3 p61

73-1

Land Use and Placemaking highlights Sacramento's "1.5million acres of some of the most fertile farmland in the United States," and as such, "planning efforts are guided by 'smart growth' principles that aim to promote a compact development footprint, helping to minimize urban sprawl and pollution." 3-2 p60

The Community Issues and Opportunities section of the plan notes that "North Natomas has some of Sacramento's biggest opportunities for infill and redevelopment," pointing out that "vacant and underutilized properties along the I-5 corridor, Del Paso Road, and Truxel Road are opportunities for infill development that make use of existing infrastructure and community resources." 11-NN-5 p367

The 2040 Plan does not endorse expanding the urban services boundary or rezoning agriculture to residential or commercial use.

When mentioning the proposals for the Upper Westside and Grandpark Specific Plans, community feedback showed "North Natomas residents want to see preservation of natural areas,

including wildlife habitats and corridors within the unincorporated area consistent with the HCP; and want new development to have a compact form, integrated with existing development within the city so as to minimize traffic impacts and utility demand, and take advantage of opportunities for improved bicycle and pedestrian connectivity." 11-NN-5 p367-8

Environmental Resources and Constraints objective #2 is "Thriving rivers, wildlife, and natural open spaces that contribute to public health, livability, and protection of the environment for future generations." 6-3 p131

Sprawling beyond the City's current boundary to pave over food production and destroy wildlife habitat is not what we want. The Upper Westside Specific Plan is a direct contradiction to the goals and wishes of our community.

Stop this nonsense. Your time and resources are better spent elsewhere.

Thank you,
R.J.

73-1 cont.

From: Harinder Dhanota <hdhanota@gmail.com>
Sent: Saturday, September 28, 2024 7:16 PM
To: Patten. Emma <pattene@saccounty.gov>; Clerk of the Board Public Email <boardclerk@saccounty.gov>
Subject: Petition

Hi,

We like the Upper west side specific plan and it's EIR . We support the project. 74-1

Thanks,

Dr. Harinder Dhanota
Sutter North Medical Group Board Member
Sutter Surgical Hospital North Valley Board Member

Sent from my iPhone

From: kamal dhanota <kamdhanota@gmail.com>
Sent: Sunday, September 29, 2024 8:09 AM
To: Patten. Emma <pattene@saccounty.gov>; Clerk of the Board Public Email <boardclerk@saccounty.gov>
Subject: We Support the project

Hi there

I support the upper west side specific plan and its EIR. I support the project.This will create more jobs and affordable housing and also make Sacramento look beautiful. Thanks 75-1

Kamal Dhanota PharmD

From: Ramsaran Dhanota [ramsdhanota@gmail.com]
Sent: Tuesday, October 1, 2024 7:11 PM
To: Patten. Emma [pattene@saccounty.gov]; Clerk of the Board Public Email [boardclerk@saccounty.gov]
Subject: Re:

Categories: Public Comment

On Sat, Sep 28, 2024 at 7:26 PM Ramsaran Dhanota <ramsdhanota@gmail.com> wrote:

> Hi,
>
> We like the Upper west side specific plan and it's EIR . We support the project. 76-1
>
> Thanks,
> Ramsaran Dhanota

From: Amy Rodrigues <amyrod24@gmail.com>
Sent: Monday, September 23, 2024 3:42 PM
To: Patten. Emma <pattene@saccounty.gov>; Clerk of the Board Public Email <boardclerk@saccounty.gov>
Subject: Public Comment | Oct 3 Natomas CPAC Upper Westside Specific Plan
Attachments: Public Comment Upper Westside Sept 2024 - CPAC.pdf

Good afternoon,

I received a courtesy meeting notice in the mail today for the October 3, 2024 6pm meeting with the County Board of Supervisors and Natomas CPAC to discuss the Upper Westside Specific Plan.

I am strongly opposed to the planned development and would like to submit the attached comment for consideration, encouraging the board to NOT expand the urban services boundary, and instead maintain the Agriculture land use designation.

Thank you,
Amy

September 23, 2024

Sacramento County Board of Supervisors
700 H Street, Suite 2450
Sacramento, CA 95814

RE: Upper Westside Specific Plan (PLNP2018-00284) Public Comment for the October 3, 2024 Natomas CPAC meeting with the County Board of Supervisors

Position: Oppose

Dear Sacramento County Board of Supervisors,

I am a homeowner and proud resident of the Gateway West neighborhood that borders the proposed project site. I strongly oppose this development because it will significantly harm wildlife, local farms, and the existing community.

Habitat Conservation
This region provides vital habitat for wildlife including migratory and resident birds, mammals, reptiles and insects. Consider protecting these lands as part of the Natomas HCP or mitigation bank rather than developing, to maintain open space and support Swainson hawk, VELB, western pond turtle and other threatened species. This area provides contiguous habitat along the Sacramento River and Bypass Wildlife Areas that should be protected. Open space bordering our Garden Highway levee provides flood protection for greater Natomas, and permeable surfaces promote groundwater recharge.

Prime Farm Land
The existing farms on these lands feed our community and people around the world. My family enjoys watching the tomatoes, sunflowers, pumpkins, and corn grow in the fields down the street, and shopping at the Cuevas stand on El Centro for the freshest produce. Sacramento prides itself on being the Farm-to-Fork capitol. Please don't pave over these iconic family farms.

Impacts to Locals
The 49er Travel Plaza is also a cornerstone of our community, serving travelers and truckers for more than 50 years. Their proximity to the I-5 and I-80 junction and being just offset from residential tracts is ideal. Don't build around them and force them out.

I do not want the added noise and air pollution, strain on our infrastructure and utilities, increased traffic, loss of wildlife, loss of existing community & tradition, and destruction of natural resources. Open space is precious and disappearing quickly. **Agriculture and natural open space is the very best use of these lands.** Please protect the farms that are the symbol and heart of Sacramento, and the reason I chose to live here.

77-1

Thank you,

Amy Rodrigues
23 Alcanon Ct
Sacramento, CA 95833

From: ashikal ashikal@telus.net
Sent: Thursday, September 26, 2024 11:47 AM
To: Clerk of the Board Public Email <boardclerk@saccounty.gov>
Subject: Questions for Courtesy Meeting- project PLNP2018-00284- Upper Westside Specific Plan- October 3rd at 6 pm

Hello

I will be attending the Courtesy Meeting- project PLNP2018-00284- Upper West Side Specific Plan- October 3rd at 6 pm via telephone and wanted to ask a couple of questions as my family owns one of the parcels.

1. When will there be offers made to owners of current parcels, should they decide to sell their land.
2. What is the process if the current land owner does not want to sell their land?
3. Will the parcel be sold to the City of Sacramento?
4. Will offers to current parcel owners be made on a phase by phase basis. For example, if a land owner owns a parcel in phase 3 or 4, when will the owner be made an offer to sell their land?

Please feel free to answer these questions via email or at the meeting on October 3d.

78-1

Regards,

Ashika

From: Oksana Adamko <oksanavoronyy@icloud.com>
Sent: Sunday, September 29, 2024 8:00 PM
To: Clerk of the Board Public Email <BoardClerk@saccounty.gov>
Subject: Upper West Side Plan

I support the Upper West Side Project plan. It will make Sacramento beautiful, create more jobs, and it will make more affordable housing for our community. It will generate millions of dollars of revenue for the city and county. 79-1
Sent from my iPhone

From: Oksana Adamko
Sent: Monday, September 30, 2024 6:27 PM
To: Patten. Emma
Subject: We support Upper West side Specific plan . We support the project. 80-1

Sent from my iPhone

From: Aditya Maheshwari <aditya351@gmail.com>
Sent: Sunday, September 29, 2024 7:19 PM
To: Patten. Emma <pattene@saccounty.gov>; Clerk of the Board Public Email <boardclerk@saccounty.gov>
Subject: Upper West Side Project Support

Hi Emma / Board Clerk,

I am writing to express my support for the Upper West Side Project Specific Plan. I like the project and it's EIR. As a current resident of Sacramento and Natomas, I believe it will make Sacramento beautiful and bring business opportunities, jobs, and growth to the area. 81-1

--
Thanks and Regards,
Aditya Maheshwari

Sent from my iPhone

From: Neelima Maheshwari <nmaheshwari71@gmail.com>
Sent: Saturday, September 28, 2024 4:57 PM
To: partene@saccounty.gov; Clerk of the Board Public Email <Boardclerk@saccounty.gov>
Subject: Upper West side plan

Hello,

I am a resident of Natomas and I like the Upper west side specific plan and its EIR. This will bring more jobs to the area and make natomas an attractive place for families to spend quality time with their community. 82-1

Thank u

Neelima
Sent from my iPhone

From: Mandeep Sahejpal <mp.sahejpal486@gmail.com>
Sent: Sunday, September 29, 2024 11:24 PM
To: Clerk of the Board Public Email <BoardClerk@saccounty.gov>
Subject:

Sent from my iPhone hello my name is mandeep sahejpal,,I support upper west side specific plan,,because it make Sacramento beautiful and create more jobs.thanks

83-1

From: Janet <janetgmurph@gmail.com>
Sent: Saturday, September 28, 2024 5:28 PM
To: Clerk of the Board Public Email <BoardClerk@saccounty.gov>
Subject: Upper west side project

I like the Upper west side specific plan and it's EIR. I support the project. 84-1

From: Kevin Murphy <kevinmurph31@gmail.com>
Sent: Saturday, September 28, 2024 5:35 PM
To: Clerk of the Board Public Email <BoardClerk@saccounty.gov>
Subject: Upper west side project

I like the Upper west side specific plan and it's EIR. I support the project. 85-1

From: yudhvinder sandhu <yudhpreet99@hotmail.com>
Sent: Monday, September 30, 2024 10:42 AM
To: Patten. Emma <pattene@saccounty.gov>; Clerk of the Board Public Email <boardclerk@saccounty.gov>
Subject: Upper west side specific plan

Good morning.

I like upper west specific plan and it's EIR. We whole family support this plan. 86-1

Regards
Yudhvinder Sandhu

Sent from my iPhone

From: gurpreet sandhu <gurpreet.1999@hotmail.com>
Sent: Monday, September 30, 2024 10:52 AM
To: Patten. Emma <pattene@saccounty.gov>; Clerk of the Board Public Email <boardclerk@saccounty.gov>
Subject: Upper west side specific plan

Hello Officers

Our all family members support upper west side specific plan and it's EIR. We like this project. 87-1
Thanks

Preeti

From: marinder sandhu <marinder2002@hotmail.com>
Sent: Monday, September 30, 2024 11:00 AM
To: Patten. Emma <pattene@saccounty.gov>
CC: Clerk of the Board Public Email <boardclerk@saccounty.gov>
Subject: Upper west side specific plan

Hi everybody

This is Marry and live in Natomas. We all like upper west side specific plan and the EIR. 88-1

We support this project and will really appreciate if you develop it as soon as possible.

Sincerely

Marry

From: Gurvir Sandhu <Gugisandhu2003@outlook.com>
Sent: Monday, September 30, 2024 11:17 AM
To: Patten. Emma <pattene@saccounty.gov>
CC: Clerk of the Board Public Email <boardclerk@saccounty.gov>
Subject: Upper west side specific plan

Dear officials

Good morning. For your kind information we like to inform you that we like upper west side specific plan and EIR as well. We all support this project very soundly. Have a great day. 89-1

Very Faithfully

Gugi and family

From: Yudhvinder Sandhu <yudhpreet99@gmail.com>
Sent: Monday, September 30, 2024 11:34 AM
To: Patten. Emma <Pattene@saccounty.gov>
CC: Clerk of the Board Public Email <Boardclerk@saccounty.gov>
Subject: Upper west side specific plan

Hello

This Resham live in Natomas for the last many many years.
Our whole family like upper west side plan and it's environment report. We support this project and standing in its favor. 90-1

Gratefully

Resham

From: Hardev Singh <hardevs1945@gmail.com>
Sent: Monday, September 30, 2024 12:34 PM
To: Patten. Emma <pattene@saccounty.gov>
CC: Clerk of the Board Public Email <boardclerk@saccounty.gov>
Subject: Upper west side specific plan

Good afternoon

I want to let you know that I like upper west side specific plan. We all strongly support this project and it's EIR. Thanking you

91-1

Best regards

Hardev Singh

From: Alok Kumar <alok_kr@hotmail.com>
Sent: Sunday, September 29, 2024 1:13 PM
To: Patten. Emma <pattene@saccounty.gov>; Clerk of the Board Public Email <boardclerk@saccounty.gov>
Subject: Upper West Side Specific Plan

Hello Miss Patten

I am a resident of Natomas and support the Upper West side specific plan and its EIR. I fully endorse and support this project.. 92-1

Thanks
Alok Kumar

Alok Kumar PMP
501 Hawkcrest Circle Sacramento, CA 95835 USA

Cell: (916) 600-5586 E-mail: alok_kr@hotmail.com

From: howsrxx <howsrxx@gmail.com>
Sent: Sunday, September 29, 2024 9:07 PM
To: Clerk of the Board Public Email <BoardClerk@saccounty.gov>
Subject: Upper West Side specific project

I like the upper west side specific project and it's EIR and support the project
Thank you, Howard Lamborn

93-1

From: Luisa Montoya <luisamontoya916@gmail.com>
Sent: Sunday, September 29, 2024 6:20 PM
To: Clerk of the Board Public Email <BoardClerk@saccounty.gov>
Subject: Upper west side

We like the Upper west side specific plan and it's EIR. We support the project. This beautiful growth will create better job opportunities in Sacramento. 94-1

Sent from my iPhone

From: jaspal banga
Sent: Monday, September 30, 2024 12:09 PM
To: Patten. Emma
Subject: Support CPAC Item: Upper Westside Specific Plan
Attachments: CPAC Letter Final (1).docx

We support Upper West Side Plan

Dear Chair Christopher and Members of the Natomas CPAC Board,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

The Upper Westside project is situated within the Natomas Joint Vision Overlay Area, which has been under discussion for potential development for several decades. This project satisfies the General Plan's LU-120 performance-based and design criteria which was developed in coordination with SACOG, ensuring that it fits within the established framework for thoughtful growth.

As a member of the Natomas community, I recognize the struggles faced by local farmers due to the changing landscape around them. The Upper Westside project offers a balanced approach to land use, preserving a 542-acre agricultural buffer to protect farmland and preserve open space.

The Upper Westside development embodies SACOG's smart growth principles by utilizing existing infrastructure and providing housing near job centers. The proposed "town center" is within 3.5 miles of downtown Sacramento. More than two-thirds of the project boundary is adjacent to existing development. This project is essentially an infill development that will reduce sprawl, offer a variety of housing types, and provide easy access to jobs and transit. Of the 9,356 proposed housing units, more than 52% will be multi-family attached units, which are crucial in addressing our region's housing crisis, particularly the need for affordable apartments and duplexes. 95-1

Traffic concerns have been addressed as well. The project's location and mix of land uses result in traffic levels below the 85% threshold of baseline conditions, which is an important indicator of its suitability for the area. The developers have also prepared a comprehensive Resource Conservation Strategy, which ensures that impacts on farmland and local habitats will be responsibly mitigated.

The Upper Westside Specific Plan represents a well-balanced and forward-thinking approach to development in the most logical place in our region. It respects the areas agricultural heritage, addresses urgent housing needs, and supports economic growth, all while minimizing environmental impacts.

I urge the Natomas CPAC to support this project and help guide our community into a sustainable future.

Thank you for your consideration.

From: Ricky Banga <bangaricky2@icloud.com>
Sent: Monday, September 30, 2024 9:19 AM
To: Patten. Emma <pattene@saccounty.gov>; Clerk of the Board Public Email <BoardClerk@saccounty.gov>
Subject: Upper Westside Project

Hello,

I fully support the Upper Westside Project specific plan and the EIR. Thank you very much. 96-1

Regards,
Rajkaran Banga

From: Vick Banga <vbanga2@gmail.com>
Sent: Monday, September 30, 2024 4:17 PM
To: Clerk of the Board Public Email <BoardClerk@saccounty.gov>; Patten. Emma <pattene@saccounty.gov>
Subject: Upper Westside Project

Hello,

I am emailing to show support for the Upper Westside Project. The project addresses Sacramento's housing crisis with a sustainable approach.

According to California Housing Partnership's 2024 report on Affordable Housing Needs in Sacramento County: "54,615 low-income renter households in Sacramento County do not have access to an affordable home."

The Upper West Side Project will help alleviate this issue, while also offering a town center and the Westside Canal, which I believe will be a unique and exciting addition to the area — one that I hope to enjoy in the future.

I encourage the Natomas CPAC to support this project given the positive impact it will have on our community. Thank you.

97-1

Best Regards,
Veerkaran Banga, MD

From: Michele [mmikatic@aol.com]
Sent: Thursday, October 3, 2024 12:32 PM
To: Clerk of the Board Public Email [boardclerk@saccounty.net]
Subject: UPPER WESTSIDE PROJECT.

Categories: Public Comment

As a Garden Highway resident for over 5 decades I oppose the Upper Westside Project. The destruction of our neighborhood this last decade or so is devastating to wildlife and our neighborhood to name a few. We have watched our farm neighbors disappear and our once beautiful area is resembling a cement parking lot. Once you destroy this area you can't go back. What local services we have are being strained. Our law enforcement is lacking causing the crime to continually increase. Traffic is out of control without a proper number of law enforcement available to enforce laws. This area is not prepared for this project and going forward screams mismanagement. I urge you to reject this plan and save our environment. 98-1

Michele Katic

From: Dustin Moore [dustinjmoore@gmail.com]
Sent: Thursday, October 3, 2024 12:26 PM
To: Clerk of the Board Public Email [BoardClerk@saccounty.gov]
Subject: Opposition to Upper Westside Development

Categories: Public Comment

Greetings,

I am sending this email in opposition to the Upper Westside Project that threatens our environment, wildlife habitat, and our community.

As the Draft Environmental Impact Report clearly states, the project would result in SIGNIFICANT and UNAVOIDABLE impact on the aesthetics, agricultural resources, air quality, cultural and historical resources, noice, population and housing, transportation, and tribal cultural resources.

It will further impact climate change, geology, soils, hydrology, srainiage, water quality, public services, and water supply to name but a few of the impacts on our region and community. As a homeowner on the Garden Highway, my family has already seen the destruction of habitat, increased traffic, noise, impact on our water supply, and pollution resulting from the levee project.

99-1

We have seen public safety response times decrease and increased crime. I am deeply concerned about the additional pressure and burdens placed on our community if the Westside project moves forward. It is estimated that 75 thousand more vehicles a day will travel the Garden Highway and West El Camino Avenue. In an emergency, there will be no safe evacuation routes and all of us will be trapped.

99-2

Moreover, as I understand it, the increased housing is not designed for middle and low income families, which is the housing that the Sacramento community needs, not thousands of new homes to appeal to bay area transplants that are out of reach for most Sacramentans.

99-3

This is a bad plan for the public and our community; designed only to profit developers and increase the tax base, at the expense of the rest of us and our environment. I urge you to reject this proposal.

Sincerely,

Dustin Moore

Garden Highway resident

From: Tony@HomesByPRA.com
Sent: Thursday, October 3, 2024 12:25 PM
To: Clerk of the Board Public Email [BoardClerk@saccounty.gov]
Subject: Upper Westside Project

Categories: Public Comment

Greetings,

I am sending this email in opposition to the Upper Westside Project that threatens our environment, wildlife habitat, and our community. As the Draft Environmental Impact Report clearly states, the project would result in SIGNIFICANT and UNAVOIDABLE impact on the aesthetics, agricultural resources, air quality, cultural and historical resources, noise, population and housing, transportation, and tribal cultural resources. It will further impact climate change, geology, soils, hydrology, drainage, water quality, public services, and water supply to name but a few of the impacts on our region and community.

As a homeowner on the Garden Highway, my family has already seen the destruction of habitat, increased traffic, noise, impact on our water supply, and pollution resulting from the levee project. We have seen public safety response times decrease and increased crime. I am deeply concerned about the additional pressure and burdens placed on our community if the Westside project moves forward. It is estimated that 75 thousand more vehicles a day will travel the Garden Highway and West El Camino Avenue. In an emergency, there will be no safe evacuation routes and all of us will be trapped. Moreover, as I understand it, the increased housing is not designed for middle and low income families, which is the housing that the Sacramento community needs, not thousands of new homes to appeal to bay area transplants that are out of reach for most Sacramentans. 100-1

This is a bad plan for the public and our community; designed only to profit developers and increase the tax base, at the expense of the rest of us and our environment.

I urge you to reject this proposal.

Sincerely,

Anthony Wall
2827 Garden Hwy

From: Don Fraulob [don@rivercityattorneys.com]
Sent: Thursday, October 3, 2024 11:49 AM
To: Clerk of the Board Public Email [BoardClerk@saccounty.gov]
CC: Patrick Tully [ptully@bitwiseproperties.com]; all@gardenhwy.org; Melissa Brown [melissa@rivercityattorneys.com]
Subject: OPPOSITION TO UPPER OPPOSITION TOWESTSIDE PROJECT

Categories: Public Comment

Gentlepersons:

I oppose the Upper Westside Project.

I have lived on the Garden Highway for more than 30 years. Over the years my family and my neighbors have already experienced the destruction of habitat, increased traffic, noise, impact on our water supply, and pollution resulting from the levee project.

This proposed project would be a further destruction of idyllic settings Garden Highway residents have enjoyed for many years. Instead of vistas, farmlands and the rural feel of the community, this project – which is in clear violation of the Draft Ennvironmental Impact report – would add a new community of 9000 homes and 3 million square feet. Of commercial development.

The projects does not provide adequate vehicle access to this proposed commnuity but rather adds something like 75,000 vehicles per day to the already conjected speedway that the Garden Highway has become.

101-1

This is a bad proposal that should be rejected.

Thank you for your kind consideration.

Donald Fraulob

From: New View Window Coverings [newviewwindowcoverings@gmail.com]
Sent: Thursday, October 3, 2024 11:10 AM
To: Clerk of the Board Public Email [BoardClerk@saccounty.gov]
Subject: Natomas Community Planning Council Meeting on Westside Development 10/03/2024

Categories: Public Comment

Greetings,

I am sending this email in opposition to the Upper Westside Project that threatens our environment, wildlife habitat, and our community. As the Draft Environmental Impact Report clearly states, the project would result in SIGNIFICANT and UNAVOIDABLE impact on the aesthetics, agricultural resources, air quality, cultural and historical resources, noice, population and housing, transportation, and tribal cultural resources. It will further impact climate change, geology, soils, hydrology, srainiage, water quality, public services, and water supply to name but a few of the impacts on our region and community.

As a homeowner on the Garden Highway, my family has already seen the destruction of habitat, increased traffic, noise, impact on our water supply, and pollution resulting from the levee project. We have seen public safety response times decrease and increased crime. I am deeply concerned about the additional pressure and burdens placed on our community if the Westside project moves forward. It is estimated that 75 thousand more vehicles a day will travel the Garden Highway and West El Camino Avenue. In an emergency, there will be no safe evacuation routes and all of us will be trapped. Moreover, as I understand it, the increased housing is not designed for middle and low income families, which is the housing that the Sacramento community needs, not thousands of new homes to appeal to bay area transplants that are out of reach for most Sacramentans. 102-1

This is a bad plan for the public and our community; designed only to profit developers and increase the tax base, at the expense of the rest of us and our environment.

I urge you to reject this proposal.
Sincerely,

Jeffrey Darin Paper

From: Jovin Pannu <pannuharjovin31@gmail.com>
Sent: Thursday, October 3, 2024 11:05 AM
To: Patten. Emma <pattene@saccounty.gov>
Subject: Upper West Side Plan Support

Hello,

Attached is support I am showing for the Upper West Side to come to fruition. 103-1

Thanks,
Harjovin Pannu

Dear Chair Christopher and Members of the Natomas CPAC Board,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

The Upper Westside project is situated within the Natomas Joint Vision Overlay Area, which has been under discussion for potential development for several decades. This project satisfies the General Plan's LU-120 performance-based and design criteria which was developed in coordination with SACOG, ensuring that it fits within the established framework for thoughtful growth.

As a member of the Natomas community, I recognize the struggles faced by local farmers due to the changing landscape around them. The Upper Westside project offers a balanced approach to land use, preserving a 542-acre agricultural buffer to protect farmland and preserve open space.

The Upper Westside development embodies SACOG's smart growth principles by utilizing existing infrastructure and providing housing near job centers. The proposed "town center" is within 3.5 miles of downtown Sacramento. More than two-thirds of the project boundary is adjacent to existing development. This project is essentially an infill development that will reduce sprawl, offer a variety of housing types, and provide easy access to jobs and transit. Of the 9,356 proposed housing units, more than 52% will be multi-family attached units, which are crucial in addressing our region's housing crisis, particularly the need for affordable apartments and duplexes.

Traffic concerns have been addressed as well. The project's location and mix of land uses result in traffic levels below the 85% threshold of baseline conditions, which is an important indicator of its suitability for the area. The developers have also prepared a comprehensive Resource Conservation Strategy, which ensures that impacts on farmland and local habitats will be responsibly mitigated.

The Upper Westside Specific Plan represents a well-balanced and forward-thinking approach to development in the most logical place in our region. It respects the areas agricultural heritage, addresses urgent housing needs, and supports economic growth, all while minimizing environmental impacts.

I urge the Natomas CPAC to support this project and help guide our community into a sustainable future.

Thank you for your consideration.

103-1 cont.

From: Nina Thomson [ninat99@gmail.com]
Sent: Thursday, October 3, 2024 11:07 AM
To: Clerk of the Board Public Email [BoardClerk@saccounty.gov]
Subject: Garden Highway

Categories: Public Comment

I opposed the Upper Westside Project for all the reasons set forth by other Garden Highway residents. I urge you to reject this proposal. 104-1

Nina Thomson
4625 Garden Highway
Sacramento, CA 95837
916/834-8879
NinaT99@gmail.com

From: Kevin McRae [kevin@mcraecpa.com]
Sent: Thursday, October 3, 2024 11:00 AM
To: Clerk of the Board Public Email [BoardClerk@saccounty.gov]
Subject: October 3, the Natomas Community Planning Council (CPAC) Upper Westside Project

Categories: Public Comment

Greetings to All on the NCPC:

I am sending this email in opposition to the Upper Westside Project that threatens our environment, wildlife habitat, and our community. As the Draft Environmental Impact Report clearly states, the project would result in SIGNIFICANT and UNAVOIDABLE impact on the aesthetics, agricultural resources, air quality, cultural and historical resources, noise, population and housing, transportation, and tribal cultural resources. It will further impact climate change, geology, soils, hydrology, drainiage, water quality, public services, and water supply to name but a few of the impacts on our region and community. 105-1

As a 30 YEAR homeowner on the Garden Highway, and TEN YEAR member on the BOD of THE NATOMAS BASIS CONSERVANCY, my family has already seen the destruction of habitat, increased traffic, noise, impact on our water supply, and pollution resulting from the levee

project. We have seen public safety response times decrease and increased crime. I am deeply concerned about the additional pressure and burdens placed on our community if the Westside project moves forward. It is estimated that 75 thousand more vehicles a day will travel the Garden Highway and West El Camino Avenue. In an emergency, there will be no safe evacuation routes and all of us will be trapped. Moreover, as I understand it, the increased housing is not designed for middle and low income families, which is the housing that the Sacramento community needs, not thousands of new homes to appeal to bay area transplants that are out of reach for most Sacramentans.

105-1 cont.

This is a bad plan for the public and our community; designed only to profit developers and increase the tax base, at the expense of the rest of us and our environment.

Please think of your grandchildren, not the $.

I urge you to reject this proposal.

Sincerely,

Kind Regards,

Kevin McRae

M. Kevin McRae
4559 Garden Hwy
Sacramento, CA 95837
(916) 442-8685

kevin@mcraecpa.com

From: Brandon Castillo [bcastillo@bcfspa.com]
Sent: Thursday, October 3, 2024 10:47 AM
To: Clerk of the Board Public Email [BoardClerk@saccounty.gov]
Subject: opposition to upper westside project

Categories: Public Comment

As a Garden Highway and Sacramento County resident, I'm strongly opposed to the proposed Upper Westside development. This massive project poses a major public safety risk to those of us on the Garden Highway, by increasing traffic, threatening our levees and flood protection, and destroying habitat and wildlife. The EIR acknowledges that many of the impacts are significant and cannot be mitigated. Equally concerning, this megadevelopment will require the erosion of the Urban Services Boundary – encroaching on critical farmland and habitat and our public waterways. 106-1

I strongly encourage the County Supervisors to reject this unsustainable and unsafe development.

Brandon Castillo
3445 Garden Highway
Sacramento CA 95834

Brandon A. Castillo
Partner
O: 916 443-0872
M: 916 730-1011
BCFS PUBLIC AFFAIRS
Bicker, Castillo, Fairbanks & Spitz

From: Melissa Brown [melissa@rivercityattorneys.com]
Sent: Thursday, October 3, 2024 10:40 AM
To: Clerk of the Board Public Email [BoardClerk@saccounty.gov]
Subject: NATOMAS COMMUNITY PLANNING ADVISORY COUNCIL 10/3/2024 Meeting-Agenda Item #1

Categories: Public Comment

Greetings,
I am sending this email in opposition to the Upper Westside Project that threatens our environment, wildlife habitat, and our community. As the Draft Environmental Impact Report clearly states, the project would result in SIGNIFICANT and UNAVOIDABLE impact on the aesthetics, agricultural resources, air quality, cultural and historical resources, noice, population and housing, transportation, and tribal cultural resources. It will further impact climate change, geology, soils, hydrology, srainiage, water quality, public services, and water supply to name but a few of the impacts on our region and community. 107-1

As a homeowner on the Garden Highway, my family has already seen the destruction of habitat, increased traffic, noise, impact on our water supply, and pollution resulting from the levee project. We have seen public safety response times decrease and increased crime. I am deeply concerned about the additional pressure and burdens placed on our community if the Westside project moves forward. It is estimated that 75 thousand more vehicles a day will travel the Garden Highway and West El Camino Avenue. In an emergency, there will be no safe

evacuation routes and all of us will be trapped. Moreover, as I understand it, the increased housing is not designed for middle and low income families, which is the housing that the Sacramento community needs, not thousands of new homes to appeal to bay area transplants that are out of reach for most Sacramentans.

107-1 cont.

This is a bad plan for the public and our community; designed only to profit developers and increase the tax base, at the expense of the rest of us and our environment.

I urge you to reject this proposal.
Sincerely,
Melissa Brown

From: Bronwyn Schweigerdt [bschweigerdt@gmail.com]
Sent: Thursday, October 3, 2024 8:55 AM
To: Clerk of the Board Public Email [BoardClerk@saccounty.gov]
Subject: Say No to Upper Westside Project

Categories: Public Comment

I implore CPAC to adhere to the Urban Services Boundary that was instituted years ago precisely for proposed sprawling development proposals just like this project. Please show integrity and commitment to Sacramento residents versus the few vested interests who would benefit from this proposal. There are better, more sustainable ways to create affordable housing in the Sacramento area. Do what is right, and stand by your constituents to keep Sacramento a sustainable and desirable place to live. 108-1

Bronwyn Schweigerdt
2709 2nd Ave.
Sacramento, CA 95818

From: Steve Schweigerdt [sschweigerdt@gmail.com]
Sent: Wednesday, October 2, 2024 10:12 PM
To: Clerk of the Board Public Email [boardclerk@saccounty.gov]
Subject: PLNP2018-00284 - Upper Westside Specific Plan

Categories: Public Comment

Please provide this comment to the Natomas CPAC members regarding hearing Oct 3, 2024 on PLNP2018-00284 - Upper Westside Specific Plan

Chair Christopher and Members of the Natomas CPAC
700 H Street
Sacramento, Ca 95814
Re: Upper Westside Specific Plan DEIR

Dear Members of the Natomas CPAC:

I oppose the Upper Westside Specific Plan. Approval would be contrary to all planning to date in the Natomas Basin including the Natomas Basin Habitat Conservation Plan, Natomas Shared Joint Vision agreement between the City and County of Sacramento, Sacramento County General Plan, Urban Service Boundary, and SACOG Blueprint. Therefore, the County should inform the applicants that the proposed development directly conflicts with these plans and advise the withdrawal of the proposal. The environmental impacts of the project are overwhelmingly negative and there is no substantive economic need for the project that justifies a hearing.

The Natomas Shared Joint Vision MOU stated "The City, rather than the County, is the appropriate agent for planning new growth in Natomas and can better provide a full range of municipal services. The County is the appropriate agent for preserving open space, agricultural, and rural land uses." This language was agreed to in the 2002 MOU, and while the Joint Vision has been abandoned, the language has not been rescinded and still holds true. The County should not be supporting development of new growth directly, but should refer development proposals to LAFCO and the City for annexation proceedings. Indeed, the County has utterly failed to make any progress on its role of preserving open space and agricultural in the Natomas Basin as not a single acre has been conserved by County efforts despite billions of dollars of state and federal grants made available since the MOU was signed. Instead, the County has signaled development potential to landowners that made it unlikely any would become willing sellers for conservation purposes.

109-1

Polling shows that residents value our Natural Areas - they consistently ranks #1 in Valley Vision Livability Polls, yet our region is far behind on 30X30 goals with only 9% of our land conserved to date. This land can be put in conservation with state funds from the SALC program and landowners can be compensated at appraised fair market value if they would like to sell. This would keep the land

109-2

producing food for us, protect critical habitat and soil, and encourage investment in the ample land for development within the Urban Services Boundary. That is the path the County should be pursuing for land outside the Boundary.

109-2 cont.

This project is outside of the Urban Services Boundary and should not be considered for approval. The Sacramento County General Plan states the Urban Services Boundary " is intended to be a permanent growth boundary not subject to modification except under extraordinary circumstances." Those circumstances do not exist and any project outside of the USB is inconsistent with the General Plan on its face. While a Special Planning Zone overlay exists for the Natomas Joint Vision, that does not obviate the need for extraordinary circumstances to justify moving the Urban Services Boundary. It should be noted that the overlay stated the SACOG Blueprint shows significant development in the Joint Vision area and that is no longer the case, as detailed below.

109-3

General Plan Policy LU-2 states that the County shall maintain a USB that defines the long-range plans (beyond twenty-five years) for urbanization and extension of public infrastructure and services and defines important areas for protecting as open space and agriculture. The County has already approved for development more than 3 times the projected demand for housing units SACOG has modeled (35,610 from 2020-2050). The approval of this project in addition to the excess entitlements that already exist would inevitably result in widely scattered, partially built-out projects that would prevent development of “complete community” urban mass which the County asserts would reduce VMT; and would doom the County to increasing per capita GHG emissions far into the future, contrary to the necessities of climate change, State climate goals, and the intention of the County’s Phase 1 CAP. This is further amplified by the Phasing Plan, which leaves the highest density development to the last phase – when it is never built or rezoned to lower density sprawl.

109-4

In June 2024, SACOG adopted the 2025 Blueprint Land Use Assumptions, which do not include this project as an area to be developed. Therefore, approving this project is inconsistent with our region's Sustainable Communities Plan and risks non-attainment of greenhouse gas reduction targets along with a loss of transportation funding. The DEIR should acknowledge this fact and analyze the impact on the Sustainable Communities Plan and how much more difficult it will be for the region to meet reduction targets if the project is approved. SACOG has indicated that some approved projects need to remain unbuilt to meet the target and the impacts of this project on other projects along Jackson Highway that are more favorable for emissions reductions should be included.

109-5

This project would destroy farmland that we need and the proposed mitigation measures are inadequate. SACOG’s CROP report has found that in 30 years (1988-2018) Sacramento County converted more than 73,000 acres of ag land to urban uses – an area larger than the entire City of Sacramento (63,852 acres). It specifically calls out the Upper Westside project as destructive to Prime Farmland and indicates the mitigation requirements are inadequate. “Biological conservation is the planned mitigation for the project; however, biological easements have restrictions and are not guaranteed to support agriculture. Urban/community gardens have also been proposed as a mitigation measure for the project, and while a community garden will support the health and resilience of the new community, it does not support agriculture in the same way the land is being used today.” Indeed, farmland loss cannot be mitigated by simply protecting farmland elsewhere. Mitigation measure AG-1 that protects other agricultural land does not in effect mitigate the loss of prime farmland in the area. True mitigation would require improving the productivity of less productive farmlands to the equivalent of the prime farmland being lost. Even were compensatory mitigation to be used, it should require an affirmative commitment for productive agriculture and have no restrictions on agricultural intensification. It should

109-6

be further noted that many of the properties along the Garden Highway the DEIR includes as an "agricultural buffer" are zoned AR-2 (97 acres) and are primarily residential instead of productive agricultural properties, thus should not qualify as any type of agricultural credit for the project. 109-6 cont.

The Natomas Basin HCP was predicated on land outside the USB remaining undeveloped. Starting to develop this land is incompatible with the protections put in place through the HCP and the analysis provided in the DEIR is lacking details on the impacts to the HCP. The DEIR Biological Resources Introduction includes requests from CDFW, USFWS, LAFCO, and City of Sacramento that are not fulfilled in the DEIR and until those details are included in a DEIR the public can review it is incomplete and must be recirculated with the requested information included. 109-7

Proposed mitigation for Swainson's hawk foraging habitat is unacceptable. A key part of the NBHCP Conservation Strategy is to both preserve to the extent practicable habitat within the Swainson's Hawk Zone adjacent to the Sacramento River and also to enhance and expand Swainson's hawk habitat through provision of suitable trees and groves in proximity to upland foraging reserves. The project removes about a third of the Swainson's Hawk Zone in Sacramento County from foraging habitat and impacts the already diminished habitat the hawks rely on. A much higher ration than 1:1 mitigation land would be required and it needs to be provided within the Sacramento County portion of the Natomas Basin. 109-8

The reasons to reject this project are overwhelming and there is no need for it to even be considered. Please relegate it to the dustbin.

Steve Schweigerdt
(916) 877-5288
sschweigerdt@gmail.com

From: Debra V [vanhulsteyn@gmail.com]
Sent: Thursday, October 3, 2024 8:44 AM
To: Clerk of the Board Public Email [BoardClerk@saccounty.gov]
Subject: Upper Westside Specific Plan

Categories: Public Comment

Thanks for taking my comment.
As someone who grew up in the Santa Clara Valley, now Silicon Valley, I have deep opinions about the potential plan to pave this area

Santa Clara Valley, at one time had a unique climate and some of the richest deepest top soil in the world.

Most of the Santa Clara Valley's rich farmlands are paved over now. What was once a producer of food is now a heat sink.

This is what is happening to our valley. We are paving it. We are removing hundred plus year old stands of tree canopy.

We are making the region unlivable and contributing to climate change and potential flooding.

Please protect our green spaces!

110-1

Sincerely

Debra van Hulsteyn
2200 I St
Sacramento CA 95816

Letter 111

From: Srirama Tanniru <srirama.tanniru@gmail.com>
Sent: Wednesday, October 2, 2024 5:29 PM
To: Patten. Emma <pattene@saccounty.gov>
Subject: Upper Westside Specific Plan

Dear Emma Patten,

My name is Srirama Tanniru ('Sri'), an IT Project Management Professional who has been working in and around downtown Sacramento for approximately 30 years.

As someone who is intimately familiar with the Sacramento area, I'm writing to express my strong support for the **Upper Westside Specific Plan** development project. My strong support for this development project is based on several reasons that include the following:

- The Upper Westside Specific Plan development project will help to alleviate the housing shortage especially with respect to affordable apartments and duplexes in our region. And as the location of the project is close to downtown Sacramento, and as there are over 200,000 existing jobs within 5 miles of the plan area this type of compact development will help to meet the region's goals of reducing Vehicle Miles Travel (VMT) and Greenhouse Gas emissions (GHG).
- The Urban town center that is envisioned by this project is similar to Santana Row in San Jose with mid-rise architecture and active pedestrian median. The town center will help create jobs as well in the community.
- The Westside Canal that is proposed as part of this project will create a unique urban waterfront experience.
- The Upper Westside Specific Plan development project will leverage the extensive investment that has occurred in the Natomas basin (airport, freeway interchanges,

111-1

downtown, levees, etc.). As such it represents principles of smart growth by utilizing existing infrastructure and providing housing near job centers.

111-1 cont.

Again, I would like to express my strong support for the **Upper Westside Specific Plan** development project.

Thank you,

Srirama Tanniru ('Sri')

From: Dan Ramos <danramos@ramco-ent.com>
Sent: Wednesday, October 2, 2024 5:13 PM
To: Patten. Emma <PattenE@SacCounty.gov>
Subject: Support for Upper Westside Specific Plan and DEIR

Subject: Support for Upper Westside Specific Plan and DEIR

Chair, members of the CPAC, my name is Dan Ramos. Unfortunately, I will be out of town on your scheduled hearing date. I am writing on behalf of the Ramos family. Our company (Ramco Enterprises, Inc) / Family owns approximately 35 acres within the Upper Westside project area. We have owned the land for more than 50 years. The basin has changed dramatically since we bought the property. Farming and agriculture were the prime land use then. Our property is surrounded by residential and commercial development now. Our tenant farmer struggles every year to adequately produce an economical crop and is sometimes harassed by the surrounding neighborhood. 112-1

I want to commend Tim Denham and his team at Wood Rodgers on developing a thoughtful land use plan that creates a connection from the project site to downtown Sacramento. Also, his team has done an outstanding job of communicating to us ,property owners,

on every step of this entitlement process which we are very thankful for their communication efforts.

Our family has a long history of investment in the Natomas basin. We, along with our partners, have invested many decades of our family's time and money to develop Metro Airpark, one of the largest industrial, manufacturing and distribution hubs in the region. We are invested in Natomas and want to ensure that it develops while being able to preserve its history.

We strongly urge the CPAC and ultimately the Board of Supervisors to approve our project because it's smart planning according to true environmentalists with its proximity to the downtown Sacramento job center and one of the only places in our region that makes sense to continue growing.

112-1 cont.

Thanks for your consideration,

Dan Ramos

Daniel F. Ramos

RAMCO ENTERPRISES, INC.

1450 Harbor Blvd., Suite B
West Sacramento, CA 95691
(916) 372-6170 office
(916) 254-5372 facsimile
(916) 919-1824 cellular

Siempre Adelante

From: Amarjit Dhillon [adhillon218@gmail.com]
Sent: Wednesday, October 2, 2024 10:50 PM
To: Patten. Emma [pattene@saccounty.gov]; Clerk of the Board Public Email [boardclerk@saccounty.gov]
Subject: Support for Upper West side project

Categories: Public Comment

My name is Amarjit Dhillon and I support this project. 113-1

Thanks

From: Ann Burke [ann_burke@mindspring.com]
Sent: Wednesday, October 2, 2024 3:51 PM
To: Clerk of the Board Public Email [BoardClerk@saccounty.gov]
Subject: Upper Westside Specific Plan

Categories: Public Comment

I am writing to let you know that I am opposed to further development in the Upper Westside Specific Plan. Traffic in North Natomas has become extremely congested. With the apartment buildings already constructed, the roads are inadequate regardless of the time of day. If we ever had to evacuate our homes, we would not be able to safely get out of our Community because the current roads could not handle emergency traffic. In addition, the pollution is creating more problems for me and my husband. We have been more prone to colds and congestion than we have ever experienced. These lands were supposed to be designated green space which was an important factor when we decided to build have. We have watched our green space be taken over by unnecessary building that is occurring too fast for our emergency services to maintain.

Please do not allow further unnecessary building to occur. Thank you.

114-1

Ann Burke (ann_burke@mindspring.com)

From: Brittany Brazil
Sent: Wednesday, October 2, 2024 11:32 AM
To: Patten. Emma
Subject: Upper Westside Support

Dear Chair Christopher and Members of the Natomas CPAC Board,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

The Upper Westside project is situated within the Natomas Joint Vision Overlay Area, which has been under discussion for potential development for several decades. This project satisfies the General Plan's LU-120 performance-based and design criteria which was developed in coordination with SACOG, ensuring that it fits within the established framework for thoughtful growth.

As a member of the Natomas community, I recognize the struggles faced by local farmers due to the changing landscape around them. The Upper Westside project offers a balanced approach to land use, preserving a 542-acre agricultural buffer to protect farmland and preserve open space.

The Upper Westside development embodies SACOG's smart growth principles by utilizing existing infrastructure and providing housing near job centers. The proposed "town center" is within 3.5 miles of downtown Sacramento. More than two-thirds of the project boundary is adjacent to existing development. This project is essentially an infill development that will reduce sprawl, offer a variety of housing types, and provide easy access to jobs and transit. Of the 9,356 proposed housing units, more than 52% will be multi-family attached units, which are crucial in addressing our region's housing crisis, particularly the need for affordable apartments and duplexes. 115-1

Traffic concerns have been addressed as well. The project's location and mix of land uses result in traffic levels below the 85% threshold of baseline conditions, which is an important indicator of its suitability for the area. The developers have also prepared a comprehensive Resource Conservation Strategy, which ensures that impacts on farmland and local habitats will be responsibly mitigated.

The Upper Westside Specific Plan represents a well-balanced and forward-thinking approach to development in the most logical place in our region. It respects the areas

agricultural heritage, addresses urgent housing needs, and supports economic growth, all while minimizing environmental impacts.

I urge the Natomas CPAC to support this project and help guide our community into a sustainable future.

115-1 cont.

Thank you for your consideration.

Brittany Brazil

From: Diana
Sent: Monday, September 30, 2024 1:11 PM
To: Patten. Emma
Subject: Upper Westside Development

Dear Chair Christopher and Members of the Natomas CPAC Board,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

The Upper Westside project is situated within the Natomas Joint Vision Overlay Area, which has been under discussion for potential development for several decades. This project satisfies the General Plan's LU-120 performance-based and design criteria which was developed in coordination with SACOG, ensuring that it fits within the established framework for thoughtful growth.

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116-1

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The Upper Westside Specific Plan represents a well-balanced and forward-thinking approach to development in the most logical place in our region. It respects the areas agricultural heritage, addresses urgent housing needs, and supports economic growth, all while minimizing environmental impacts.

I urge the Natomas CPAC to support this project and help guide our community into a

sustainable future.

116-1
cont.

Thank you for your consideration.

Sincerely,
Diana L Brazil

From: JOSEPH BRAZIL
Sent: Wednesday, October 2, 2024 9:45 AM
To: Patten. Emma
Subject: Joe Brazil - Upper Westside CPAC comment

Dear CPAC Members:

My name is Joseph Brazil, and I appreciate the opportunity to provide my perspective regarding the Upper Westside project and the land my family has farmed for nearly 80 years. As a farming family in the Natomas Boot, we have witnessed first-hand how urbanization and changing conditions have made agriculture in this area increasingly unsustainable. I would like to address some of the concerns raised about converting farmland for the Upper Westside development.

The Reality of Farming in Natomas Today
There is a prevailing concern that this land should remain designated as farmland. While I respect the importance of agriculture, it's essential to recognize that the viability of farming in this area has diminished drastically. Over the decades, urbanization has surrounded our farmland, introducing challenges such as theft, vandalism, increased traffic, and restrictions on farming techniques due to proximity to homes and businesses. These conditions have made it nearly impossible to farm profitably.

In recent years, our family has been forced to sell a portion of our land simply to keep our farming operations afloat. Despite these efforts, the financial strain continues to grow. Maintaining an agricultural designation for this land ignores the on-the-ground reality that farming here is no longer practical or sustainable. For those who claim this is still "prime farmland," I invite them to take a closer look at the everyday challenges we face as farmers in this urbanized landscape.

117-1

Farmland Conversion and Responsible Development
The conversion of farmland for development is a major concern for many, but the Upper Westside project offers a balanced approach to addressing this issue. For every acre of farmland converted, the project will implement a 1:1 mitigation ratio, preserving an equivalent amount of agricultural land elsewhere in Sacramento County. This ensures that while development proceeds, farmland preservation efforts continue in other areas better suited for agriculture.

Furthermore, the Upper Westside project has carefully planned to include a 534-acre agricultural buffer along its western edge to minimize conflicts between urban and agricultural uses. This buffer will help protect the surrounding farmland and reduce the impact of urban activities on agricultural operations.

Addressing Environmental Concerns
While converting farmland is always a sensitive issue, the Upper Westside development has taken significant steps to mitigate its environmental impact. Wildlife corridors and habitat restoration efforts are part of the plan to ensure that local ecosystems, including those supporting special-status species like the Swainson's Hawk and the giant garter snake, remain intact. By including these measures, the project strikes a balance between necessary urban growth and environmental stewardship.

The Need for Housing and Economic Growth
Sacramento is facing a housing crisis, and responsible development like the Upper Westside project is essential to meet the region's growing population and housing demands. The project will provide desperately needed housing units within biking distance to downtown Sacramento. The project will include commercial and office space, creating nearly 90,000 new jobs during construction and in the long term. This development is designed to integrate with the existing urban fabric of Sacramento, while minimizing environmental impacts through sustainable practices such as green building designs and transportation improvements.

The notion that this land can continue as viable farmland is, unfortunately, no longer accurate. My family has farmed here for generations, but the challenges we face today are insurmountable. The Upper Westside project offers a forward-thinking solution that balances the need for development with responsible farmland mitigation and environmental protections.

By embracing this development, we can help address Sacramento's housing crisis, create jobs, and ensure that farmland preservation efforts continue in areas where agriculture remains sustainable. I urge you to support this project as it presents a thoughtful and necessary step forward for our community.

117-1 cont.

Thank you for your time and consideration.

Sincerely,
Joseph Brazil
Trustee of J&D Natomas Property Trust and JDL&M Natomas Property Trust
(916) 489-1950
GoodNewsJoe@comcast.net

From: Sabrina Brazil
Sent: Wednesday, October 2, 2024 10:30 AM
To: Patten. Emma
Subject: Support CPAC Item: Upper Westside Specific Plan

Dear Chair Christopher and Members of the Natomas CPAC Board,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

The Upper Westside project is situated within the Natomas Joint Vision Overlay Area, which has been under discussion for potential development for several decades. This project satisfies the General Plan's LU-120 performance-based and design criteria which was developed in coordination with SACOG, ensuring that it fits within the established framework for thoughtful growth.

As a member of the Natomas community, I recognize the struggles faced by local farmers due to the changing landscape around them. The Upper Westside project offers a balanced approach to land use, preserving a 542-acre agricultural buffer to protect farmland and preserve open space.

The Upper Westside development embodies SACOG's smart growth principles by utilizing existing infrastructure and providing housing near job centers. The proposed "town center" is within 3.5 miles of downtown Sacramento. More than two-thirds of the project boundary is adjacent to existing development. This project is essentially an infill development that will reduce sprawl, offer a variety of housing types, and provide easy access to jobs and transit. Of the 9,356 proposed housing units, more than 52% will be multi-family attached units, which are crucial in addressing our region's housing crisis, particularly the need for affordable apartments and duplexes.

118-1

Traffic concerns have been addressed as well. The project's location and mix of land uses result in traffic levels below the 85% threshold of baseline conditions, which is an important indicator of its suitability for the area. The developers have also prepared a comprehensive Resource Conservation Strategy, which ensures that impacts on farmland and local habitats will be responsibly mitigated.

The Upper Westside Specific Plan represents a well-balanced and forward-thinking approach to development in the most logical place in our region. It respects the areas agricultural heritage, addresses urgent housing needs, and supports economic growth, all while minimizing environmental impacts.

I urge the Natomas CPAC to support this project and help guide our community into a sustainable future.

118-1 cont.

Thank you for your consideration.
Sabrina Brazil

Sent from my iPhone

From: D C
Sent: Monday, September 30, 2024 5:04 PM
To: Patten. Emma
Subject: Support CPAC Item: Upper Westside Specific Plan

Dear Chair Christopher and Members of the Natomas CPAC Board,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

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119-1

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agricultural heritage, addresses urgent housing needs, and supports economic growth, all while minimizing environmental impacts.

I urge the Natomas CPAC to support this project and help guide our community into a sustainable future.

Thank you for your consideration.

Dennis Crabtree

From: Med Aid
Sent: Wednesday, October 2, 2024 12:49 PM
To: Patten. Emma
Subject: Upper West Side Plan...

Dear Chair Christopher and Members of the Natomas CPAC Board,

I am writing to lend my voice in support of the Upper West Side Specific Plan, a project that mirrors our community's vision for growth while addressing the unfortunate housing shortage in the Sacramento area. Please accept my Vote in backing this project. If there are any questions or concerns, I can be reached at the number below. 120-1

Thank you,

Erick Deeton, Pharm D.
Med-Aid Pharmacy
(916) 736-3188

From: Erick Deeton Sr.
Sent: Wednesday, October 2, 2024 1:38 PM
To: Patten. Emma
Subject: Upper westside project support
Attachments: CPAC Letter Final (1).docx

Hi,

I support Upper Westside project.

Sincerely,
Erick Deeton

Dear Chair Christopher and Members of the Natomas CPAC Board,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

The Upper Westside project is situated within the Natomas Joint Vision Overlay Area, which has been under discussion for potential development for several decades. This project satisfies the General Plan's LU-120 performance-based and design criteria which was developed in coordination with SACOG, ensuring that it fits within the established framework for thoughtful growth.

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Traffic concerns have been addressed as well. The project's location and mix of land uses result in traffic levels below the 85% threshold of baseline conditions, which is an important indicator of its suitability for the area. The developers have also prepared a comprehensive Resource Conservation Strategy, which ensures that impacts on farmland and local habitats will be responsibly mitigated.

The Upper Westside Specific Plan represents a well-balanced and forward-thinking approach to development in the most logical place in our region. It respects the areas agricultural heritage, addresses urgent housing needs, and supports economic growth, all while minimizing environmental impacts.

I urge the Natomas CPAC to support this project and help guide our community into a sustainable future.

Thank you for your consideration.

From: c tru
Sent: Wednesday, October 2, 2024 1:33 PM
To: Patten. Emma
Subject: Support project
Attachments: CPAC Letter Final (1).docx

Hi,

I support this project.

Sincerely,
Chi Deeton

Dear Chair Christopher and Members of the Natomas CPAC Board,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

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122-1

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The Upper Westside Specific Plan represents a well-balanced and forward-thinking approach to development in the most logical place in our region. It respects the areas agricultural heritage, addresses urgent housing needs, and supports economic growth, all while minimizing environmental impacts.

I urge the Natomas CPAC to support this project and help guide our community into a sustainable future.

Thank you for your consideration.

From: Bobby Gosal
Sent: Monday, September 30, 2024 4:05 PM
To: Patten. Emma
Subject: Support CPAC Item: Upper Westside Specific Plan

Dear Chair Christopher and Members of the Natomas CPAC Board,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

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123-1

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The Upper Westside Specific Plan represents a well-balanced and forward-thinking approach to development in the most logical place in our region. It respects the areas agricultural heritage, addresses urgent housing needs, and supports economic growth, all while minimizing environmental impacts.

I urge the Natomas CPAC to support this project and help guide our community into a sustainable future. 123-1 cont.

Thank you for your consideration.

Bobby Gosal
570 Hawkcrest Circle
Sacramento Ca 95835

916-715-0035

•

From: dean@2bsls.com
Sent: Wednesday, October 2, 2024 2:04 PM
To: Patten. Emma
Subject: Chair and Members...

Dear Chair Christopher and Members of the Natomas CPAC Board,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

The Upper Westside project is situated within the Natomas Joint Vision Overlay Area, which has been under discussion for potential development for several decades. This project satisfies the General Plan's LU-120 performance-based and design criteria which was developed in coordination with SACOG, ensuring that it fits within the established framework for thoughtful growth.

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The Upper Westside Specific Plan represents a well-balanced and forward-thinking approach to development in the most logical place in our region. It respects the areas agricultural heritage, addresses urgent housing needs, and supports economic growth, all while minimizing environmental impacts.

I urge the Natomas CPAC to support this project and help guide our community into a sustainable future.

Thank you for your consideration.

Lawrence D Grzelak

From: Paul Jacinth
Sent: Tuesday, October 1, 2024 8:05 AM
To: Patten. Emma
Subject: Dear Chair and Members

Dear Chair Christopher and Members of the Natomas CPAC Board,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

The Upper Westside project is situated within the Natomas Joint Vision Overlay Area, which has been under discussion for potential development for several decades. This project satisfies the General Plan's LU-120 performance-based and design criteria which was developed in coordination with SACOG, ensuring that it fits within the established framework for thoughtful growth.

I recognize the struggles faced by local farmers in the Natomas area due to the changing landscape around them. The Upper Westside project offers a balanced approach to land use, preserving a 542-acre agricultural buffer to protect farmland and preserve open space.

The Upper Westside development embodies SACOG's smart growth principles by utilizing existing infrastructure and providing housing near job centers. The proposed "town center" is within 3.5 miles of downtown Sacramento. More than two-thirds of the project boundary is adjacent to existing development. This project is essentially an infill development that will reduce sprawl, offer a variety of housing types, and provide easy access to jobs and transit. Of the 9,356 proposed housing units, more than 52% will be multi-family attached units, which are crucial in addressing our region's housing crisis, particularly the need for affordable apartments and duplexes. 125-1

Traffic concerns have been addressed as well. The project's location and mix of land uses result in traffic levels below the 85% threshold of baseline conditions, which is an important indicator of its suitability for the area. The developers have also prepared a comprehensive Resource Conservation Strategy, which ensures that impacts on farmland and local habitats will be responsibly mitigated.

The Upper Westside Specific Plan represents a well-balanced and forward-thinking approach to development in the most logical place in our region. It respects the areas agricultural heritage, addresses urgent housing needs, and supports economic growth, all while minimizing environmental impacts.

I urge the Natomas CPAC to support this project and help guide our community into a sustainable future.

125-1 cont.

Thank you for your consideration.

Please take note of my new email address.
paul@jacinthinsurance.com
I appreciate your business!

Paul J Jacinth

916-470-7772
PO BOX 1041
NEWCASTLE, CA 95658
License # 0818989, 3320847, 807285, 2549690 NIPR # 2549690

follow and like us on

From: Shalayne Jorn
Sent: Wednesday, October 2, 2024 11:09 AM
To: Patten. Emma
Subject: CPAC Comment on Upper Westside

Dear Chair Christopher and Members of the Natomas CPAC Board,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

The Upper Westside project is situated within the Natomas Joint Vision Overlay Area, which has been under discussion for potential development for several decades. This project satisfies the General Plan's LU-120 performance-based and design criteria which was developed in coordination with SACOG, ensuring that it fits within the established framework for thoughtful growth.

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126-1

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The Upper Westside Specific Plan represents a well-balanced and forward-thinking approach to development in the most logical place in our region. It respects the areas agricultural heritage, addresses urgent housing needs, and supports economic growth, all while minimizing environmental impacts.

I urge the Natomas CPAC to support this project and help guide our community into a sustainable future. 126-1 cont.

Thank you for your consideration.
Shalayne Jorn

From: Sam Kermanian
Sent: Tuesday, October 1, 2024 4:46 PM
To: Patten. Emma
Subject: Letter of support for the Upper Westside Specific Plan

Dear Chair Christopher and Members of the Natomas CPAC Board,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

The Upper Westside project is situated within the Natomas Joint Vision Overlay Area, which has been under discussion for potential development for several decades. This project satisfies the General Plan's LU-120 performance-based and design criteria which was developed in coordination with SACOG, ensuring that it fits within the established framework for thoughtful growth.

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I urge the Natomas CPAC to support this project and help guide our community into a sustainable future.

127-1 cont.

Thank you for your consideration.

Sam Kermanian

From: alopezz1@aol.com
Sent: Monday, September 30, 2024 4:24 PM
To: Patten. Emma
Subject: Upper Westside Specific Plan

Dear Chair Christopher and Members of the Natomas CPAC Board,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

The Upper Westside project is situated within the Natomas Joint Vision Overlay Area, which has been under discussion for potential development for several decades. This project satisfies the General Plan's LU-120 performance-based and design criteria which was developed in coordination with SACOG, ensuring that it fits within the established framework for thoughtful growth.

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The Upper Westside Specific Plan represents a well-balanced and forward-thinking approach to development in the most logical place in our region. It respects the areas agricultural heritage, addresses urgent housing needs, and supports economic growth, all while minimizing environmental impacts.

I urge the Natomas CPAC to support this project and help guide our community into a sustainable future.

128-1 cont.

Thank you for your consideration.

Alex Lopez

From: Manuel Lopez
Sent: Monday, September 30, 2024 5:05 PM
To: Patten. Emma
CC: Manuel Lopez
Subject: The Upper Westside Specific Plan

Dear Chair Christopher and Members of the Natomas CPAC Board,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

The Upper Westside project is situated within the Natomas Joint Vision Overlay Area, which has been under discussion for potential development for several decades. This project satisfies the General Plan's LU-120 performance-based and design criteria which was developed in coordination with SACOG, ensuring that it fits within the established framework for thoughtful growth.

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The Upper Westside Specific Plan represents a well-balanced and forward-thinking approach to development in the most logical place in our region. It respects the areas agricultural heritage, addresses urgent housing needs, and supports economic growth, all while minimizing environmental impacts.

I urge the Natomas CPAC to support this project and help guide our community into a sustainable future. 129-1 cont.

Thank you for your consideration.

Manuel Lopez

From: Ashley Milton
Sent: Monday, September 30, 2024 1:23 PM
To: Patten. Emma
Subject: Upper Westside

Dear Chair Christopher and Members of the Natomas CPAC Board,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

The Upper Westside project is situated within the Natomas Joint Vision Overlay Area, which has been under discussion for potential development for several decades. This project satisfies the General Plan's LU-120 performance-based and design criteria which was developed in coordination with SACOG, ensuring that it fits within the established framework for thoughtful growth.

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130-1

Traffic concerns have been addressed as well. The project's location and mix of land uses result in traffic levels below the 85% threshold of baseline conditions, which is an important indicator of its suitability for the area. The developers have also prepared a comprehensive Resource Conservation Strategy, which ensures that impacts on farmland and local habitats will be responsibly mitigated.

The Upper Westside Specific Plan represents a well-balanced and forward-thinking approach to development in the most logical place in our region. It respects the areas agricultural heritage,

addresses urgent housing needs, and supports economic growth, all while minimizing environmental impacts.

130-1 cont.

I urge the Natomas CPAC to support this project and help guide our community into a sustainable future.

Thank you for your consideration.

Ashley Milton
AshleyMilton@Live.com
(916) 676-5135

From: Fredo Sanchez
Sent: Tuesday, October 1, 2024 9:48 AM
To: Patten. Emma
Subject: Upper Westside Specific Plan

Dear Chair Christopher and Members of the Natomas CPAC Board,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

The Upper Westside project is situated within the Natomas Joint Vision Overlay Area, which has been under discussion for potential development for several decades. This project satisfies the General Plan's LU-120 performance-based and design criteria which was developed in coordination with SACOG, ensuring that it fits within the established framework for thoughtful growth.

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The Upper Westside Specific Plan represents a well-balanced and forward-thinking approach to development in the most logical place in our region. It respects the areas agricultural heritage, addresses urgent housing needs, and supports economic growth, all while minimizing environmental impacts.

I urge the Natomas CPAC to support this project and help guide our community into a sustainable future. 131-1 cont.

Thank you for your consideration.

Fredo Sanchez
916-882-9691

From: Jordan Walker
Sent: Tuesday, October 1, 2024 7:45 AM
To: Patten. Emma
Subject: Upper Westside Community

Dear Chair Christopher and Members of the Natomas CPAC Board,

My name is Jordan Walker. I wanted to reach out and address my position on the Upper Westside community.

I strongly support the Upper Westside Specific Plan, a development that will significantly benefit our community. The project will help alleviate Sacramento's housing crisis by providing a diverse range of housing options, including affordable multi-family units. Its location near downtown offers easy access to jobs and transit, reducing commute times and promoting a sustainable lifestyle.

The project also preserves a 542-acre agricultural buffer, maintaining the region's agricultural roots while embracing growth. Its smart design minimizes traffic impacts and promotes environmental stewardship with a Resource Conservation Strategy that mitigates harm to farmland and local habitats.

By leveraging existing infrastructure and encouraging infill development, the Upper Westside project will create a vibrant town center, boosting the local economy with job opportunities and new businesses. It fosters a balanced approach, respecting both urban needs and environmental concerns.

Supporting this project means promoting responsible growth that will strengthen our community and enhance the quality of life for residents.

132-1

Thank you for your consideration.

--
Jordan EA Walker

From: Nick Bennett
Sent: Monday, September 30, 2024 2:53 PM
To: Patten. Emma
Subject: Upper Westside Specific Plan

Dear Chair Christopher and Members of the Natomas CPAC Board,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

The Upper Westside project is situated within the Natomas Joint Vision Overlay Area, which has been under discussion for potential development for several decades. This project satisfies the General Plan's LU-120 performance-based and design criteria which was developed in coordination with SACOG, ensuring that it fits within the established framework for thoughtful growth.

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133-1

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I urge the Natomas CPAC to support this project and help guide our community into a sustainable future.

133-1 cont.

Thank you for your consideration.

--

Nicholas Bennett

m: 512.698.9615
a: Los Angeles, California, U.S.

From: Bill Schomberg [schombergbill@icloud.com]
Sent: Thursday, October 3, 2024 1:35 PM
To: Clerk of the Board Public Email [BoardClerk@saccounty.net]
Subject: Westside development

Categories: Public Comment

I oppose the building out of one of the last true open spaces in the Notomas basin it's not necessary we need open space for our children to appreciate what life in the valley used to be
Sent from my iPhone

134-1

From: Alex Lopez [alex.s.loka@gmail.com]
Sent: Thursday, October 3, 2024 1:32 PM
To: Clerk of the Board Public Email [BoardClerk@saccounty.gov]
Subject: Natomas Development Comment

Categories: Public Comment

From Alex Lopez/Kaufmann:

Please reconsider the proposal of additional construction and look at preserving this land. Our natural resources are some of our most defining features regionally and globally. I urge our local government to do its duty in ensuring the future rather than destroying the present, especially when we have other opportunities already within existing areas. 135-1

Thank you
Alex Lopez/Kaufmann

From: Lauren Carpenter [carpenterlauren1@gmail.com]
Sent: Thursday, October 3, 2024 1:28 PM
To: Clerk of the Board Public Email [BoardClerk@saccounty.gov]
Subject: Opposition to Upper Westside Development

Categories: Public Comment

Greetings,

I am sending this email in opposition to the Upper Westside Project that threatens our environment, wildlife habitat, and our community.

As the Draft Environmental Impact Report clearly states, the project would result in SIGNIFICANT and UNAVOIDABLE impact on the aesthetics, agricultural resources, air quality, cultural and historical resources, noice, population and housing, transportation, and tribal cultural resources.

It will further impact climate change, geology, soils, hydrology, srainiage, water quality, public services, and water supply to name but a few of the impacts on our region and community. As a homeowner on the Garden Highway, my family has already seen the destruction of habitat, increased traffic, noise, impact on our water supply, and pollution resulting from the levee project.

We have seen public safety response times decrease and increased crime. I am deeply concerned about the additional pressure and burdens placed on our community if the Westside project moves forward. It is estimated that 75 thousand more vehicles a day will travel the Garden Highway and West El Camino Avenue. In an emergency, there will be no safe evacuation routes and all of us will be trapped.

Moreover, as I understand it, the increased housing is not designed for middle and low income families, which is the housing that the Sacramento community needs, not thousands of new homes to appeal to bay area transplants that are out of reach for most Sacramentans.

136-1

This is a bad plan for the public and our community; designed only to profit developers and increase the tax base, at the expense of the rest of us and our environment. I urge you to reject this proposal.

Sincerely,

Lauren Carpenter
Garden Highway resident

From: Perjit Virk [perjitvirk@gmail.com]
Sent: Thursday, October 3, 2024 12:55 PM
To: Patten. Emma [pattene@saccounty.gov]; Clerk of the Board Public Email [BoardClerk@saccounty.gov]
Subject: UPPER WEST SIDE SPECIFIC PLAN

Categories: Public Comment

I like the upper west side plan and looking forward to it growing the Sacramento county with more jobs. Also will help with making Sacramento a more diverse and populated city which is great for future companies coming here. 137-1

Thank you

Perjit Virk

From: Fabian Lara [fabianlara81@gmail.com]
Sent: Thursday, October 3, 2024 11:09 AM
To: Clerk of the Board Public Email [BoardClerk@saccounty.gov]
Subject: Natomas Community Planning Council Meeting on Westside Development 10/03/2024

Categories: Public Comment

Greetings,

I am sending this email in opposition to the Upper Westside Project that threatens our environment, wildlife habitat, and our community. As the Draft Environmental Impact Report clearly states, the project would result in SIGNIFICANT and UNAVOIDABLE impact on the aesthetics, agricultural resources, air quality, cultural and historical resources, noice, population and housing, transportation, and tribal cultural resources. It will further impact climate change, geology, soils, hydrology, drainage, water quality, public services, and water supply to name but a few of the impacts on our region and community.

As a homeowner on the Garden Highway, my family has already seen the destruction of habitat, increased traffic, noise, impact on our water supply, and pollution resulting from the levee project. We have seen public safety response times decrease and increased crime. I am deeply concerned about the additional pressure and burdens placed on our community if the Westside project moves forward. It is estimated that 75 thousand more vehicles a day will travel the Garden Highway and West El Camino Avenue. In an emergency, there will be no safe evacuation routes and all of us will be trapped. Moreover, as I understand it, the increased housing is not designed for middle and low income families, which is the housing that the Sacramento community needs, not thousands of new homes to appeal to bay area transplants that are out of reach for most Sacramentans. 138-1

This is a bad plan for the public and our community; designed only to profit developers and increase the tax base, at the expense of the rest of us and our environment.

I urge you to reject this proposal.
Sincerely,

Fabian Lara

From: 2wingdam33@gmail.com
Sent: Thursday, October 3, 2024 2:31 PM
To: Clerk of the Board Public Email [BoardClerk@saccounty.gov]
CC: Supervisor Serna [SupervisorSerna@Saccounty.gov]
Subject: Opposition to Upper Westside Development Plan

October 3, 2024

To: Natomas Community Planning Council Members (BoardClerk@saccounty.gov)

From: Christine Olsen, Garden Highway, Sacramento

Subject: Opposition to Upper Westside Development Plan

People in Sacramento don't want to live in LA-like concrete sprawl. Hundreds of people - Sacramento residents, interest groups, experts, and government agencies have come together repeatedly, and spent thousands of hours to plan for growth that makes life better for everyone. Transportation and other urban service plans have been developed to support the County General Plan for development within the Urban Services Boundary. Planned growth saves taxpayers money by ensuring orderly growth of infrastructure and urban services. Planned growth protects Sacramento's quality of life.

The plan before you tonight is not consistent with the County General Plan. Three-quarters of the Upper Westside Plan is outside the Urban Services Boundary, where there is currently protected farmland, open space, and riparian habitat. Once that farmland, riparian habitat and open space is gone, the people of Sacramento lose that forever.

Environmental groups have come together to oppose this project. Their objections on behalf of all of us, deserve your support. Wildlife and wildlife areas contribute to the community's quality of life. We can't keep accepting mitigation that says wildlife needs to live elsewhere. Sacramento has committed to preserving and protecting habitat for the benefit of community health and the enjoyment of nature by current and future generations. Once you approve urban sprawl into protected areas, those natural areas and the wildlife they support are lost to Sacramentans forever.

Among the lengthy list of significant and unavoidable impacts from this project are loss of farmland, increased air pollution, and urban sprawl. We recognized during the pandemic that small family farms can be critical infrastructure. This project permanently wipes out about 1400 acres of already diminished available farmland. Increased air pollution from the project could result in significant health risks. The project, inconsistent with the County General Plan and the USB, is the urban sprawl we seek to avoid. It opens the door to more unplanned growth and raises public costs for unplanned infrastructure and services.

139-1

The Garden Highway Community Association opposes this project and will offer more detailed written comments in the near future. Specifically with respect to Garden Highway, the EIR failed

139-2

to address 2 critical impacts – noise and traffic. Garden Highway knows from experience that amplified sound can travel at least 2.5 miles from the source. The project before you has a stadium, and an outdoor pavilion that is one half mile from Garden Highway homes that will be blasted by sound from those facilities. Second, and critically, are traffic safety impacts on Garden Highway. The EIR calls for improvements at 3 Garden Highway intersections, anticipating significantly increased traffic onto Garden Highway, but there is no meaningful discussion of the traffic safety impacts of increased traffic all along Garden Highway. Garden Highway is a rural road on top of a levee. It is half the width it should be to meet safety standards. It has blind curves, no shoulders, no guardrails, and most dangerously a mixed use by regular vehicles, vehicles hauling boats, farm equipment, semi-trucks, cyclists, groups of cyclists and car clubs, pedestrians and wildlife that can all appear suddenly out of driveways and farm roads.

139-2 cont.

Getting planning right ensures a community we love to live in and community that works for everyone. This project is the spawl we all want to avoid. The County made a commitment to the people of Sacramento that the County would not expand the Urban Service Boundary unless there was inadequate vacant land within the USB to accommodate the projected 25-year demand for urban uses. There is ample land for development consistent with the County General Plan and within the Urban Services Boundary. Say no to any General Plan amendments or development outside the USB. Say no to sprawl. Say no to this project.

139-3

Thank you.

ECOS
ENVIRONMENTAL
COUNCIL
OF SACRAMENTO

Post Office Box 1526 | Sacramento, CA 95812-1526

October 21, 2024

Sacramento County Planning Commission

Justin Raithel, Chair
Jofil Borja, Vice Chair
Damon Conklin
Mariana Corona Sabeniano
Joseph Devlin

Sent by email to BoardClerk@saccounty.gov

SUBJECT: AGENDA ITEM 3, October 21, 2024 Sacramento County Planning Commission
Natomas – Upper Westside, PLNP2018-00284 – GP Amendment, Specific Plan, etc.

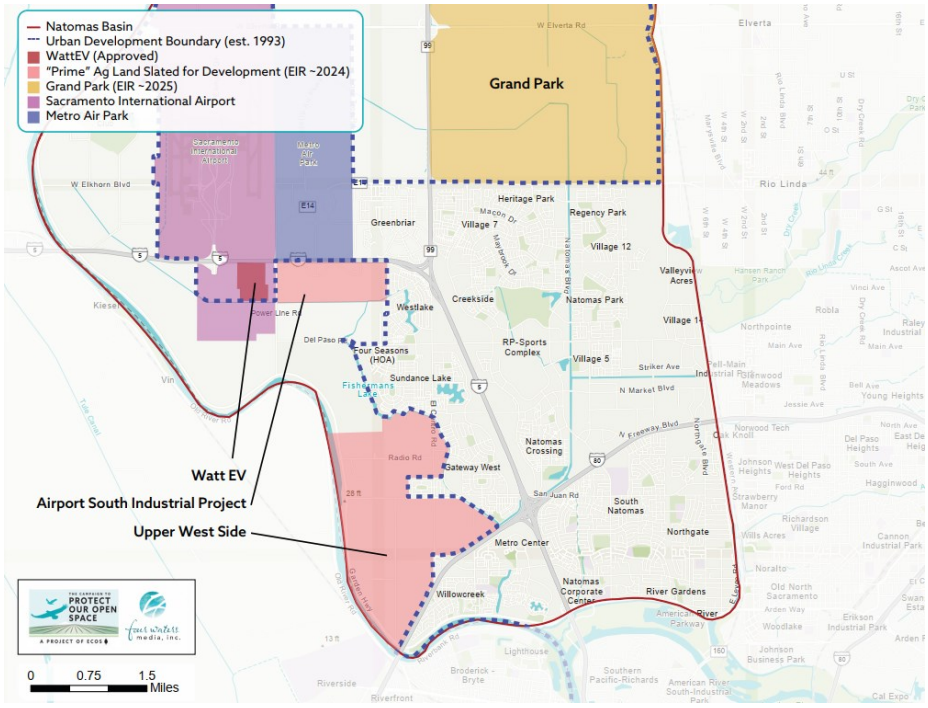
Dear Chair Raithel and Planning Commissioners,

The Environmental Council of Sacramento, which includes a number of Natomas residents, asks you to consider the following issues as you review the Upper Westside project and its Draft Environmental Impact Report.

1) **Consider all of the developments currently being proposed.** Review the Upper Westside in the context of the entire 8,000 acres across three projects now proposed for development in the Natomas Basin in Sacramento County.

   The map at right highlights the Upper Westside, Airport South Industrial, and Grand Park projects.

   These projects would dramatically decrease open land in Natomas and present impacts to traffic, air quality, flood control, the Natomas Basin Habitat Conservation Plan, and City services -- all of which should be considered together.

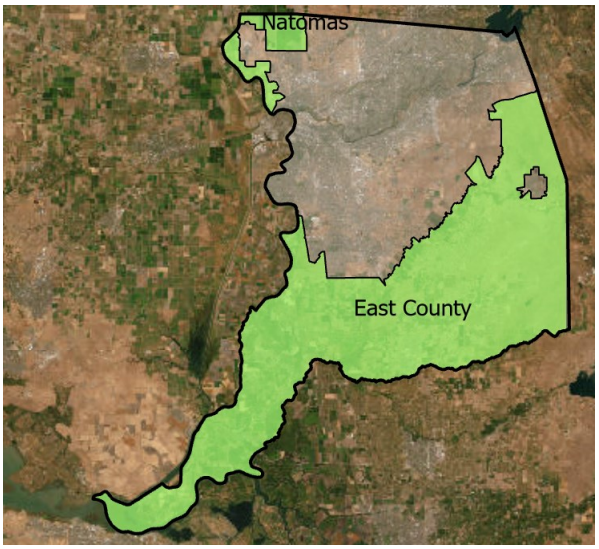


187-1

2) **Consider what it means to break through the Urban Services Boundary (USB).** This boundary, in place for three decades, is based upon jurisdictional, natural and environmental constraints to urban growth and "is intended to be a permanent growth boundary not subject to modification except under extraordinary circumstances."[1]

All three of the projects would break through the USB. Changes to the USB are to be made only for "extraordinary projects" and yet there is nothing extraordinary about Upper Westside except that it is close to the City of Sacramento. What is extraordinary about the area is the deep, prime agricultural soil from many years of overflow from the Sacramento River.

The USB was drawn in 1993 to protect development from the risk of flood and fire, and to preserve agriculture, ranch, and habitat lands. The image below of Sacramento County shows the urbanized area inside the USB, with areas outside of it in GREEN. With climate change, the USB is a bulwark of sustainability for our region.



Consider the requirements in Sacramento County's General Plan Policy LU-127 for projects that propose to break through the USB:

LU-127. The County shall not expand the Urban Service Boundary unless:
• There is inadequate vacant land within the USB to accommodate the projected 25-year demand for urban uses; and
• The proposal calling for such expansion can satisfy the requirements of a master water plan as contained in the Conservation Element; and
• The proposal calling for such expansion can satisfy the requirements of the Sacramento County Air Quality Attainment Plan; and
• The area of expansion does not incorporate open space areas for which previously secured open space easements would need to be relinquished; and
• The area of expansion does not include the development of important natural resource areas, aquifer recharge lands or prime agricultural lands;
• The area of expansion does not preclude implementation of a Sacramento County-adopted Habitat Conservation Plan;
OR
• The Board approves such expansion by a 4/5ths vote based upon on finding that the expansion would provide extraordinary environmental, social or economic benefits and opportunities to the County.

Given the impacts of this project on the region and the Natomas community, the Upper Westside project does not meet most of the listed requirements, nor does it merit a finding of extraordinary benefits and opportunities by 4/5ths of the Board of Supervisors.

187-1 cont.

[1] Sacramento County General Plan, Land Use Element

3) Consider what it means to develop on land not within the NBHCP/MAPHCP Permit Acres. The NBHCP is basin-wide for important biological reasons. The hatched areas on the Natomas Basin Habitat Conservation Plan (NBHCP) below indicate where development is permitted. Land outside of the NBHCP/MAPHCP Permit Acres "is designated for retention as Agricultural Cropland by the Sacramento County General Plan."[2]

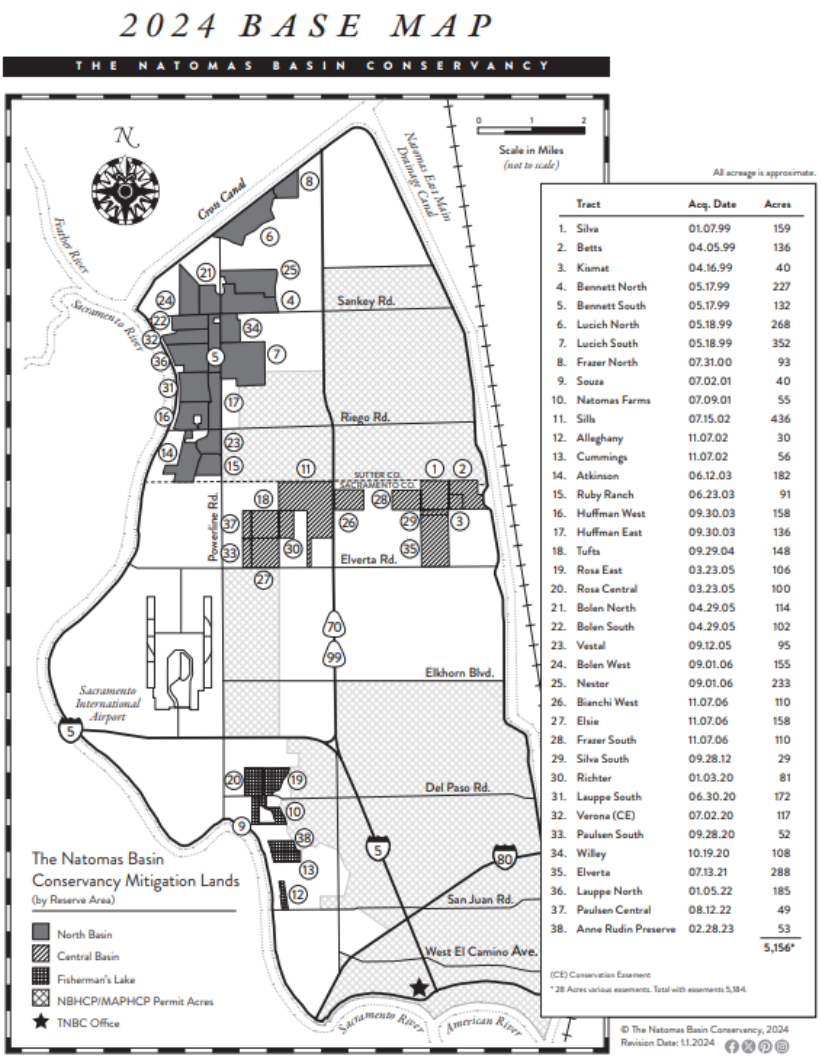
The Upper Westside project (Airport South Industrial and Grand Park as well) is proposed for areas outside of the NBHCP/MAPHCP Permit Acres. It would replace wildlife-supportive agriculture with concrete, vehicles and houses, severely impacting the resident wildlife in the Basin. The protection of resident wildlife in the Basin was promised when the City signed a contract with the federal government and approved the Natomas Basin Habitat Conservation Plan. Sacramento Area Flood Control Agency (SAFCA) also agreed to protect resident wildlife. The Upper Westside project cannot mitigate for its impacts to resident wildlife as the Natomas Basin is finite – the harm to the Basin's wildlife conservation efforts will be irreparable.

The Natomas Basin is a deep flood basin. Much of the interior of the Basin is lower than the elevation of the Sacramento and American Rivers, particularly during annual high-water flows in winter and spring.

The Natomas levees were designed for a 200-year storm, as it was understood at the time of design in the late 1990s. Climate change is creating a moving target for flood protection, we no longer can accurately estimate size and frequency of floods.

In a crisis, flood mitigation requires everything to work perfectly – pumps, electricity, detention basins, canals, river levels, and people. Hurricane Helene just provided an example of what happens when systems are overwhelmed by water.

Development in the Natomas Basin should be consistent with the NBHCP.



187-1 cont.

[2] https://natomasbasin.org/wp-content/uploads/natomas-basin-habitat-conservation-plan/5nbhcpland_use2006_a11y.pdf, pg III-13

4) **Consider how Upper Westside is inconsistent with the goals of the Blueprint.** On November 4, 2020, SACOG commented on the Notice of Preparation of the Upper Westside DEIR, stating "implementation of the Blueprint vision depends greatly on the efforts of cities and counties through local plans and projects. . . [and] the Upper Westside project and the project area itself are not anticipated for development in either the MTP/SCS or the Blueprint."[3]

This is still true today. SACOG's selected land use scenario for the 2025 MTP/SCS, dated April 2024, does not include the Upper Westside, or Airport South Industrial, or Grand Park – it includes no buildout in the coming decades, as shown in the excerpt at right.

Attachment A

2025 Blueprint (MTP/SCS) Discussion Scenario

April 2024

Jurisdiction/Community Type	Baseyear and Buildout				ng 24 Discussion ario			
	isting Conditions 020)		tential ildout		2020 - 2035		2020 - 2050	
	Jobs	using Units	os	sing Jnits	Jobs	using Units	os	sing s
amento City								
ntial Developing Communities (not yet under construction)								
Panhandle	-	-	-	,620	-	595	130	1,295
Airport South Industrial Project	-	-	-	-				
amento County Unincorporated								
ntial Developing Communities (not yet under construction)								
Cordova Hills	-	-	3,190	),000	320	350	600	1,500
Glenborough at Easton	-	-	1,800	,239	-	-	80	300
South Mather	-	-	940	,522	-	400	730	1,805
Aerojet	1,600	-	10,180	-				
Elverta	10	50	200	,627				
Grand Park	20	10	3,010	,892				
Jackson Township	10	30	900	,690				
Jackson West	1,240	110	11,210	,484			-	-
Newbridge	110	10	450	,075				
Upper Westside	430	60	3,820	),356				
New Induced Growth Areas	200	500	-	-				

SACOG went on to say "The Upper Westside project . . . raises important policy questions for the region's implementation of the Blueprint. For example, the capacity for growth in existing entitled lands far exceeds expected demand over the next twenty years: collectively, the region's jurisdictions have entitled, or are in the process of entitling **2.5 times the region's projected need for the next 20 years**. More than half of that capacity—387,000 units—is in greenfield areas that are on the edge of existing development."[4] This means there is far more entitled acreage for new homes than the market will bear. Upper Westside is not needed.

187-1 cont.

5) **Consider how Upper Westside is inconsistent with General Plans.** The project proposes a change to Sacramento County's General Plan from agricultural to residential/commercial uses. While the project would be in Sacramento County, it would likely be served with utilities and services by the City of Sacramento, and, in future, could be fully annexed into the City.

6) **Consider the project's effect on our Air Quality Plan.** The proposed project would worsen the Sacramento regions ability to meet state and federal air quality standards by interfering with implementation of our Air Quality Plan. The Upper Westside DEIR makes clear that the project's air quality impacts are significant and unavoidable. Failure to honor our Air Quality Plan could result in our area losing access to federal transportation funds.

[3] MTP/SCS or Blueprint - https://www.sacog.org/planning/blueprint

[4] James Corless, SACOG Ex Dir., November 4, 2020 letter to County Environmental Planning, Notice of Preparation of DEIR for Upper West Side Specific Plan (PLNP2018- 00284, p. 6)

7) **Consider the other areas available for development.** Open land inside the Urban Services Boundary (USB) is available for housing, both in the City of Sacramento and unincorporated Sacramento County – land that is not in a deep flood basin or on prime farmland. In addition, there is enormous capacity for infill development in existing communities, especially around transit stations. Building in communities with existing public infrastructure and services can limit costs to local jurisdictions for maintenance and operations, and it can lower the combined housing-transportation costs to households. While the Upper Westside project proposes the City of Sacramento extend its utilities and services to the project, the City's new 2040 General Plan strongly emphasizes infill development to provide needed housing.

8) **Consider the land uses being proposed.** We need more housing, but it does not need to be located in the Natomas Basin; and the Upper Westside project does not address our most critical housing need -- for low income households.

   The project proposes three million square feet of commercial space. For comparison, the Westfield Galleria shopping mall in Roseville is 1.3 million square feet. If this commercial space is built, will it take the life out of the 100,000 square-foot shopping mall at West El Camino and Truxel Road?

   The proposed site is on the urban edge, bounded by the Sacramento River. For an educational campus, this means difficult access by automobile, and certainly by public transit.

9) **Consider the traffic impacts.** The project proposes 9,000 residences and three million square feet of commercial space, plus the schools. The project will be almost entirely auto-centric. Thousands of auto-trips each day will significantly impact El Centro Road and West El Camino (whose width varies from 2 lanes to 6 lanes between I-80 and Northgate Blvd), as well as Garden Highway and San Juan Road (neither of which can be widened.)

   Traffic will increase throughout South Natomas. The six-lane West El Camino overpass of I-80 and El Centro Road, at the primary gateway to the project, will be especially congested. This junction and the gateway itself, intended to be a "smart growth street", will be bumper to bumper.

187-1 cont.

10) **Consider impacts on biological resources.** The Upper Westside Specific Plan (UWSP), if approved, would harm the viability of the NBHCP conservation strategy and impair NBC's ability to protect wildlife in its preserve system. The UWSP conflicts with the NBHCP's intent to conserve wildlife in the Basin and fails to comply with the NBHCP's proviso that additional development outside of the NBHCP/MAPHCP Permit Acres be mitigated by amending the NBHCP or writing/obtaining approval of a new HCP to cover the project's impacts.

    The NBHCP/MAPHCP Permit Acres are not built out so the impact on wildlife of full buildout is yet to be determined. At this time, key species are showing signs of serious decline, so, now is not the time to remove habitat. Instead NBC should respond with strategic and tactical remedial actions and additional resources.

    NBC's monitoring studies show Giant Garter Snake (GGS) has not been found at Fisherman's Lake since 2017. This key indicator of species protection performance shows that the range of this federally endangered species has been reduced by development despite significant effort by NBC to build robust GGS preserves. This problem must be corrected before any more development outside of the NBHCP/MAPHCP Permit Acres is considered. The UWSP would have direct and indirect impacts on the Fisherman's Lake preserve area and NBC and SAFCA mitigation properties included in and adjacent to the UWSP. The proposed mitigation is deferred, speculative, out of basin, and inadequate.

187-2

The UWSP removes 2,000 acres of essential habitat in the Swainson's Hawk zone, a key part of the NBHCP conservation strategy. Yet the Draft Environmental Impact Report does not mention the NBHCP's requirement for development projects proposed for land outside of the NBHCP/MAPHCP Permit Acres to obtain 2081 permits from the CA Department of Fish and Wildlife. Swainson's Hawk monitoring by the NBC has shown huge swings in nesting productivity, indicating a population under stress and unstable. The NBHCP is designed to support the Basin population of Swainson's Hawks through the various natural stresses in the environment. But this guarantee is only with the availability of at least 13,000 acres of foraging habitat, focused in the Swainson's Hawk Zone, maintained in the Basin in perpetuity per the 2003 NBHCP. UWSP proposes to mitigate for these impacts somewhere out of Basin. The project will result in the reduction of the range of the Swainson's Hawk and severely compromise its sustainability in the Natomas Basin.

187-2 cont.

11) Consider impacts on ground conditions. Development of the region would likely cause subsidence of the project area and exacerbate risks for natural hazards like flooding.

With 3 million square feet of commercial use, the weight load of construction may increase subsidence. The land proposed for the Upper Westside development, with its particular soil type, flood plain status, and proximity to the Hunting Creek-Berryessa fault system, has experienced "moderate to high land subsidence in the past." (DEIR, 11-15) Considering the area consists largely of expansive soils that shrink and expand dynamically, additional subsidence should be expected. In addition to the structural hazards that progressive subsidence poses, further depression of the already low-lying land would increase the intensity and range of flooding in and surrounding the area.

187-3

Project designs for Upper Westside should factor in the subsidence and flooding that the buildings will cause; should evaluate the buildings' contribution to regional subsidence and flooding and ensure that existing structures in the surrounding areas will not be compromised as a result of new construction-related subsidence.

While safe, code-compliant designs can mitigate the subsidence and flood risks to the buildings, the required structural and seismic measures may alter the land itself, and they may be costly. How costly would development of California Building Code- and County-compliant structures be, compared to development in other already approved greenfield plots within the USB?

12) "It's housing – what's not to like?!"

The capacity for growth in existing entitled lands far exceeds expected demand over the next twenty years according to SACOG. "Collectively, the region's jurisdictions have entitled, or are in the process of entitling **2.5 times the region's projected need for the next 20 years**. More than half of that capacity—387,000 units—is in greenfield areas that are on the edge of existing development."[5]

187-4

This means there is far more entitled acreage for new homes than the market will bear. Upper Westside is not needed.

[5] James Corless, SACOG Ex Dir., November 4, 2020 letter to County Environmental Planning, Notice of Preparation of DEIR for Upper West Side Specific Plan (PLNP2018- 00284, p. 6)

Conclusion:

The Upper Westside conflicts with land use planning actions of regional significance including:

- Blueprint – the Sacramento region's smart growth plan concept that then-Senator Darrell Steinberg applied statewide in 2008 through SB375;
- Urban Services Boundary (USB) -- a Sacramento County construct, but which now in light of climate change has regional significance) See the Powerpoint on why the USB was delineated as it was – the forces that shaped it;
- Natomas Basin Habitat Conservation Plan – to protect twenty-two threatened species.

Each of these actions was hard won, painstakingly agreed to, and in place for decades. These land use actions are our legacy; they represent our core values. They are sustainability bulwarks against climate change. Don't toss them aside.

Today, Sacramento County staff recommends that you end the DEIR process and "direct staff to prepare the FEIR."

If you do this, you will turn your back on our planning legacy. Instead, we ask that you direct staff to reject the project and stop the process.

Sincerely,

Heather Fargo

Heather Fargo, Chair
ECOS Natomas Team

Susan Herre AIA AICP
President of the Board of Directors

From: Patrick Tully <ptully@bitwiseproperties.com>
Sent: Monday, October 21, 2024 4:16 PM
To: Clerk of the Board Public Email <BoardClerk@saccounty.gov>
CC: Supervisor Serna <supervisorserna@saccounty.gov>
Subject: Sacramento County Planning Commissioners; GHCA Opposition to Upper Westside Development

TO: Sacramento County Planning Commissioners

From: Garden Highway Community Association (GHCA)

Dear Commissioners & Supervisor Serna,

Thank you for your service to the community. We appreciate the hard work you and your staff put into making a good community. We know it is not easy. GHCA is the community association residents living along Garden Hwy, from the City of Sacramento to Sutter County (and including Sutter County). Many of our homes directly border the proposed Upper Westside Development Plan.

We are writing today in opposition to this plan. Two primary concerns for our members are**: First, the significant reduction of the urban services boundary between the Sacramento River and the proposed Development & Second, the incredible increase of traffic the development will put onto the Garden Highway**. Details of each issue are included below.

We urge the planning commissioners to consider other alternatives which keep the Urban Services boundary at its current distance, and to provide an alternative "ring" road which will keep north/south/I-5 traffic off of Garden Highway.

Sincerely,
Patrick Tully
President
Garden Highway Community Association (GHCA)

Arguments About Violating the Urban Services Boundary and Existing County Plans

Before considering this project, we urge you to hold public hearings on expanding the Urban Services Boundary. This project is outside the Urban Services Boundary. Before considering any development outside the Urban Services Boundary, we urge the County to pause development applications outside the Urban Services Boundary and hold hearings on whether the Urban Services Boundary should be expanded. If one project is approved beyond the Urban Services Boundary, other developments will surely follow, and the Urban Services boundary will no longer function as a barrier intended to preserve open space, habitat and

188-1

farmland. Changing the Urban Services Boundary will have significant negative impacts on the environment and Sacramento County residents far beyond the Upper Westside project area. 188-1 cont.

This project represents the urban sprawl which Sacramento County residents have said they do not want, and which the County's 2030 General Plan, County zoning, the Urban Services Boundary, the Urban Policy Area, and SACOG's Blueprint for regional development seek to avoid. 188-2

The EIR fails to state clearly that the proposed project violates existing County land use plans. This is clear in the entitlements the project is seeking. The land use strategies and policies of the Sacramento County 2030 General Plan were designed to promote the efficient use of land, encourage economic vitality and reduce urban sprawl and its impacts, preserve habitat and open space, and protect local farming. The Urban Services Boundary was intended to implement that vision and promote orderly growth within the County. The proposed project unnecessarily violates the County's 2030 General Plan, County zoning, the Urban Services Boundary, the Urban Policy Area, and SACOG's Blueprint for regional development. 188-3

The EIR for the project is fundamentally flawed and should be rejected. The EIR identifies changes the project applicant is seeking to the County's 2030 General Plan, County zoning, the Urban Services Boundary, and the Urban Policy Area. Then throughout the EIR, the EIR, makes false claims that the project does not conflict with County land use policies. The purpose and legal requirement for the EIR is to provide accurate, fact-based and evidence-based information to the public and decision makers. Developers have a right to spin the truth in their communication with Planning Commissioners and County Supervisors, but deceit and spin has no place in an EIR. 188-4

The County's Urban Services Boundary document says, "The County shall not expand the Urban Service Boundary unless there is inadequate vacant land within the USB." There is adequate vacancy inside the Urban Services Bounday for the number of housing units and commercial space the project proposes. 188-5

There is no responsible rationale, and **no rationale is presented in the EIR, for approving this project outside the Urban Services Boundary**.

We strongly oppose changes to the County's 2030 General Plan, the Urban Services Boundary, and the Urban Policy Area to accommodate this or other projects outside the Urban Services Boundary. 188-6

The EIR fails to recognize that allowing development outside the Urban Services Boundary harms the Sacramento community inside the Urban Services Boundary. An important achievement of infill development is that it not only provides advantages to residents inside the new development, it adds vitality and benefits to the nearby community, and it reduces environmental impacts associated with urban sprawl. That is not true of this project. Allowing development sprawl outside the Urban Services Boundary discourages infill development. 188-7

The County's current land use policies are the result of participation and input from multitudes of residents throughout Sacramento County over many years. The County's plans represent difficult compromises, but a broad consensus to manage development to reduce urban sprawl and its impacts, build a vibrant community where people want to live and work, and to preserve habitat, open space, and local farming. The proposed project does not respect 188-8

the thousands of hours of input Sacrament County residents provided to ensure planned growth in Sacramento, nor does the project respect the huge investment of taxpayer resources that resulted in existing County plans and policies the project seeks to change. 188-8 cont.

The EIR fails to identify that planned and orderly growth of services such as public transit, utility services, and roadway improvements saves taxpayers and ratepayers money. Unplanned growth upends and redirect plans, increasing costs for taxpayers and ratepayers. The proposed project is unplanned growth outside the Urban Services Boundary. 188-9

Sacramento Area-Wide Harms from the Project

We strongly oppose this project. It is unnecessary and would have a severe, long-lasting, and in some cases permanent negative impacts on residents of Sacramento County.

This project harms the entire Sacramento community because of the loss of open space, and habitat and their associated recreational benefits; the loss of farmland; a significant increase in roadway dangers because of increased traffic on rural roads and increased congestion and conflicts at freeway on and off ramps which may not be able to be mitigated for some time; and a significant increase in area air pollution which has health consequences for the entire Sacramento area. 188-10

The EIR falsely claims that the project does not violate habitat conservation plans. We agree with the Environmental Council of Sacramento that the proposed project does violate approved habitat conservation plans and would lead to the permanent destruction of open space, habitat and wildlife. 188-11

The EIR fails to identify that river corridors are rare and valuable resources to residents of any community, and are particularly valued by Sacramento County residents for recreation, open space, wildlife, and local farmland. The proposed project introduces permanent harms by urbanizing a river corridor, putting urban activity within about 700 feet of Garden Highway and the river. River corridors need to be protected for current and future area residents**.** 188-12

*** The proposed project changes the existing one-mile river corridor protection buffer to 700 feet.** Years ago, during County hearings on the Urban Services Boundary, many residents argued for a miles wide protection buffer for the Sacramento River corridor to protect recreation, open space, habitat and local farmland. The County settled on a one-mile buffer. This project would reduce that buffer to a wholly inadequate 700 feet in some areas, up to a maximum of one-half mile. 188-13

* **The proposed project would result in the significant and permanent loss** of open space, habitat, already diminished local farmland, and floodplain protections. Once these community resources are gone, they are gone forever. 188-14

Mitigation for loss of farmland, wildlife and wildlife habitat would most likely occur beyond the Sacramento area, depriving Sacramento County residents of those benefits. The project applicant says loss of farmland, wildlife, and wildlife habitat would be mitigated outside the Natomas Basin. People in Sacramento value and find benefit in farmland, wildlife, and the open space that serves as wildlife habitat. **The EIR fails to identify the communitywide loss of farmland, wildlife and wildlife habitat resources as community assets.** If the project is approved farmland and wildlife mitigations should be required within the Natomas basin where those resources would continue to benefit community residents. 188-15

The EIR fails to identify that the proposed project could result in a total loss of project area farmland. Most of the project area is currently farmland that would be converted to urban uses. In the past 10 years Sacramento has lost more than 14,000 acres of farmland. This project could result in the permanent loss of another 1500 acres or more of high-value, productive local farmland. The project applicant says 534 acres of farmland would remain, but about 130 acres of that is intended as buffer land that will not be useable for farming. The remaining 400 acres of farmland is a long narrow space (some just 700 feet wide), and just 30 to 50 feet from potential urban conflicts, which may make the remaining farmland impractical to use for commercial farming. 188-16

The recent pandemic made clear that farmland is important community infrastructure. **The EIR fails to address the loss of area farmland as a community food resource** when there are disruptions to the food distribution system. 188-17

The EIR fails to identify that the proposed project could reduce existing floodplain protection. Around the United States, communities are starting to reserve land near waterways to use as open space for flood protection This project puts housing in a floodplain close to the river. While the new Natomas levee is expected to provide 200-year flood protection, climate change increases the chance of extreme flooding. Recent flooding in Ashville, North Carolina is proof of that. Current open space and farmland near the river provides urban areas with an additional level of flood protection. The proposed project would eliminate this protection. 188-18

This project is unnecessary and has an unacceptably long list of significant and unavoidable impacts, many that are harmful, permanent, and cannot be mitigated, including unplanned growth, urbanization of a rural area, increased traffic and roadway hazards, increased air pollution, increased noise, loss of wildlife, loss of habitat, loss of productive farmland, and the permanent loss of an important landscape for indigenous communities of Sacramento County. 188-19

The project significantly and unacceptably increases air pollution, possibly exceeding thresholds of significance for everyone, and posing serious health risks, including an increased risk of cancer. In addition, operation of the proposed project would significantly conflict with and obstruct implementation of the Sacramento Metropolitan Air Quality Management District air quality improvement efforts. 188-20

Sacramento does need affordable housing, but **the EIR fails to note that this project makes no commitment to a specific number of very affordable, affordable, and missing middle housing (duplexes, etc.) units** or a specific percentage of affordable housing units. In addition, the buildout of this project will take 20-30 years, and the first phase will take 7 years. So, there would not be housing from this project for many years. If the project is approved it should have specific affordable housing requirements, with a high percentage of affordable housing units in each housing development. 188-21

The EIR fails to note that the project applicant's very limited ownership of the project (about 10%) suggests that any commitments made by the applicant in order to receive entitlements, including **any community protections offered by the applicant, could be severely compromised as new developers come in to carry out the development**. 188-22

The EIR fails to recognize that the project reduces Sacramento recreational opportunities, because increased traffic in the project area, would make it unsafe for individual 188-23

cyclists and cycling clubs, as well as motorcycle clubs and antique or specialty car clubs that use Garden Highway for recreation**.** 188-23 cont.

Natomas Area Harms From the Project

The proposed project could occur anywhere. It has no relationship to Natomas. It **would forever change the character of the area, and open Natomas to more urbanization**. If this development is approved outside the Urban Services Boundary, the County has no basis to deny similar projects. 189-24

The project's 20-30 year buildout schedule creates unacceptable noise, dust, air pollution and general area disruption over decades. 188-25

Garden Highway Impacts Not Adequately Addressed in the EIR

Garden Highway residents strongly oppose any proposed project outside the Urban Services Boundary in the Natomas area. This project is unnecessary and has permanent and harmful impacts that cannot be mitigated. 188-26

The EIR fails to identify that this project puts urban activity within 700 feet of a rural residential zone, changing the expectations and characteristics for area rural residents.

The EIR fails to adequately address the severe and dangerous impacts project traffic would have on Garden Highway and existing Garden Highway users. The EIR suggests the project could add 4,000 trips a day to Garden Highway. Garden Highway is a rural 2-lane, undivided road. Garden Highway is an elevated roadway on top of a levee, so widening is not feasible. Garden Highway is half the width it should be for traffic safety. It has blind curves, no shoulders and no guard rails. The project EIR emphasized concerns about traffic safety, including hazardous conditions at Garden Highway intersections. However, the EIR fully failed to address the greatest safety issue on Garden Highway, which is the mixed use of the road by personal vehicles, semitrucks, agricultural equipment, cars pulling boats, golf carts, individual and groups of cyclists, pedestrians, and wildlife, any of which can enter the roadway unexpectedly from farm roads, driveways, and the riverbank. Adding traffic to Garden Highway is unacceptably dangerous. If the project is approved, a new traffic circulation plan should be required and agreed to by the Garden Highway Community Association, that discourages project vehicle traffic on Garden Highway. 188-27

The EIR fails to identify that adding traffic to Garden Highway would make recreational use of Garden Highway too dangerous for cyclists, and vehicle clubs such as antique car clubs, **eliminating a valuable Sacramento recreational opportunity.** 188-28

The EIR fails to adequately address the impacts from a proposed stadium, which would be close to residences all around the project, including Garden Highway. Stadium traffic, noise, and light do not belong in/near residential areas. Stadium noise can travel miles. County and City Code Enforcement offices and Sacramento stadium operators can confirm stadium conflicts with residential areas. Any stadium should be miles from any residences. 188-29

The EIR fails to adequately address noise impacts from amplified noise at the project site, including the stadium, and the outdoor pavilion. Amplified noise can travel miles. Prevailing winds can push amplified sound toward Garden Highway. If the project is approved, no amplified sound should be permitted (except at school sites for emergencies). For past area 188-30

projects, developers have said amplified sound can be regulated. That has proven to be untrue. Over time sound equipment and the location of speakers can change resulting in unmitigated noise, and noise makers like bull horns can be introduced. 188-30 cont.

The EIR notes that nighttime lighting would have a permanent impact on the area. But **the EIR fails to adequately address the harmful impacts of nighttime lighting on human health and on wildlife**, including migratory birds using the Pacific Flyway. **The EIR fails to provide adequate light mitigations for humans and wildlife.** If the project is approved, there should be a minimum one-half mile buffer between the project and Garden Highway that includes a minimum 100 foot wide densely planted tree buffer adjacent to the project. The tree buffer must include tall native evergreen trees planted at the beginning of project construction. 188-31

According to the EIR, buildout of the project is expected to take 20-30 years. **The EIR fails to address mitigations that could reduce area impacts by requiring that development occurs first adjacent to El Centro Road, with the final project development reaching areas near Garden Highway last.** 188-32

The EIR fails to adequately address that project related air pollution and its resulting serious health impacts, as well as construction dust, could be more severe on Garden Highway because of the prevailing wind that blows toward Garden Highway. 188-33

Problems Within the Project

Children at schools in the project area would be subjected to harmful levels of air pollution, increasing cancer risks. 188-34

The EIR says the project would be constructed over 20-30 years, and some mitigations are outside the applicant's control. **The EIR fails to consider that people may live in the project area before needed resources and mitigations are available, creating unplanned problems.** 188-35

Letter 189

Sacramento County Planning Commission
700 H Street, Suite 2450
Sacramento, CA 95814

COUNTY OF SACRAMENTO
BOARD OF SUPERVISORS

2024 OCT 18 PM 12: 05

RE: Upper Westside October 21, 2024 Public Hearing PLNP 2018-00284

Position: Opposed

Commissioners,

Thank you for the opportunity to provide comment on this planning proposal. I have lived in Natomas for 15 years. First and foremost, **I am opposed to expanding the urban services boundary**. Urban sprawl should be avoided at all costs. Development should focus on infill and revitalizing older buildings. Only when we have maximized the efficiency and development of all areas within the existing City bounds should we consider geographic expansion. 189-1

Should we make the mistake of developing over our local farmland and wildlife habitat, please ensure this new community plan includes: 189-2

1. **Prioritizing people over cars.** Upper Westside residents should be able to live comfortably without owning a car. More walkways, mixed use, grocery stores, and local businesses.

2. **Light Rail integration.** The community college absolutely must have a light rail station. Again, people should be able to live, work, learn, and shop here without using a car. Require the developer to work with SacRT to integrate a new rail route into the Green Line (Natomas/airport connector) map. 189-3

3. **Downtown Connectivity**. The proximity of the Upper Westside to downtown will likely attract people who need to commute to the grid for work. They should be able to bike or take light rail. Currently, biking is most feasible from the pedestrian bridge at Peregrine Park, along the canal, then dangerously crossing Garden Highway to get to Discovery Park. Add a pedestrian bridge near the RD 1000 site (1633 Garden Hwy) to cross the river towards River Crest Dr in West Sacramento. Require the Upper Westside developer to also allocate funds towards the new Truxel crossing through Discovery Park which its residents will undoubtedly be using. How about a safer bike lane along West El Camino from the 49er truck stop all the way to Northgate Blvd? 189-4

Essentially, I urge you to stop developing communities in isolated bubbles and put more thought into integrating them with existing development. Consider how to move people through the city more efficiently. Traffic is ridiculous. More roads and more lanes are not the answer. Require all new developments to expand bike paths and public transit routes, and pay for these added community amenities. We want to be a greener city. 189-5

Paving over our valuable open spaces is a BIG deal. Set the price tag and hurdles accordingly.

Thank You,

Marie Martin

Marie Martin

SACRAMENTO CA 957

16 OCT 2024 PM 2 L

As in past elections, USPS is re
If you choose to
please mail ea

FOREVER / USA

COUNTY OF SACRAMENTO
BOARD OF SUPERVISORS

2024 OCT 18 PM 12:05

SAC County Planning Commission
Re: Oct 21 Upper Westside PLNP2018-00284
700 H Street, Suite 2450
Sacramento, CA 95814

95814-129800

Letter 190

From: Aarati chaudhary <chaudharyaarati@gmail.com>
Sent: Friday, October 11, 2024 10:47 AM
To: Patten. Emma <pattene@saccounty.gov>; boardclerk@saccounty.go
Subject: The Upper west side specific plan and it's EIR

HI, I support the project. Thank you

190-1

From: Jennifer Ip <themusingpen@gmail.com>
Sent: Thursday, October 10, 2024 4:02 PM
To: Clerk of the Board Public Email <BoardClerk@saccounty.gov>
Subject: October 21 - Upper Westside Specific Plan

To the Sacramento County Planning Commission,

While I do not live in Natomas, I commute there for work from South Sacramento to Natomas. I oppose the development of the unincorporated Natomas area due to the damage it will cause to the environment and all living things, including us. I also oppose the development due to the nature of where this area is located. It is a flood basin and as our climate continues to be unpredictable, it is unwise to build here. I personally wish developers would build up instead of out, but I know that comes with other issues. 191-1

I strongly believe there are other avenues to pursue in terms of housing and commercial development. Furthermore, I do not want Sacramento County to be without some aspect of nature. We should keep our city as green as possible.

Regards,
Jennifer

From: RONALD COSTA <rcosta1@prodigy.net>
Sent: Friday, October 11, 2024 5:20 PM
To: Clerk of the Board Public Email <boardclerk@saccounty.gov>; Sacramento County Planning Commission <planning@saccounty.gov>; Patten. Emma <pattene@saccounty.gov>
Subject: Upper Westside Project PLNP2018-00284
Attachments: October 7-2024 Comments.pdf; October 7-2024 Comments.docx

Please find attached my public comments on the Upper Westside Project.

I am in favor of your approval of this project as it is badly needed to mitigate our current housing shortage.

Sincerely,

Ronald Costa
Email: rcosta1@prodigy.net
Phone: (916) 922-8798

October 7, 2024

From: Ronald Costa
Ref: Upper Westside Project PLNP2018-00284
Subject: Public Comments
To: Sacramento County Board of Supervisors (boardclerk@saccounty.gov)
To: Sacramento County Planning Commission (planning@saccounty.gov)
To: Natomas Planning Advisory Council (pattene@saccounty.gov)
To: Lead Planner, Emma Patten (pattene@saccounty.gov)
Ref: Upper Westside Project PLNP2018-00284
Subject: Public Comments

I attended the October 3, 2024 meeting of the Natomas Community Planning Advisory Council (CPAC).

First let me state that it's about time that we developed that property as it is very close to the City of Sacramento, which is our largest employment center and it is only a bicycle commute away from the Upper Westside Project. Several other sites were mentioned in public comments as already approved and further, that we do not need this site as those sites are available. The problem with that is that they are a lot further away from the major employment center, which would result in longer commutes, thus more traffic congestion and pollution.

Some environmental issues were raised at the CPAC meeting; however, I think that the EIR addresses those issues adequately.

Several 20-to-30-year long-time Garden Highway residents made comments, and all of them were negative on development of the Upper Westside Specific plan. No doubt many of them raised a family during their long tenure, and the children are now grown up and are out of their childhood homes. Now they need a place to live. The production of children has outpaced the production of new homes and associated facilities for many years; consequently, there is a housing shortage that has caused home prices and rents to soar beyond affordability. This is evidenced by the many homeless tents along our streets.

The problem is easy to solve. BUILD, BUILD ,BUILD, will solve it! I urge you to approve the Upper Westside Project PLNP2018-00284.

192-1

Letter 193

From: RONALD COSTA <rcosta1@prodigy.net>
Sent: Friday, October 18, 2024 10:19 PM
To: Clerk of the Board Public Email <boardclerk@saccounty.gov>; Sacramento County Planning Commission <planning@saccounty.gov>; Patten. Emma <pattene@saccounty.gov>
Subject: Planning Commission Hearing Item 3, PLNP2018-00284

Please accept my attached emailed public comments on the Upper Westside Specific Plan, PLNP2018-00284

Sincerely,

Ronald Costa
Email: rcosta1@prodigy.net
Phone: (916) 922-8798

October 19, 2024

From: Ronald Costa
Ref: Upper Westside Specific Plan, PLNP2018-00284
Subject: Public Comments - Planning Commission Hearing Item 3
To: Sacramento County Board of Supervisors (boardclerk@saccounty.gov)
To: Sacramento County Planning Commission (planning@saccounty.gov)
To: Lead Planner, Emma Patten (pattene@saccounty.gov)
Ref: Upper Westside Project PLNP2018-00284
Subject: Public Comments

Dear Chair and members of the Planning Commission,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

I read the comments from the Natomas Planning Advisory Council (NPAC). Most of the negative comments were for environmental reasons. In your deliberations and decision making, please keep in mind that while they may have good intentions, most environmentalists just think that they know what they are talking about.

CASE AND POINT: In order to increase the delta smelt population, the pseudo intellectual environmentalists have been purging the Sacramento River Delta with fresh water for 20 or 30 years without any measurable success. They keep hollering, "we need more fresh water". They overlook the fact that before Shasta Dam was built, in late summer the Sacramento River was down to a trickle. When high tide was in San Francisco Bay, the river here in Sacramento used to run backward (toward Shasta). When that occurred, saltwater from San Francisco Bay would infiltrate the delta. There was an abundance of smelt in those days. It could be that, just maybe, in order to survive the Smelt, need a dose of saltwater in late summer instead of more fresh water. It could also be that the salt water gets rid of the smelt's predators. I know that these facts are true because as a young man I lived on the Garden Highway and I watched the river run backwards several times while sitting in our family car on the Garden Highway Levee (not much traffic in those days). It amazed my father so much that he would stop the car and point it out.

193-1

Bottom line, in making your decision be skeptical of what some people tell you, use some common sense and keep in mind the public need for the development of more housing. The Upper Westside Specific Plan represents a well-balanced and forward-thinking approach to development in the most logical place in our region. It respects the areas agricultural heritage, addresses urgent housing needs, and supports economic growth, all while minimizing environmental impacts.

I urge you to support this project when it comes to a vote, in order to help guide our community into a sustainable future.

Thank you for your consideration.

Ronald Costa

October 19, 2024

From: Ronald Costa
Ref: Upper Westside Specific Plan, PLNP2018-00284
Subject: Public Comments - Planning Commission Hearing Item 3
To: Sacramento County Board of Supervisors (boardclerk@saccounty.gov)
To: Sacramento County Planning Commission (planning@saccounty.gov)
To: Lead Planner, Emma Patten (pattene@saccounty.gov)
Ref: Upper Westside Project PLNP2018-00284
Subject: Public Comments

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Bottom line, in making your decision be skeptical of what some people tell you, use some common sense and keep in mind the public need for the development of more housing. The Upper Westside Specific Plan represents a well-balanced and forward-thinking approach to development in the most logical place in our region. It respects the areas agricultural heritage, addresses urgent housing needs, and supports economic growth, all while minimizing environmental impacts.

I urge you to support this project when it comes to a vote, in order to help guide our community into a sustainable future.

Thank you for your consideration.

Ronald Costa

From: speaks.shannon@gmail.com
Sent: Monday, October 21, 2024 1:44 PM
To: Clerk of the Board Public Email <BoardClerk@saccounty.gov>
Subject: Written Comment

I object to the upper west side development in Natomas. The impact to traffic, wildlife, and natural land is not worth it. 194-1

Shannon Speaks
541 Alcantar Cir, Sacramento

Sent from my iPhone

From: Karen Jacques <threegables1819@gmail.com>
Sent: Monday, October 21, 2024 11:45 AM
To: Clerk of the Board Public Email <BoardClerk@saccounty.gov>
Subject: 10-21-14 Planning Commission Item #3: General Plan Amendment: Upper Westside Specific Plan

Dear Chair Raithal and Commission Members

My name is Karen Jacques. I am a long time resident of Sacramento's Central City (District 1). I am unable to attend the October 21st Planning Commission meeting in person so I am writing to express my strong opposition to Agenda Item #3: "General Plan Amendment: Upper Westside Specific Plan". The proposed Amendment would allow the conversion oft 2,000 undeveloped acres of agricultural land and wildlife habitat outside the County's Urban Services Boundary into a new sprawl development including 9,000 housing units, 3 million square ft. of commercial space and the roads and other infrastructure necessary to serve such a development. For the reasons stated below, I do not believe that any new development should be allowed outside the Urban Services Boundary in the Natomas Basin now or in the future. The County has already approved far too many sprawl projects and I don't want to see any more of them, especially in land as sensitive as the Natomas Basin. 195-1

__ The current Urban Services Boundary was established in 1993. It was the understanding of City and County residents who lived here at that time that the boundary was to be permanent for a number of important reasons including.to reduce the risk of flood and fire to surrounding, already developed communities; to preserve some of the richest farmland in the greater Sacramento region; and to buffer and ensure the integrity of the Natomas Basin Habitat Conservation Plan (NBHCP) area, which is home to several endangered species. The City of Sacramento established the NBHCP area when it opened North Natomas up for development. The NBHCP was the result of an agreement between the city and the federal government to protect the Basin's endangered species and their habitat. I find it extremely concerning that the larger Natomas Basin area is now threatened by massive sprawl development after so many of us thought that it was permanently protected. 195-2

__ The area where the Upper Westside development would be built isn't the only portion of the Natomas Basin that is being targeted for new sprawl development. It is my understanding that the County will be bringing forward a second even larger sprawl project the 5,000 acre Grand Park Project) in 2025. The City of Sacramento has also received an application for a 450 acre commercial warehouse project outside the Urban Services Boundary in the Natomas Basin. Approval of the Upper Westside project would set a precedent for the approval of these other destructive sprawl projects and threaten the integrity of the NBHCP area. The county needs to look at the cumulative impact of all these destructive projects and stop them by saying no to the Upper Westside project now. 195-3

___ The Natomas Basin is a deep flood basin. Much of its' interior is lower than the elevation of the Sacramento and American Rivers. The Natomas levies were built to withstand a 200 year flood. The climate crisis is leading to extreme rain events in many parts of the country and the world. It is no longer safe to assume that levies built for a 200 year flood will be adequate to deal with the kind of floods we could well be facing It is irresponsible to build new developments in an area where there is potential for catastrophic flooding and that would also greatly increase the flood risk to surrounding areas that have already been built out. We need the undeveloped and agricultural lands of the Natomas Basin to provide a place where flood waters can go and to recharge our ground water that gets depleted in drought years. 195-4

___ Undeveloped lands, especially lands that have healthy, rich soil - as the Natoas Basin does - also serve as badly needed carbon sinks. As the climate crisis worsens, the need for carbon sinks becomes more and more apparent. We cannot afford to turn what is now a valuable carbon sink into yet another paved over urban heat island, especially given the fact that temperatures are rising far faster than climate scientists predicted. 195-5

___Small farms, like those in the Natomas Basin with their fertile soil are an important source of fresh, healthy food. They will become even more important as a food source as the climate crisis worsens and some areas of the U.S. and the world that were once able to produce food no longer can. 195-6

___ The 9,000 market rate housing units proposed for the Upper West Side project and however many such units will be proposed for the Grand Park project are not needed. My understanding is that Sacramento County has already entitled more market rate sprawl housing than projections say we will need for the next several yeas. What we do need and the County doesn't have is more infill housing, especially infill housing that is affordable. The County should start prioritizing and incentivizing such housing. There is absolutely no justification for going outside the Urban Services Boundary and destroying all or part of the Natomas Base to build sprawl housing that isn't needed. The County must start paying attention to the SACOG Blueprint and stop allowing market rate housing developers to build whatever they want wherever they want. 195-7

___ Building more sprawl housing in the Natomas Basin (or anywhere) will lead to more traffic jams and the need to build more roads. Our region needs more transit not more cars and more transit requires more density, not more sprawl. If the Upper Westside project were built, its residents would all need cars to get around The SACOG region is supposed to reduce its vehicle miles traveled (VMT), by 19%, but it can't do that if projects like the Upper Westside project are built. Failure to meet VMT goals could make our region ineligible for federal and state funding. 195-8

___. More driving leads to more air pollution. The Sacramento region's failure to meet its' air quality goals could cost it federal and state funding.
Sacramento County has already approved far too much sprawl and we are all paying the price in the form of poor air quality, traffic congestion, lack of public transit and disappearing open space. Meeting clean air standards should be a priority for the county. 195-9

In conclusion, Sacramento County has already approved far too much sprawl development and can't afford any more. The Natomas Basin, with its open space, small farms, fertile farmland, significant wildlife, including endangered species, importance as a carbon sink and ability to reduce flood risk is a gem that needs to be protected, not paved over. Please recognize that development in the Natomas Basin is inappropriate and vote not to approve the Upper Westside Specific Plan. 195-10

Thank-you for this opportunity to comment. Please make my comments available to Commissioners and include them in your official record.

Karen Jacques

. :

From: Aaron Brazil <everything9876@gmail.com>
Sent: Monday, October 21, 2024 11:06 AM
To: Patten. Emma <Pattene@saccounty.gov>
Subject: Upper Westside Specific Plan - Planning Commission Hearing Item 3

Dear Chair and members of the Planning Commission,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

The Upper Westside project is situated within the Natomas Joint Vision Overlay Area, which has been under discussion for potential development for several decades. This project satisfies the General Plan's LU-120 performance-based and design criteria which was developed in coordination with SACOG, ensuring that it fits within the established framework for thoughtful growth.

As a member of the Natomas community, I recognize the struggles faced by local farmers due to the changing landscape around them. The Upper Westside project offers a balanced approach to land use, preserving a 542-acre agricultural buffer to protect farmland and preserve open space.

196-1

The Upper Westside development embodies SACOG's smart growth principles by utilizing existing infrastructure and providing housing near job centers. The proposed "town center" is within 3.5 miles of downtown Sacramento. More than two-thirds of the project boundary is adjacent to existing development. This project is essentially an infill development that will reduce sprawl, offer a variety of housing types, and provide easy access to jobs and transit. Of the 9,356 proposed housing units, more than 52% will be multi-family attached units, which are crucial in addressing our region's housing crisis, particularly the need for affordable apartments and duplexes.

Traffic concerns have been addressed as well. The project's location and mix of land uses

result in traffic levels below the 85% threshold of baseline conditions, which is an important indicator of its suitability for the area. The developers have also prepared a comprehensive Resource Conservation Strategy, which ensures that impacts on farmland and local habitats will be responsibly mitigated.

The Upper Westside Specific Plan represents a well-balanced and forward-thinking approach to development in the most logical place in our region. It respects the areas agricultural heritage, addresses urgent housing needs, and supports economic growth, all while minimizing environmental impacts.

I urge, when the project comes to a vote, that you support this project and help guide our community into a sustainable future.

Thank you for your consideration.

-Aaron B

196-1 cont.

From: Brittany Brazil <brazil91@live.com>
Sent: Monday, October 21, 2024 11:30 AM
To: Patten. Emma <pattene@saccounty.gov>
Subject: Support for Upper Westside

Dear Chair and members of the Planning Commission,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

The Upper Westside project is situated within the Natomas Joint Vision Overlay Area, which has been under discussion for potential development for several decades. This project satisfies the General Plan's LU-120 performance-based and design criteria which was developed in coordination with SACOG, ensuring that it fits within the established framework for thoughtful growth.

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197-1

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The Upper Westside Specific Plan represents a well-balanced and forward-thinking approach to development in the most logical place in our region. It respects the areas agricultural heritage, addresses urgent housing needs, and supports economic growth, all while minimizing environmental impacts.

I urge, when the project comes to a vote, that you support this project and help guide our community into a sustainable future.

Thank you for your consideration.

Brittany Brazil

197-1 cont.

From: JOSEPH BRAZIL <goodnewsjoe@comcast.net>
Sent: Saturday, October 19, 2024 11:49 AM
To: Clerk of the Board Public Email <BoardClerk@saccounty.gov>
Subject: Comment on Upper Westside agenda item

Sacramento County Planning Commission:
Attached as a PDF file is my comment letter regarding the Upper Westside agenda item scheduled for the County Planning meeting of October 21, 2024 at 5:30pm pst. I've also posted the letter in this email below in case there is any issue in opening the PDF.
Thank you.
Joe Brazil
(916) 489-1950

(COPY OF ATTACHED PDF):

Justin Raithel, Chair
Sacramento County Planning Commission
700 H Street
Sacramento, CA 95814

Chair Raithel and Commissioners:
I am writing to provide comments regarding the Upper Westside Specific Plan through the lens of the land my family has farmed for nearly 80 years. As a farming family in the Natomas Boot, we have witnessed firsthand how urbanization and changing conditions have made agriculture in this area increasingly unsustainable. I'd like to address some concerns raised by ECOS regarding the conversion of farmland and the preservation of agricultural land.

The Changing Realities of Agriculture in Natomas
ECOS asserts that the Upper Westside project threatens prime agricultural land, but this viewpoint does not consider the on-the-ground realities that many local farmers are facing. Farming in Natomas is no longer economically viable or sustainable. Over the past several decades, urbanization has surrounded our farmlands, introducing challenges such as increased theft, vandalism, traffic, and restrictions on farming practices due to proximity to homes and businesses. These conditions make it extremely difficult for farmers like myself to continue operations.

Despite efforts to adapt to these changing conditions (including selling portions of our land to sustain operations), our farming conditions and financial challenges continue to worsen. The land can no longer be effectively farmed at scale due to the encroaching urban environment.

198-1

Addressing Agricultural Preservation through Responsible Development
While ECOS calls for continued agricultural preservation, the Upper Westside project presents a balanced approach to development and agricultural land conservation. The project includes a 1:1 mitigation strategy for every acre of farmland converted, preserving an equivalent amount of agricultural land elsewhere in Sacramento County. This ensures that while development moves forward, agricultural land in areas more conducive to farming is preserved and protected.

Additionally, the project incorporates a 534-acre agricultural buffer on its western edge, reducing conflicts between urban and agricultural uses. This buffer demonstrates that the development has been carefully planned to protect the surrounding agricultural land and mitigate the potential impacts on neighboring farming operations.

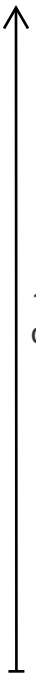
Mitigating Environmental Impacts and Ensuring Balance
ECOS expresses concerns about wildlife and habitat loss, but the Upper Westside development takes significant steps to address these environmental issues. The project includes wildlife corridors and habitat restoration efforts that aim to protect species like the Swainson's Hawk and the giant garter snake, ensuring that local ecosystems are preserved. By implementing these strategies, the project strikes a balance between necessary urban growth and environmental stewardship, showing that development and habitat conservation can coexist.

Given the unsustainable conditions for farming in Natomas and the careful planning incorporated into the Upper Westside project, it is clear that this development represents a thoughtful, forward-thinking solution. It balances the need for new housing and economic growth with responsible agricultural preservation and environmental protections.

I urge you to support this project as it represents a sustainable, future-oriented solution to our region's challenges.

Thank you for your time and consideration.

Sincerely,
Joseph Brazil
Trustee of J&D Natomas Property Trust and JDL&M Natomas Property Trust
(916) 489-1950
GoodNewsJoe@comcast.net



From: Sabrina Brazil <surfsupsabrina@comcast.net>
Sent: Saturday, October 19, 2024 10:00 AM
To: Patten. Emma <Pattene@saccounty.gov>
Subject: Upper Westside Specific Plan - Planning Commission Hearing Item 3

Dear Chair and members of the Planning Commission,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

The Upper Westside project is situated within the Natomas Joint Vision Overlay Area, which has been under discussion for potential development for several decades. This project satisfies the General Plan's LU-120 performance-based and design criteria which was developed in coordination with SACOG, ensuring that it fits within the established framework for thoughtful growth.

As a member of the Natomas community, I recognize the struggles faced by local farmers due to the changing landscape around them. The Upper Westside project offers a balanced approach to land use, preserving a 542-acre agricultural buffer to protect farmland and preserve open space.

The Upper Westside development embodies SACOG's smart growth principles by utilizing existing infrastructure and providing housing near job centers. The proposed "town center" is within 3.5 miles of downtown Sacramento. More than two-thirds of the project boundary is adjacent to existing development. This project is essentially an infill development that will reduce sprawl, offer a variety of housing types, and provide easy access to jobs and transit. Of the 9,356 proposed housing units, more than 52% will be multi-family attached units, which are crucial in addressing our region's housing crisis, particularly the need for affordable apartments and duplexes.

199-1

Traffic concerns have been addressed as well. The project's location and mix of land uses result in traffic levels below the 85% threshold of baseline conditions, which is an important indicator of its suitability for the area. The developers have also prepared a comprehensive Resource Conservation Strategy, which ensures that impacts on farmland and local habitats will be responsibly mitigated.

The Upper Westside Specific Plan represents a well-balanced and forward-thinking approach to development in the most logical place in our region. It respects the areas agricultural heritage, addresses urgent housing needs, and supports economic growth, all while minimizing environmental impacts.

I urge, when the project comes to a vote, that you support this project and help guide our community into a sustainable future.

Thank you for your consideration.
Sabrina Brazil

Sent from my iPhone

From: Josh Harmatz <joshharmatz@gmail.com>
Sent: Monday, October 21, 2024 3:36 PM
To: Clerk of the Board Public Email <BoardClerk@saccounty.gov>
Subject: Comments for County Planning Meeting- Monday 10/21/24 - 530pm
Attachments: Harmatz Opposition Letter (1).pdf

Hello, can you please submit my written comments below, and attached, for review by the County Supervisors for tonights meeting.
Thank you.

Josh W. Harmatz
4171 Garden Hwy
Sacramento, CA, 95834
joshharmatz@gmail.com
916-284-2507

October 21, 2024

Sacramento County Board of Supervisors
827 7th Street, Room 225
Sacramento, CA 95814

Dear Members of the Board of Supervisors,

I am writing to express my strong opposition to the Upper Westside Specific Plan due to the significant impact it will have on traffic conditions along Garden Highway, Powerline Road, and West Del Paso Road. These roads, which are currently narrow, single-lane urban roads, ranging between 9 and 10 feet in width, are already struggling to accommodate the existing traffic. The addition of heavy commercial vehicles, workers commuting to the proposed commercial spaces, and 25,000 future residents from the planned Upper Westside Development will exacerbate these issues.

The Sacramento County Transportation Analysis (March 2022) prepared for this project indicates that these roads will face substantial increases in traffic volumes, especially during peak hours, when freeway congestion diverts additional traffic onto local roads. Given that these routes cannot safely handle large trucks exceeding 7 tons, this poses a safety risk, and the congestion will likely become unbearable.

200-1

Moreover, the study clearly acknowledges that Garden Highway requires widening to 12 feet in each direction, with an additional 6-foot shoulder. However, the development proposal does not adequately address how this widening will be achieved or who will pay the associated costs, especially considering the recent completion of the setback levy, power pole relocations, and other flood protection measures. The levee system improvements recently undertaken along Garden Highway were designed without considering this required widening. To date, neither the U.S. Army Corps of Engineers nor the Central Valley Flood Protection Board has been consulted about this crucial aspect of the plan. 200-2

Without a comprehensive and feasible solution to the traffic and safety concerns along these critical roads, approving this development would worsen traffic congestion, increase the risk of accidents, and diminish the quality of life for current residents. I strongly urge the Board of Supervisors to reconsider approving the Upper Westside Specific Plan unless these infrastructure issues are fully addressed in coordination with the relevant agencies. 200-3

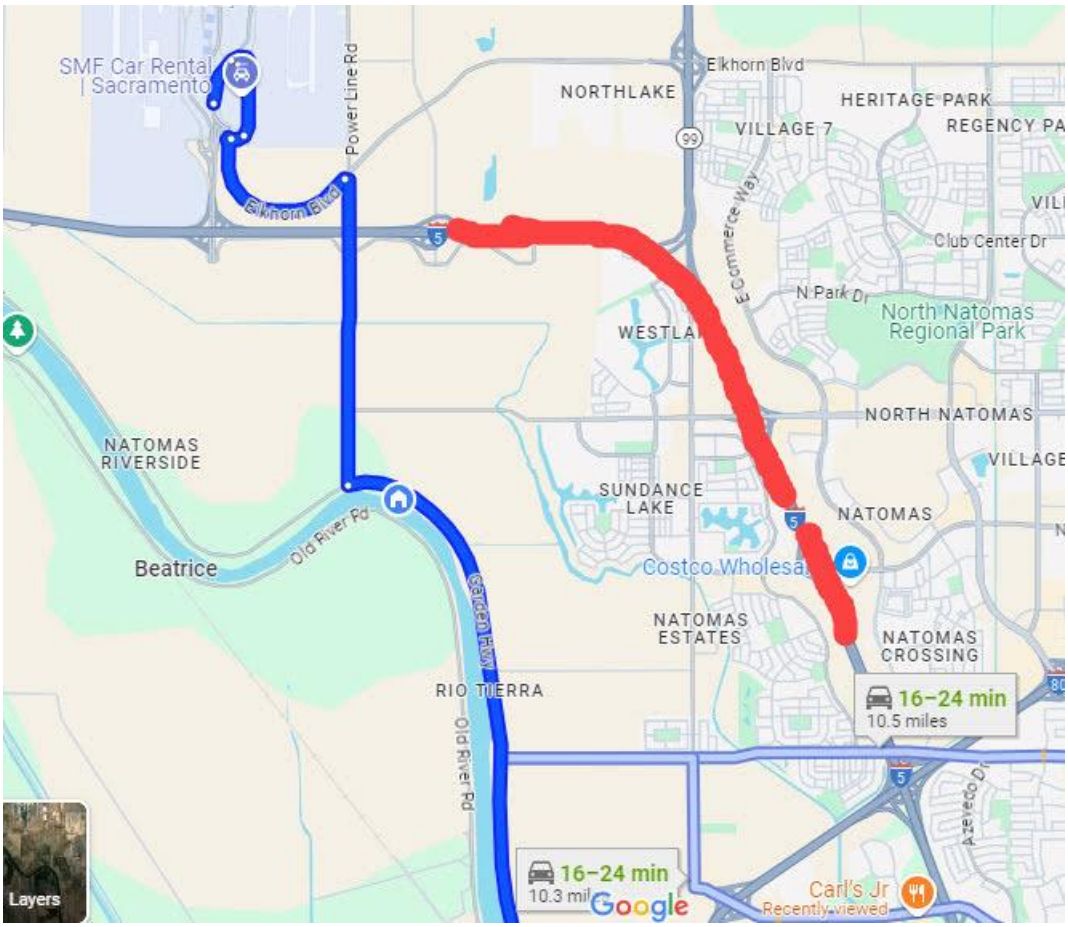
Thank you for your time and consideration of my concerns.

Sincerely,

Josh W. Harmatz
4171 Garden Hwy
Sacramento, CA, 95834
joshharmatz@gmail.com

916-284-2507

Map of Most used Routes from the Airport and 3mil square feet of commercial space at Metro Air Park:



Pictures of the crumbling road:

Picture of the existing road width that does NOT meet county requirements:

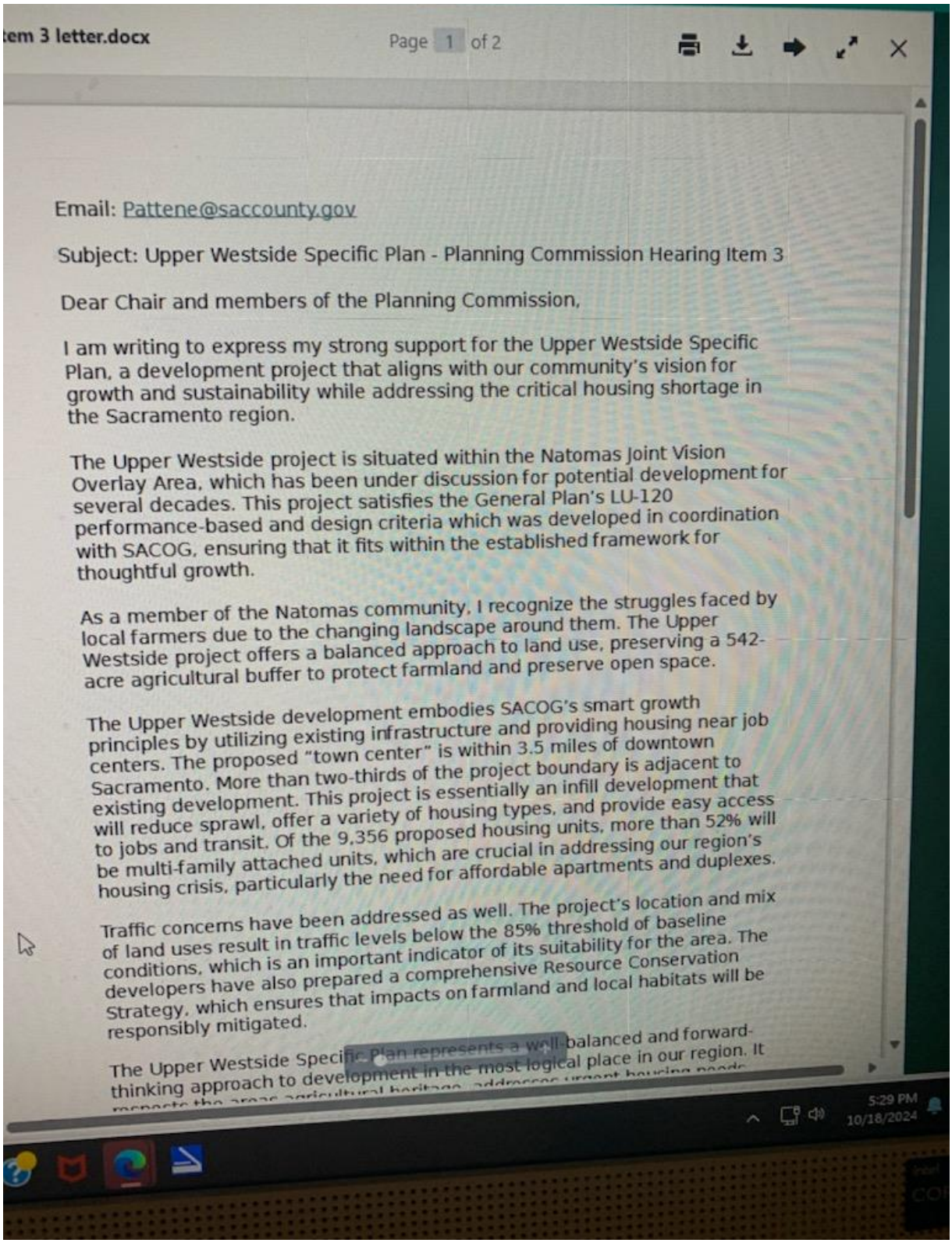
Garden Hwy:

Powerline Road at 16’ - The average SUV is 8 ft wide, and avg delivery TRUCK is 10 ft wide

Additional pictures of Garden Hwy road widening issues and condition:

6” Bumps in the road with no shoulder:

From: satnam kaur <satsatk@yahoo.com>
Sent: Monday, October 21, 2024 6:21 AM
To: Patten. Emma <pattene@saccounty.gov>
Subject: In support



tem 3 letter.docx Page 1 of 2

Email: Pattene@saccounty.gov

Subject: Upper Westside Specific Plan - Planning Commission Hearing Item 3

Dear Chair and members of the Planning Commission,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

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Traffic concerns have been addressed as well. The project's location and mix of land uses result in traffic levels below the 85% threshold of baseline conditions, which is an important indicator of its suitability for the area. The developers have also prepared a comprehensive Resource Conservation Strategy, which ensures that impacts on farmland and local habitats will be responsibly mitigated.

The Upper Westside Specific Plan represents a well-balanced and forward-thinking approach to development in the most logical place in our region. It

5:29 PM 10/18/2024

201-1

Hello,

I do support the project.
Satnamm Kaur

201-1
cont.

Yahoo Mail: Search, Organize, Conquer

Letter 202

From: jaspal banga <rickyvicky2@sbcglobal.net>
Sent: Saturday, October 19, 2024 4:06 PM
To: Patten. Emma <pattene@saccounty.gov>
Subject: Upper West Side Plan

Hi ,
We support this plan for our city. You must approve this project ASAP so our life can get better.
Surjit Kaur

Email: Pattene@saccounty.gov

Subject: Upper Westside Specific Plan - Planning Commission Hearing Item 3

Dear Chair and members of the Planning Commission,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

The Upper Westside project is situated within the Natomas Joint Vision Overlay Area, which has been under discussion for potential development for several decades. This project satisfies the General Plan's LU-120 performance-based and design criteria which was developed in coordination with SACOG, ensuring that it fits within the established framework for thoughtful growth.

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The Upper Westside development embodies SACOG's smart growth principles by utilizing existing infrastructure and providing housing near job centers. The proposed "town center" is within 3.5 miles of downtown Sacramento. More than two-thirds of the project boundary is adjacent to existing development. This project is essentially an infill development that will reduce sprawl, offer a variety of housing types, and provide easy access to jobs and transit. Of the 9,356 proposed housing units, more than 52% will be multi-family attached units, which are crucial in addressing our region's housing crisis, particularly the need for affordable apartments and duplexes.

Traffic concerns have been addressed as well. The project's location and mix of land uses result in traffic levels below the 85% threshold of baseline conditions, which is an important indicator of its suitability for the area. The developers have also prepared a comprehensive Resource Conservation Strategy, which ensures that impacts on farmland and local habitats will be responsibly mitigated.

The Upper Westside Specific Plan represents a well-balanced and forward-thinking approach to development in the most logical place in our region. It respects the areas agricultural heritage, addresses urgent housing needs, and supports economic growth, all while minimizing environmental impacts.

I urge, when the project comes to a vote, that you support this project and help guide our community into a sustainable future.

Thank you for your consideration.

202-1

From: Sam Kermanian <SKermanian@ICOinvestment.com>
Sent: Friday, October 18, 2024 5:01 PM
To: Patten. Emma <Pattene@saccounty.gov>
Subject: Letter of support

Dear Sir/Lady,

Attached to this email please find our unqualified letter of support for the proposed Upper Westside Specific Plan.

Thank you

Sam Kermanian
Director, Asset Management
ICO Investment Group Inc.

NOTE - NEW ADDRESS:
10780 Santa Monica Blvd. #140
Los Angeles, CA 90025
Direct: +1 (213) 270-8030

Email: Pattene@saccounty.gov

Subject: Upper Westside Specific Plan - Planning Commission Hearing Item 3

Dear Chair and members of the Planning Commission,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

The Upper Westside project is situated within the Natomas Joint Vision Overlay Area, which has been under discussion for potential development for several decades. This project satisfies the General Plan's LU-120 performance-based and design criteria which was developed in coordination with SACOG, ensuring that it fits within the established framework for thoughtful growth.

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I urge, when the project comes to a vote, that you support this project and help guide our community into a sustainable future.

Thank you for your consideration.

Sam Kermanian

Letter 204

From: Med Aid <medaidrx1@gmail.com>
Sent: Saturday, October 19, 2024 3:11 PM
To: Patten. Emma <pattene@saccounty.gov>
Subject: Support letter

Email: Pattene@saccounty.gov

Subject: Upper Westside Specific Plan - Planning Commission Hearing Item 3

Dear Chair and members of the Planning Commission,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

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I urge, when the project comes to a vote, that you support this project and help guide our community into a sustainable future.

Thank you for your consideration.

204-1

Letter 205

From: jaspal banga <rickyvicky2@sbcglobal.net>
Sent: Saturday, October 19, 2024 4:09 PM
To: Patten. Emma <pattene@saccounty.gov>
Subject: upper west side plan

Yes, all our 5 family members love this plan.
Banga family
600 Hawkcrest cir
Sacramento, Ca 95835

Email: Pattene@saccounty.gov

Subject: Upper Westside Specific Plan - Planning Commission Hearing Item 3

Dear Chair and members of the Planning Commission,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

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I urge, when the project comes to a vote, that you support this project and help guide our community into a sustainable future.

Thank you for your consideration.

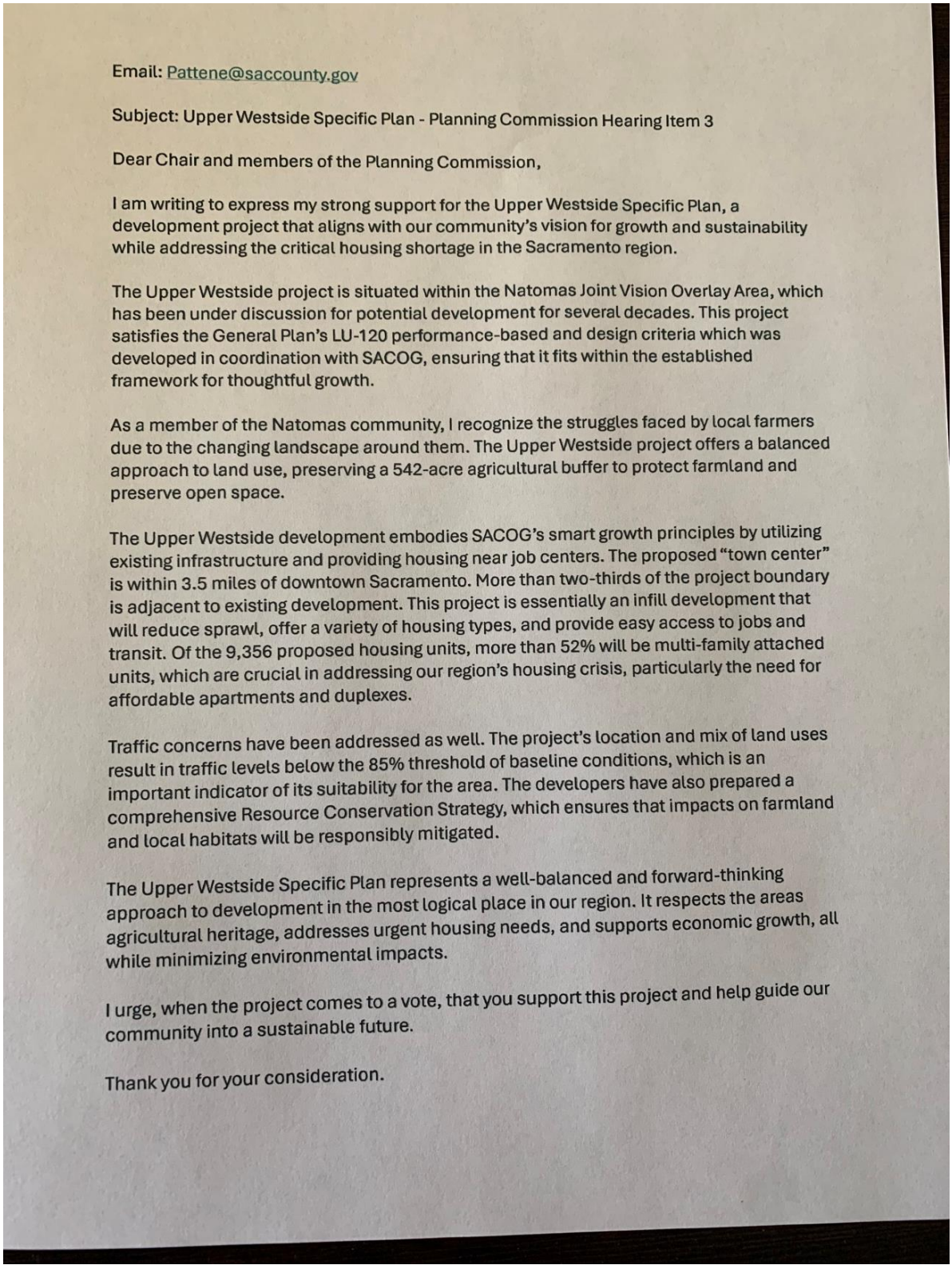
205-1

From: jaspal banga <medaidpharmacy@att.net>
Sent: Saturday, October 19, 2024 4:01 PM
To: Patten. Emma <pattene@saccounty.gov>
Subject: Upper West Side Plan

Hi Ms. Emma,

We support this plan for Natomas area. We have 100s of families who are supporting this project. All our members of soccer clubs, our church members are excited about this project. 206-1
Harpreet

From: Harpreet Banga <harpreet.banga@icloud.com>
Sent: Saturday, October 19, 2024 1:27 PM
To: Patten. Emma <pattene@saccounty.gov>
Subject: Upper west side plan



Email: Pattene@saccounty.gov

Subject: Upper Westside Specific Plan - Planning Commission Hearing Item 3

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I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

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I urge, when the project comes to a vote, that you support this project and help guide our community into a sustainable future.

Thank you for your consideration.

207-1

Letter 208

From: jaspal banga <medaidpharmacy@att.net>
Sent: Saturday, October 19, 2024 3:55 PM
To: Patten. Emma <pattene@saccounty.gov>
Subject: Upper West Side Support Letter

I strongly support this plan for Natomas. See the support letter. Thank you.
Jas Banga

208-1

From: Ricky Banga <bangaricky2@icloud.com>
Sent: Sunday, October 20, 2024 11:48 AM
To: Patten. Emma <pattene@saccounty.gov>
Subject: Upper Westside Specific Plan - Planning Commission Hearing Item 3

Dear Chair and members of the Planning Commission,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

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I urge, when the project comes to a vote, that you support this project and help guide our community into a sustainable future.
Thank you for your consideration.

209-1 cont.

Regards,
Rajkaran Banga

From: Vick Banga <vbanga2@gmail.com>
Sent: Sunday, October 20, 2024 11:49 AM
To: Patten. Emma <pattene@saccounty.gov>
Subject: Upper Westside Specific Plan - Planning Commission Hearing Item 3

Dear Chair and members of the Planning Commission,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

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210-1

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I urge, when the project comes to a vote, that you support this project and help guide our community into a sustainable future.
Thank you for your consideration.

Best Regards,
Veerkaran Banga, MD

210-1
cont.

From: Natomas Pharmacy <natomaspharmacy@gmail.com>
Sent: Monday, October 21, 2024 1:13 PM
To: Patten. Emma <pattene@saccounty.gov>
Subject: UPPER WEST SIDE PLAN

Dear Emma Pattene,

I would like to formally support the upper west side plan. 211-1

Thank you.

Sincerely,

Sukh Jhutty, Pharm. D
Natomas Pharmacy

Letter 212

From: howsrxx <howsrxx@gmail.com>
Sent: Sunday, October 20, 2024 1:45 PM
To: Patten. Emma <pattene@saccounty.gov>
Subject: Upper West Side project

I fully support this project.
Howard Lamborn

Email: Pattene@saccounty.gov

Subject: Upper Westside Specific Plan - Planning Commission Hearing Item 3

Dear Chair and members of the Planning Commission,

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The Upper Westside Specific Plan represents a well-balanced and forward-thinking

212-1

approach to development in the most logical place in our region. It respects the areas agricultural heritage, addresses urgent housing needs, and supports economic growth, all while minimizing environmental impacts.

I urge, when the project comes to a vote, that you support this project and help guide our community into a sustainable future.

212-1 cont.

Thank you for your consideration.

From: Bobby Gosal <bobbygosal@aol.com>
Sent: Friday, October 18, 2024 7:05 PM
To: Patten. Emma <pattene@saccounty.gov>
Subject: Upper West Side Project

Subject: Upper Westside Specific Plan - Planning Commission Hearing Item 3

Dear Chair and members of the Planning Commission,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

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213-1

I urge, when the project comes to a vote, that you support this project and help guide our community into a sustainable future. 213-1 cont.

Thank you for your consideration.

Bobby Gosal
916-715-0035
570 Hawkcrest Circle
Sacramento Ca 95835

From: Resham Singh <reshamks1@gmail.com>
Sent: Monday, October 21, 2024 9:49 AM
To: Patten. Emma <Pattene@saccounty.gov>
Subject: Upper Westside — Planning Commission Hearing Item 3

Dear Chair and members of the Planning Commission,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

The Upper Westside project is situated within the Natomas Joint Vision Overlay Area, which has been under discussion for potential development for several decades. This project satisfies the General Plan's LU-120 performance-based and design criteria which was developed in coordination with SACOG, ensuring that it fits within the established framework for thoughtful growth.

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I urge, when the project comes to a vote, that you support this project and help guide our community into a sustainable future.
Thank you for your consideration.

Thank you!

From: Sarabjit Singh <sarabjitsingh916@gmail.com>
Sent: Monday, October 21, 2024 4:12 PM
To: Patten. Emma <pattene@saccounty.gov>
Subject: Project

Respected sir/ma'am
Yes support this project
Thank you

215-1

From: Janet <janetgmurph@gmail.com>
Sent: Sunday, October 20, 2024 4:37 PM
To: Patten. Emma <pattene@saccounty.gov>
Subject: Upper Westside Plan-Planning Commission Hearing Item 3

Dear Chair and members of the Planning Commission,

I like the Upper Westside Specific Plan and it's EIR.

I support the plan.

216-1

Janet Murphy
590 Hawkcrest Circle (Westlake)
Sacramento, CA 95835

From: Kevin Murphy <kevinmurph31@gmail.com>
Sent: Sunday, October 20, 2024 4:43 PM
To: Patten. Emma <pattene@saccounty.gov>
Subject: Upper Westside Plan-Planning Commission Hearing Item 3

Dear Chair and members of the Planning Commission,

I like the Upper Westside Specific Plan and it's EIR. 217-1

I support the plan.

Kevin Murphy
590 Hawkcrest Circle (Westlake)
Sacramento, CA 95835

From: Paul Jacinth <paul@jacinthinsurance.com>
Sent: Monday, October 21, 2024 8:21 AM
To: Patten. Emma <pattene@saccounty.gov>
Subject: Upper Westside Specific Plan

Attached is my support for the development project.

Please take note of my new email address.
paul@jacinthinsurance.com
I appreciate your business!

Paul J Jacinth

916-470-7772
PO BOX 1041
NEWCASTLE, CA 95658
License # 0818989, 3320847, 807285, 2549690 NIPR # 2549690

.

Email: Pattene@saccounty.gov

Subject: Upper Westside Specific Plan - Planning Commission Hearing Item 3

Dear Chair and members of the Planning Commission,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

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218-1

Traffic concerns have been addressed as well. The project's location and mix of land uses result in traffic levels below the 85% threshold of baseline conditions, which is an important indicator of its suitability for the area. The developers have also prepared a comprehensive Resource Conservation Strategy, which ensures that impacts on farmland and local habitats will be responsibly mitigated.

The Upper Westside Specific Plan represents a well-balanced and forward-thinking approach to development in the most logical place in our region. It respects the areas agricultural heritage, addresses urgent housing needs, and supports economic growth, all while minimizing environmental impacts.

I urge, when the project comes to a vote, that you support this project and help guide our community into a sustainable future.

Thank you for your consideration.

From: Jordan Walker <jordanw1630@gmail.com>
Sent: Friday, October 18, 2024 3:20 PM
To: Patten. Emma <Pattene@saccounty.gov>
Subject: Upper Westside Specific Plan - Planning Commission Hearing Item 3

Dear Chair and Members of the Planning Commission,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

Having worked with farmers in the area and hearing their concerns, I understand the challenges faced by local farmers in the community and this area. The Upper Westside project offers a balanced approach to land use, preserving a significant 542-acre agricultural buffer to protect farmland and open space while giving them the opportunity to provide for their families needs better than what the land is currently able to yield in crops while they often see net losses or break evens in many cases.

The Upper Westside development embodies SACOG's smart growth principles by utilizing existing infrastructure and providing housing near job centers. The proposed "town center" is conveniently located within 3.5 miles of downtown Sacramento, and more than two-thirds of the project boundary is adjacent to existing development. 219-1

This infill development will reduce sprawl, offer a variety of housing types, and provide easy access to jobs and transit. Of the 9,356 proposed housing units, over 52% will be multi-family attached units, which are crucial for addressing our region's housing crisis, particularly the need for affordable apartments and duplexes.

This project offers a balanced approach to land use, preserving a significant agricultural buffer while providing a variety of housing options and promoting smart growth. The proposed "town center" is conveniently located near downtown Sacramento, and the project's focus on affordable housing is essential for addressing our region's housing crisis.

I am particularly impressed by the project's commitment to environmental stewardship. The developers have carefully considered traffic concerns and have prepared a comprehensive Resource Conservation Strategy to mitigate impacts on farmland and local habitats.

The Upper Westside Specific Plan represents a valuable investment in our community's future. It provides a sustainable, vibrant, and inclusive neighborhood while addressing our region's pressing needs.

I urge you to support this project and help shape a brighter future for Sacramento.

219-1 cont.

Thank you for reading,
--
Jordan EA Walker

From: Ldg@DeanG <ldg@deangrzelak.com>
Sent: Friday, October 18, 2024 3:39 PM
To: Patten. Emma <pattene@saccounty.gov>
Subject: Upper Westside Specific Plan - Planning Commission Hearing Item 3

Dear Chair and members of the Planning Commission,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

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220-1

Traffic concerns have been addressed as well. The project's location and mix of land uses result in traffic levels below the 85% threshold of baseline conditions, which is an important indicator of its suitability for the area. The developers have also prepared a comprehensive Resource Conservation Strategy, which ensures that impacts on farmland and local habitats will be responsibly mitigated.

The Upper Westside Specific Plan represents a well-balanced and forward-thinking approach to development in the most logical place in our region. It respects the areas agricultural heritage, addresses urgent housing needs, and supports economic growth, all while minimizing environmental impacts.

I urge, when the project comes to a vote, that you support this project and help guide our community into a sustainable future.

220-1 cont.

Thank you for your consideration.

Regards,

Lawrence D Grzelak

Get TypeApp for Android

From: Mari-2bsls <mari@2bsls.com>
Sent: Friday, October 18, 2024 3:42 PM
To: Patten. Emma <pattene@saccounty.gov>
Subject: Upper Westside Specific Plan - Planning Commission Hearing Item 3

Dear Chair and members of the Planning Commission,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

The Upper Westside project is situated within the Natomas Joint Vision Overlay Area, which has been under discussion for potential development for several decades. This project satisfies the General Plan's LU-120 performance-based and design criteria which was developed in coordination with SACOG, ensuring that it fits within the established framework for thoughtful growth.

As a member of the Natomas community, I recognize the struggles faced by local farmers due to the changing landscape around them. The Upper Westside project offers a balanced approach to land use, preserving a 542-acre agricultural buffer to protect farmland and preserve open space.

The Upper Westside development embodies SACOG's smart growth principles by utilizing existing infrastructure and providing housing near job centers. The proposed "town center" is within 3.5 miles of downtown Sacramento. More than two-thirds of the project boundary is adjacent to existing development. This project is essentially an infill development that will reduce sprawl, offer a variety of housing types, and provide easy access to jobs and transit. Of the 9,356 proposed housing units, more than 52% will be multi-family attached units, which are crucial in addressing our region's housing crisis, particularly the need for affordable apartments and duplexes. 221-1

Traffic concerns have been addressed as well. The project's location and mix of land uses result in traffic levels below the 85% threshold of baseline conditions, which is an important indicator of its suitability for the area. The developers have also prepared a comprehensive Resource Conservation Strategy, which ensures that impacts on farmland and local habitats will be responsibly mitigated.

The Upper Westside Specific Plan represents a well-balanced and forward-thinking approach to development in the most logical place in our region. It respects the areas agricultural heritage, addresses urgent housing needs, and supports economic growth, all while minimizing environmental impacts.

I urge, when the project comes to a vote, that you support this project and help guide our community into a sustainable future.

221-1 cont.

Thank you for your consideration.

Sincerely,

Mari A. Noss

Get TypeApp for Android

From: Srirama Tanniru <srirama.tanniru@gmail.com>
Sent: Sunday, October 20, 2024 5:46 PM
To: Patten. Emma <pattene@saccounty.gov>
Subject: Upper Westside Specific Plan - Planning Commission Hearing Item 3

Dear Chair and members of the Planning Commission,

My name is Srirama Tanniru ('Sri'), an IT Project Management Professional who has been working in and around downtown Sacramento for approximately 30 years. I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

The Upper Westside project is situated within the Natomas Joint Vision Overlay Area, which has been under discussion for potential development for several decades. This project satisfies the General Plan's LU-120 performance-based and design criteria which was developed in coordination with SACOG, ensuring that it fits within the established framework for thoughtful growth.

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222-1

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The Upper Westside Specific Plan represents a well-balanced and forward-thinking approach to development in the most logical place in our region. It respects the area's agricultural heritage, addresses urgent housing needs, and supports economic growth, all while minimizing environmental impacts.

I urge, when the project comes to a vote, that you support this project and help guide our community into a sustainable future.

222-1 cont.

Thank you for your consideration.

Best Regards,

Srirama Tanniru ('Sri')
Email: Srirama.Tanniru@gmail.com

From: D C <dc238@yahoo.com>
Sent: Friday, October 18, 2024 3:22 PM
To: Patten. Emma <pattene@saccounty.gov>
Subject: Upper Westside Specific Plan - Planning Commission Hearing Item 3

Dear Chair and members of the Planning Commission,

I am writing to express my strong support for the Upper Westside Specific Plan, a development project that aligns with our community's vision for growth and sustainability while addressing the critical housing shortage in the Sacramento region.

The Upper Westside project is situated within the Natomas Joint Vision Overlay Area, which has been under discussion for potential development for several decades. This project satisfies the General Plan's LU-120 performance-based and design criteria which was developed in coordination with SACOG, ensuring that it fits within the established framework for thoughtful growth.

As a member of the community, I recognize the struggles faced by local farmers due to the changing landscape around them. The Upper Westside project offers a balanced approach to land use, preserving a 542-acre agricultural buffer to protect farmland and preserve open space.

The Upper Westside development embodies SACOG's smart growth principles by utilizing existing infrastructure and providing housing near job centers. The proposed "town center" is within 3.5 miles of downtown Sacramento. More than two-thirds of the project boundary is adjacent to existing development. This project is essentially an infill development that will reduce sprawl, offer a variety of housing types, and provide easy access to jobs and transit. Of the 9,356 proposed housing units, more than 52% will be multi-family attached units, which are crucial in addressing our region's housing crisis, particularly the need for affordable apartments and duplexes.

223-1

Traffic concerns have been addressed as well. The project's location and mix of land uses result in traffic levels below the 85% threshold of baseline conditions, which is an important indicator of its suitability for the area. The developers have also prepared a comprehensive Resource Conservation Strategy, which ensures that impacts on farmland and local habitats will be responsibly mitigated.

The Upper Westside Specific Plan represents a well-balanced and forward-thinking approach to development in the most logical place in our region. It respects the areas agricultural heritage, addresses urgent housing needs, and supports economic growth, all while minimizing environmental impacts.

I urge, when the project comes to a vote, that you support this project and help guide our community into a sustainable future.

Thank you for your consideration.

Dennis A. Crabtree

From: Alex Jang <alexxjang@live.com>
Sent: Monday, October 21, 2024 2:57 PM
To: Clerk of the Board Public Email <BoardClerk@saccounty.gov>
Subject: October 21 Agenda Item #3, the Upper Westside Specific Plan

Greetings Board Members,

I hope this message finds you well. My name is Alex Jang, a lifelong resident of Natomas whose family has been a part of this community since the 1950s. I am writing to express my deep concerns regarding the Upper Westside Specific Plan and its potential impacts on our beloved community and environment.

Natomas has always been a unique blend of growth and environmental stewardship, making it a special place to live. However, the proposed plan threatens to disrupt this delicate balance. With 9,000 housing units and 3 million square feet of retail space, the project will introduce approximately 20,000 additional cars onto our already congested roads.

Traffic is already a significant challenge for our community, with only four roads serving the area. Of these, two are two-lane roads that cannot be widened, and others, like San Juan, are limited by surrounding housing and overpasses. Garden Highway cannot be widened due to its status as a levee, as stated by the Army Corps of Engineers. Most traffic will funnel onto W. El Camino, which varies from two to six lanes and is already busy, fast, and unsafe for pedestrians. In emergencies, the evacuation of thousands of new residents would be nearly impossible.

224-1

Furthermore, the land designated for development is not only rich in nutrients and close to the river, but once it is paved over, it is lost forever. This development will exacerbate existing flood risks by significantly reducing natural flood absorption capabilities. We've already witnessed accidents and fatalities on fully developed roads due to drivers who neglect rules and show little respect for others. If the city has been ineffective in addressing these safety concerns to date, what assurances do we have that it will manage the added pressure from this plan?

224-2

I've personally noticed the alarming decline in local wildlife. Years ago, my neighborhood was filled with the sounds of frogs and crickets at night, but now their silence is a painful reminder of the wildlife we are losing. Coyotes will be forced to find food and shelter within our neighborhoods. Egrets and herons, the very birds our schools are named after, are becoming increasingly rare sights along our levees and canals. The proposed plan will further threaten these species, including those protected under the Natomas Basin Habitat Conservation Plan (NBHCP). The mitigation strategies outlined in the plan are inadequate and insufficient to safeguard these critical habitats. We should be committed to upholding our agreements and preserving what remains of our natural environment instead of continuing to pave over it.

224-3

Additionally, we must consider the impact on air quality, which cannot be effectively mitigated. This development threatens our quality of life and the existing businesses in South Natomas. It fails to address the urgent need for affordable and middle-to-lower-income housing and is premature, given that there are plenty of other infill locations available for development. We cannot afford to approve more sprawl that will ultimately strain our infrastructure and quality of life.

224-4

Natomas is unique, and we have an opportunity to preserve what makes it special for future generations. Let's create a community we can all continue to be proud of—one that balances growth with environmental responsibility.

Thank you for considering these concerns. I urge you to reject the Upper Westside Specific Plan and to commit to a future that prioritizes the well-being of our community and environment.

224-5

Sincerely,

Alexandria (Alex) Jang and the Jang Families
South, West and North Natomas Residents

From: Cynthia Romero <cynthiaromero@yahoo.com>
Sent: Monday, October 21, 2024 12:38 PM
To: Clerk of the Board Public Email <boardclerk@saccounty.gov>
Subject: October 21 Agenda Item #3, the Upper Westside Specific Plan
Attachments: Upper Westside Specific Plan.pdf

Good afternoon,

Please see my letter attached for tonight's public hearing regarding the Upper Westside Specific Plan.

Regards,
Cynthia Romero

October 21, 2024

Re: October 21 Agenda Item #3, the Upper Westside Specific Plan

Dear County Planning Commissioners,

I have lived and worked in Natomas for 29 years. Over those years, I have seen the area slowly develop from farmland to residential and commercial buildings. We are at the point now where the infrastructure cannot support any more development and areas that were set aside for farming and nature preserves are being threatened.

I travel El Centro Road daily between North and South Natomas. This drive used to take me 10 minutes from one end to the other but now takes 15-20 minutes with the increased traffic. If there is an accident on I-80 or I-5, freeway travelers detour onto El Centro Road which then takes 30-45 minutes to travel from one end to the other. The West El Camino overpass is only two lanes and during commute times, traffic is bumper to bumper with both off ramps backing up onto the freeway.

We do not have adequate infrastructure to support a development of this size.

225-1

Regards,

Cynthia Romero

180 Sutley Circle

Sacramento, CA 95835

From: JudyGuma Tretheway <judytre@gmail.com>
Sent: Monday, October 21, 2024 2:52 PM
To: Clerk of the Board Public Email <BoardClerk@saccounty.gov>
Subject: October 21 Agenda Item #3, the Upper Westside Specific Plan"

A poem:

Let the land speak: *No eulogy for Natomas lands*

I have grown giant oak trees,
I have grown ripe, red tomatoes,
I have grown pumpkins, I have grown bees.

I have watched generations of life thrive,
I have seen the waters rise
I've offered rest for the birds above.

I've opened myself to the roots of all kinds of plant life
mingling with the waters of the river.
I have watched my bounty
carried off to nourish hungry people.

Left open,
I can breath
the surface of my being
connecting the deep darkness of the earth
to the vastness holding ten million stars.

Left open,
I can contribute
to the passage of the animals,
to the feeding of the hungry,
to the cycles of a land pulsing with life.

Left open,
I can stay alive
married to my river,
anchoring her shape,
cheering her on as she comes into her finish line at the sea.

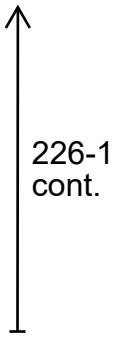
226-1

Left open,
I can seed the future
supporting generations of life processes
and the healing of our beloved earth.

Honor me here in the heart of the valley,
In the heart of our community.
My pulse is your pulse is our future.

Judy Tretheway • 10/2024

916 600 8241



From: Ray Tretheway <ray8733@swisscows.email>
Sent: Monday, October 21, 2024 4:25 PM
To: Clerk of the Board Public Email <BoardClerk@saccounty.gov>
CC: Edith Thacher <egthacher@gmail.com>; Heather Fargo <h-fargo@comcast.net>; Marbella Sala <smarbellasala@gmail.com>; trinaldrotar@gmail.com; dav49@att.net; irandolph6722@gmail.com; Judy Tretheway <judytre@gmail.com>
Subject: October 21 Agenda Item 3 - Testimony on Upper Westside Specific Plan

My name is Ray Tretheway, I am a longtime resident of Natomas.

I recommend the Planning Commission deny in its entirely the proposed Upper Westside Specific Plan.

I urge the Planning Commission to recognize how this Plan violates and dissolves the designated Urban Services Boundary in Natomas that was adopted to give permanent protection to both farmlands and endangered and threatened species and their habitats.

I urge the Planning Commission to give serious consideration to the negative impacts of this proposal to the Natomas Basin Conservancy's nearly 40 decade's of unprecedented farming and habitat achievements.

I urge the Planning Commission to not ignore the thousands of empty parcels within the Urban Services Boundary ready to accommodate the promise of infill projects - the revitalization, as well as the building of new industrial and commercial districts and neighborhoods. 227-1

I urge the Planning Commission to consider how approval of this Plan will exasperate, and at times negate due to budgetary and staffing constrains, the ability for the County to deliver on a timely basis critical services, such as fire, police, roadway, water and other basic services, to existing neighborhoods.

Your 'NO' vote will be a validation for all the promises of infill the County has made to its residences and businesses; and it will recognize the value of farmland, wildlife and habitat protection consistent with Federal, State, City of Sacramento and County of Sutter binding agreements.

Your 'NO' vote will send a clear message countywide that the days of farmland speculation and farmland sprawl will no longer trump the guiding principles and values of urban and suburban planning in Sacramento County.

Ray

916-719-8733

From: Melissa Brown <melissa@rivercityattorneys.com>
Sent: Monday, October 21, 2024 11:07 AM
To: Clerk of the Board Public Email <BoardClerk@saccounty.gov>; Supervisor Serna <SupervisorSerna@saccounty.gov>
CC: Don Fraulob <don@rivercityattorneys.com>; Patrick Tully <ptully@bitwiseproperties.com>; GHCA Board <GHCABoard@gardenhwy.org>
Subject: Opposition to Upper Westside Plan

Greetings,

Please accept this communication in opposition to the Upper Westside Plan**.** As a residents and homeowners of the Garden Highway for over 35 years, I have witnessed the gradual degradation of our neighborhood as a result of the levee project. The destruction of habitat is quite apparent. And already, the increased traffic has resulted in accidents, killing of wildlife and pets. This is before the proposed massive increase in population, traffic, pollution, and pressure on public safety that will result from the Westside Plan. Moreover, the project's 20-30 year buildout schedule creates unacceptable noise, dust, air pollution and general area disruption over decades.The EIR fails to consider how current and future residents will be provided with safe mitigation during the decades of construction.

The following are specific comments that we ask you to address.

1. Public hearings on expanding the Urban Services Boundary are necessary. This project is outside the Urban Services Boundary. Before considering any development outside the Urban Services Boundary, the County should pause development applications outside the Urban Services Boundary and hold hearings on whether the Urban Services Boundary should be expanded.and consider the significant negative impacts on the environment and Sacramento County residents far beyond the Upper Westside project area.

2. This project's urban sprawl is unacceptable. . The County's 2030 General Plan, County zoning, the Urban Services Boundary, the Urban Policy Area, and SACOG's Blueprint for regional development all seek to avoid. The land use strategies and policies of the Sacramento County 2030 General Plan were designed to promote the efficient use of land, encourage economic vitality and reduce urban sprawl and its impacts, preserve habitat and open space, and protect local farming. The Urban Services Boundary was intended to implement that vision and promote orderly growth within the County. The proposed project violates the County's 2030 General Plan, County zoning, the Urban Services Boundary, the Urban Policy Area, and SACOG's Blueprint for regional development.There is no rationale is presented in the EIR, for approving this project outside the Urban Services Boundary.

228-1

3. This project harms the entire Sacramento community because of the loss of open space, and habitat and their associated recreational benefits; the loss of farmland; a significant increase in roadway dangers because of increased traffic on rural roads and increased congestion and conflicts at freeway on and off ramps which may not be able to be mitigated for some time; and a significant increase in area air pollution which has health consequences for the entire Sacramento area. **The EIR fails to recognize that the project reduces Sacramento recreational opportunities,** because increased traffic in the project area, would make it unsafe for individual cyclists and cycling clubs, as well as motorcycle clubs and antique or specialty car clubs that use Garden Highway for recreation**.**

4. The EIR falsely claims that the project does not violate habitat conservation plans. We agree with the Environmental Council of Sacramento that the proposed project does violate approved habitat conservation plans and would lead to the permanent destruction of open space, habitat and wildlife.

5. The EIR fails to identify that river corridors are rare and valuable resources to residents of any community, and are particularly valued by Sacramento County residents for recreation, open space, wildlife, and local farmland. The proposed project introduces permanent harms by urbanizing a river corridor, putting urban activity within about 700 feet of Garden Highway and the river. River corridors need to be protected for current and future area residents**.**

228-1 cont.

6. The proposed project changes the existing one-mile river corridor protection buffer to 700 feet. Years ago, during County hearings on the Urban Services Boundary, many residents argued for a miles wide protection buffer for the Sacramento River corridor to protect recreation, open space, habitat and local farmland. The County settled on a one-mile buffer. This project would reduce that buffer to a wholly inadequate 700 feet in some areas, up to a maximum of one-half mile.

7. The proposed project would result in the significant and permanent loss of open space, habitat, already diminished local farmland, and floodplain protections. Once these community resources are gone, they are gone forever.

8. Mitigation for loss of farmland, wildlife and wildlife habitat would most likely occur beyond the Sacramento area, depriving Sacramento County residents of those benefits. The project applicant says loss of farmland, wildlife, and wildlife habitat would be mitigated outside the Natomas Basin. People in Sacramento value and findbenefit in farmland, wildlife, and the open space that serves as wildlife habitat. The EIR fails to identify the communitywide loss of farmland, wildlife and wildlife habitat resources as community assets. If the project is approved farmland and wildlife mitigations should be required within the Natomas basin where those resources would continue to benefit community residents.

9. The EIR fails to identify that the proposed project could result in a total loss of project area farmland. Most of the project area is currently farmland that would be converted to urban uses. In the past 10 years Sacramento has lost more than 14,000 acres of farmland. This project could result in the permanent loss of another 1500 acres or more of high-value, productive local farmland. The project applicant says 534 acres of farmland would remain, but about 130 acres of that is intended as buffer land that will not be useable for farming. The remaining 400 acres of farmland is a long narrow space (some just 700 feet wide), and just 30 to 50 feet from potential urban conflicts, which may make the remaining farmland impractical to use for commercial farming.

The recent pandemic made clear that farmland is important community infrastructure. **The EIR fails to address the loss of area farmland as a community food resource** when there are disruptions to the food distribution system.

10. The EIR fails to identify that the proposed project could reduce existing floodplain protection. Around the United States, communities are starting to reserve land near waterways to use as open space for flood protection This project puts housing in a floodplain close to the river. While the new Natomas levee is expected to provide 200-year flood protection, climate change increases the chance of extreme flooding. Recent flooding in Asheville, North Carolina is proof of that. Current open space and farmland near the river provides urban areas with an additional level of flood protection. The proposed project would eliminate this protection.

228-1 cont.

11. This project has an unacceptably long list of significant and unavoidable impacts, many that are harmful, permanent, and cannot be mitigated, including unplanned growth, urbanization of a rural area, increased traffic and roadway hazards, increased air pollution, increased noise, loss of wildlife, loss of habitat, loss of productive farmland, and the permanent loss of an important landscape for indigenous communities of Sacramento County.

20. The project significantly and unacceptably increases air pollution, possibly exceeding thresholds of significance for everyone, and posing serious health risks, including an increased risk of cancer. In addition, operation of the proposed project would significantly conflict with and obstruct implementation of the Sacramento Metropolitan Air Quality Management District air quality improvement efforts.

13. Sacramento does need affordable housing, but **the EIR fails to note that this project makes no commitment to a specific number of very affordable, affordable, and missing middle housing (duplexes, etc.) units** or a specific percentage of affordable housing units. In addition, the buildout of this project will take 20-30 years, and the first phase will take 7 years. So, there would not be housing from this project for many years. If the project is approved it should have specific affordable housing requirements, with a high percentage of affordable housing units in each housing development.

14. **The EIR fails to adequately address the severe and dangerous impacts project traffic would have on Garden Highway** and existing Garden Highway users. The EIR suggests the project could add 4,000 trips a day to Garden Highway. Garden Highway is a rural 2-lane, undivided road. Garden Highway is an elevated roadway on top of a levee, so widening is not feasible. Garden Highway is half the width it should be for traffic safety. It has blind curves, no shoulders and no guard rails. The project EIR emphasized concerns about traffic safety, including hazardous conditions at Garden Highway intersections. However, the EIR fully failed to address the greatest safety issue on Garden Highway, which is the mixed use of the road by personal vehicles, semitrucks, agricultural equipment, cars pulling boats, golf carts, individual and groups of cyclists, pedestrians, and wildlife, any of which can enter the roadway unexpectedly from farm roads, driveways, and the riverbank. Adding traffic to Garden Highway is unacceptably dangerous. If the project is approved, a new traffic circulation plan should be required and agreed to by the Garden Highway Community Association, that discourages project vehicle traffic on Garden Highway.

15. The EIR fails to adequately address the impacts from a proposed stadium, which would be close to residences all around the project, including Garden Highway. Stadium traffic, noise, and light do not belong in/near residential areas. Stadium noise can travel miles. County and City Code Enforcement offices and Sacramento stadium operators can confirm stadium conflicts with residential areas. Any stadium should be miles from any residences. We already experience **a**mplified noise, travelling miles with concert events such as Aftershock and the CHP Firing Range across the river in West Sacramento. If the project is approved, no amplified sound should be permitted (except at school sites for emergencies).

228-1 cont.

The EIR notes that nighttime lighting would have a permanent impact on the area. But **the EIR fails to adequately address the harmful impacts of nighttime lighting on human health and on wildlife**, including migratory birds using the Pacific Flyway. **The EIR fails to provide adequate light mitigations for humans and wildlife.** If the project is approved, there should be a minimum one-half mile buffer between the project and Garden Highway that includes a minimum 100 foot wide densely planted tree buffer adjacent to the project. The tree buffer must include tall native evergreen trees planted at the beginning of project construction.

16. The EIR fails to adequately address that project related air pollution and its resulting serious health impacts, as well as construction dust, could be more severe on Garden Highway because of the prevailing wind that blows toward Garden Highway.

We trust you will carefully consider the negative impact this project will have on our community and reject efforts to greenlight the project until these and other issues are resolved. Those of us in the community are living through the years long levee improvement project which has had significant and negative impact on our well-being. The Westside project adds decades to the disruption of our lives and environment.

Sincerely,

Don Fraulon and Melissa Brown

2517 Garden Highway

Sacramento, CA 95822

From: Melanie Herman <alwayselegant@gmail.com>
Sent: Monday, October 21, 2024 6:14 AM
To: Clerk of the Board Public Email <BoardClerk@saccounty.gov>
CC: Patrick Tully <ptully@mindsetsoft.com>; melissa@rivercityattorneys.com
Subject: Opposition to Upper Westside Project

To the Sacramento County Planning Commission,

I am writing to express my opposition to the Upper Westside Project.

If you add many more vehicles to the Garden Highway per day, you will risk causing the very catastrophe that the current levee construction is attempting to ameliorate. Soil liquefaction.

1. Even with the comparatively light traffic we currently have, our houses shake when SUVs and trucks go by. I can feel the road compress like a wave when heavier semi-trucks blast past.
2. Virtually all of the riverside properties have lost large trees over the years. The stumps and roots that remain rot, creating holes like swiss cheese.
3. Climate change is making high river levels more likely. High water saturates the levee where the clay that once capped the sandy fill has been perforated by the loss of trees.

    - Soil liquefaction is a natural hazard that occurs when saturated or partially saturated soil loses its strength and stiffness in response to an applied stress, such as an earthquake. During liquefaction, soil behaves like a liquid or viscous substance, similar to quicksand.

229-1

Obviously, the entire Natomas Basin would be endangered if the Garden Highway dissolves from beneath. At the very least, the developer and county must include a determination that shaking the levee when the river is high will not lead to liquefication anywhere along its length. If you add this much stress to the Garden Highway, it will liquify somewhere and Natomas will go underwater.

Sincerely,

Melanie Herman

2295 Garden Hwy. Sacramento, CA 95833 916-698-2736

From: Steve Schweigerdt <sschweigerdt@gmail.com>
Sent: Monday, October 21, 2024 2:00 PM
To: Clerk of the Board Public Email <BoardClerk@saccounty.gov>
Subject: Planning Commission comments
Attachments: Westside comments.docx

Hi! Please provide these comments on the Upper Westside project to the Planning Commissioners for tonight's meeting.

Thank you!

Steve Schweigerdt
(916) 877-5288
sschweigerdt@gmail.com

October 21, 2024

Sacramento County Planning Commission
Justin Raithel, Chair
Jofil Borja, Vice Chair
Damon Conklin
Mariana Corona Sabeniano
Joseph Devlin

Sent by email to BoardClerk@saccounty.gov

SUBJECT: AGENDA ITEM 3, October 21, 2024 Sacramento County Planning Commission
Natomas – Upper Westside, PLNP2018-00284

Dear Planning Commissioners,

I oppose the Upper Westside Specific Plan. Approval would be contrary to all planning to date in the Natomas Basin including the Natomas Basin Habitat Conservation Plan, Natomas Shared Joint Vision agreement between the City and County of Sacramento, Sacramento County General Plan, Urban Service Boundary, and SACOG Blueprint. Therefore, the County should inform the applicants that the proposed development directly conflicts with these plans and advise the withdrawal of the proposal. The environmental impacts of the project are overwhelmingly negative and there is no substantive economic need for the project that justifies further preparation of a Final EIR.

The Natomas Shared Joint Vision MOU stated “The City, rather than the County, is the appropriate agent for planning new growth in Natomas and can better provide a full range of municipal services. The County is the appropriate agent for preserving open space, agricultural, and rural land uses.” This language was agreed to in the 2002 MOU, and while the Joint Vision has been abandoned, the language has not been rescinded and still holds true. The County should not be supporting development of new growth directly, but should refer development proposals to LAFCO and the City for annexation proceedings. Indeed, the County has utterly failed to make any progress on its role of preserving open space and agricultural land in the Natomas Basin as not a single acre has been conserved by County efforts despite billions of dollars of state and federal grants made available since the MOU was signed. Instead, the County has signaled development potential to landowners that made it unlikely any would become willing sellers for conservation purposes.

Polling shows that residents value our Natural Areas - they consistently rank #1 in Valley Vision Livability Polls, yet our region is far behind on 30X30 goals with only 9% of our land conserved to date. This land can be put in conservation with state funds from the SALC program and landowners can be compensated at appraised fair market value if they would like to sell. This would keep the land producing food for us, protect critical habitat and soil, and encourage investment in the ample land for development within the Urban Services Boundary. That is the path the County should be pursuing for land outside the Urban Services Boundary.

This project is outside of the Urban Services Boundary and should not be considered for approval. The Sacramento County General Plan states the Urban Services Boundary " is intended to be a permanent growth boundary not subject to modification except under extraordinary circumstances." Those circumstances do not exist and any project outside of the USB is inconsistent with the General Plan on

230-1

its face. While a Special Planning Zone overlay exists for the Natomas Joint Vision, that does not obviate the need for extraordinary circumstances to justify moving the Urban Services Boundary. It should be noted that the overlay stated the SACOG Blueprint shows significant development in the Joint Vision area and that is no longer the case, as detailed below.

General Plan Policy LU-2 states that the County shall maintain a USB that defines the long-range plans (beyond twenty-five years) for urbanization and extension of public infrastructure and services and defines important areas for protecting as open space and agriculture. The County has already approved for development more than 3 times the projected demand for housing units SACOG has modeled (35,610 from 2020-2050). The approval of this project in addition to the excess entitlements that already exist would inevitably result in widely scattered, partially built-out projects that would prevent development of "complete community" urban mass which the County asserts would reduce VMT; and would doom the County to increasing per capita GHG emissions far into the future, contrary to the necessities of climate change, State climate goals, and the intention of the County's Phase 1 CAP. This is further amplified by the Phasing Plan, which leaves the highest density development to the last phase – when it is never built or rezoned to lower density sprawl.

In June 2024, SACOG adopted the 2025 Blueprint Land Use Assumptions, which do not include this project as an area to be developed. Therefore, approving this project is inconsistent with our region's Sustainable Communities Plan and risks non-attainment of greenhouse gas reduction targets along with a loss of transportation funding. The DEIR must be updated to acknowledge this fact and analyze the impact on the Sustainable Communities Plan and how much more difficult it will be for the region to meet reduction targets if the project is approved. SACOG has indicated that some approved projects need to remain unbuilt to meet the target and the impacts of this project on other projects along Jackson Highway that are more favorable for emissions reductions should be included. The DEIR attempts to skip around this by stating "the County is not obligated to support the land use types proposed in the Blueprint at the parcel level" on p. 14-23 but the DEIR should be required to analyze the impacts of building the project on the plan as a whole.

230-1 cont.

This project would destroy farmland that we need and the proposed mitigation measures are inadequate. SACOG's CROP report has found that in 30 years (1988-2018) Sacramento County converted more than 73,000 acres of ag land to urban uses – an area larger than the entire City of Sacramento (63,852 acres). It specifically calls out the Upper Westside project as destructive to Prime Farmland and indicates the mitigation requirements are inadequate. "Biological conservation is the planned mitigation for the project; however, biological easements have restrictions and are not guaranteed to support agriculture. Urban/community gardens have also been proposed as a mitigation measure for the project, and while a community garden will support the health and resilience of the new community, it does not support agriculture in the same way the land is being used today." Indeed, farmland loss cannot be mitigated by simply protecting farmland elsewhere. Mitigation measure AG-1 that protects other agricultural land does not in effect mitigate the loss of prime farmland in the area. True mitigation would require improving the productivity of less productive farmlands to the equivalent of the prime farmland being lost. Even were compensatory mitigation to be used, it should require an affirmative commitment for productive agriculture and have no restrictions on agricultural intensification. It should be further noted that many of the properties along the Garden Highway the DEIR includes as an "agricultural buffer" are zoned AR-2 (97 acres) and are primarily residential instead of productive agricultural properties, thus should not qualify as any type of agricultural credit for the project.

The Natomas Basin HCP was predicated on land outside the USB remaining undeveloped. Starting to develop this land is incompatible with the protections put in place through the HCP and the analysis provided in the DEIR is lacking details on the impacts to the HCP. The DEIR Biological Resources Introduction includes requests from CDFW, USFWS, LAFCO, and City of Sacramento that are not fulfilled in the DEIR and until those details are included in a DEIR the public can review it is incomplete and must be recirculated with the requested information included.

Proposed mitigation for Swainson's hawk foraging habitat is unacceptable. A key part of the NBHCP Conservation Strategy is to both preserve to the extent practicable habitat within the Swainson's Hawk Zone adjacent to the Sacramento River and also to enhance and expand Swainson's hawk habitat through provision of suitable trees and groves in proximity to upland foraging reserves. The project removes about a third of the Swainson's Hawk Zone in Sacramento County from foraging habitat and impacts the already diminished habitat the hawks rely on. A much higher ration than 1:1 mitigation land would be required and it needs to be provided within the Sacramento County portion of the Natomas Basin.

230-1 cont.

The reasons to reject this project are overwhelming and further development of it should stop immediately.

Sincerely,

Steve Schweigerdt
Sacramento National Park City
2709 2nd Ave.
Sacramento, CA 95818
info@sacparkcity.com

From: 2wingdam33@gmail.com
Sent: Monday, October 21, 2024 10:41 AM
To: Clerk of the Board Public Email <BoardClerk@saccounty.gov>
CC: Supervisor Serna <SupervisorSerna@Saccounty.gov>
Subject: Upper Westside Development

October 21, 2024

To: Sacramento County Planning Commissioners (BoardClerk@saccounty.gov)

From: Christine Olsen, Garden Highway, Sacramento County

Subject: Upper Westside Development Plan

Hundreds of Sacramento residents, interest groups, experts, and government agencies have come together repeatedly, over many years, and spent thousands of hours in workshops and hearings to tell the County we don't want sprawl. We want planned growth that makes life better for everyone. The Upper Westside development is urban sprawl.

Sacramento County's 2030 General Plan was designed to promote the efficient use of land, encourage economic vitality and reduce urban sprawl and its impacts, preserve habitat and open space, and protect local farming. The Urban Services Boundary was intended to implement that vision and promote orderly growth within the County. The Upper Westside project unnecessarily violates those County plans as well as the Urban Policy Area, County zoning and other County codes, SACOG's Blueprint for regional development, and agreed upon habit conservation plans.

On behalf of all the Sacramento County residents who worked to ensure the countywide benefits of planned growth, you are urged to pause consideration of any projects outside the Urban Services Boundary and hold public hearings on whether the Urban Services Boundary should be expanded. If one project is approved beyond the Urban Services Boundary, other developments will surely follow, and the Urban Services Boundary will no longer function as intended to preserve open space, habitat and prime farmland, or to encourage infill development. Changing the Urban Services Boundary will have irreparable negative impacts on the County's environment, and on Sacramento County residents far beyond the Upper Westside project.

231-1

Getting planning right ensures a community we love to live in and a community that works for everyone. The Upper Westside project is the spawl we all want to avoid. The County made a commitment to the people of Sacramento that the County would not expand the Urban Service Boundary unless there was inadequate vacant land within the USB to accommodate the demand for urban uses. There is, today, more than ample land within the Urban Services Boundary for the number of housing units and the amount of commercial space the Upper Westside Project proposes.

Allowing development outside the Urban Services Boundary harms the Sacramento community outside and inside the Urban Services Boundary. An important achievement of infill development is that it not only advantages residents inside the new development, it adds vitality and benefits to the nearby community, maximizes the cost-efficiency of urban services such as transit, and reduces environmental impacts associated with urban sprawl. The Upper Westside applicant may have no interest in infill development and that is their prerogative, but their proposed project outside the Urban Services Boundary is unnecessary and harmful far beyond the project area.

If the County does permit development outside the Urban Services Boundary, please at least protect a minimum one-mile-wide river corridor. River corridors are unique and highly valued by Sacramentans for recreation, for open space that provides a respite from urban environments, for wildlife and unique wildlife habitats and corridors, for prime farmland, for flood protection buffers, and as important tribal cultural landscapes.

With regard to the Upper Westside EIR, the EIR is fundamentally flawed and should be rejected. EIR's are intended, by law, to present the public and decisionmakers with factual, evidence-based information about a project's potential impacts. The Upper Westside EIR identifies changes the project applicant is seeking to the County's 2030 General Plan, County zoning, to the Urban Services Boundary, and to the Urban Policy Area, among others. Then, throughout the EIR, the EIR makes false claims that the project does not conflict with County land use policies. For example, under Agricultural Resources, the EIR says, "the proposed UWSP would not conflict with existing agricultural use and zoning," That is profoundly untrue. The project site is mostly zoned and used for agriculture and would be rezoned for urban uses. The project may totally wipe out local farming because the remaining 400 acres that could be used for farming is a long narrow space (some just 700 feet wide), and just 30 to 50 feet from urban conflicts, which may make the remaining farmland impractical for commercial farming. The EIR says the proposed project would not conflict with existing habitat conservation plans. That is also untrue as detailed by the Environmental Council of Sacramento. Under Land Use, the EIR says, "the proposed UWSP would not conflict with Sacramento County's Land Use Plans," despite the long list of County land use plans, policies and codes that the project seeks to change. Under Growth Inducement impacts, no rationale is presented for approving urban development outside the Urban Services Boundary and the EIR completely fails to address the growth inducement impacts due to the project applicant's requested changes to County plans, policies and codes. Developers have a right to spin the truth in their communication with Planning Commissioners and County Supervisors, but deceit and spin has no place in an EIR.

231-1 cont.

More detailed EIR comments will be submitted to the County. Here I want to highlight serious impacts the project would have on Garden Highway, where I live. The proposed project would come within 700 feet of Garden Highway. The EIR suggests the Upper Westside project could add 4,000 vehicle trips a day to Garden Highway. Intersection improvements on Garden Highway are discussed in the EIR, but there is no discussion of traffic safety impacts on the Garden Highway roadway. Garden Highway is a rural 2-lane, undivided and elevated roadway. Garden Highway is half the width it should be for traffic safety. It has blind curves, no shoulders and no guard rails. The greatest traffic safety issue on Garden Highway is the mixed use of the roadway by personal vehicles, semitrucks, agricultural equipment, cars pulling boats, golf carts, individual and groups of cyclists, pedestrians, and wildlife, any of which can enter the roadway unexpectedly from farm roads, driveways, and the riverbank. Adding traffic to Garden Highway has life safety consequences and should be rejected as unnecessary and too dangerous.

The EIR does not identify or suggest mitigations that might reduce urban-rural conflicts for a project like Upper Westside and a rural residential area such as Garden Highway. The project proposes a stadium close to residences all around the project, including Garden Highway. Stadium traffic, noise, and light do not belong in or near residential areas. Stadium noise can travel miles. County and City Code Enforcement offices and Sacramento stadium operators can confirm stadium conflicts with residential areas. Traffic and noise generating land uses, such as schools and an outdoor pavilion, should be located close to major roadways and commercial uses to reduce all residential impacts. Amplified sound should be prohibited in all residential areas. In the past, developers and the County have determined that amplified sound can be regulated to minimize impacts. That has proven to be untrue. Over time, sound equipment and the location of speakers can change and noise makers like bull horns can be introduced, resulting in uncontrolled noise that can easily travel more than 2 miles (based on real life experience). The EIR fails to address impacts from putting urban development within 700 feet of rural residential zoning on Garden Highway and fails to identify mitigations such as requiring that project construction begin closest to existing urban uses, reaching rural areas last.

The EIR says nighttime lighting is an impact, but fails to address the harmful impacts of nighttime lighting on human health and on wildlife, including migratory birds using the Pacific Flyway. And the EIR fails to identify possible light mitigations, such as establishing a minimum one-half mile setback between the project and any rural areas (i.e. Garden Highway), with the setback to include a minimum 100-foot-wide densely planted tree buffer of tall native evergreen trees at the western project boundary, with the setback established and the tree buffer installed at the beginning of project construction.

The proposed Upper West project is unnecessary and harmful. The EIR fails to honestly present impacts from changing County plans, policies and codes. The EIR highlights an unacceptably long list of significant, harmful and unavoidable impacts countywide that cannot be mitigated, including unplanned growth, urbanization of a rural area and a river corridor, increased costs for taxpayers and ratepayers because of the unplanned extension of urban services, increased traffic and roadway hazards, increased air pollution, loss of wildlife, loss of habitat, loss of productive farmland, and the permanent loss of an important landscape for indigenous communities of Sacramento County.

For the benefit of current and future Sacramento County residents, the County should reject all development outside the Urban Services Boundary, including the Upper Westside project. What is the point of urban development if a project like Upper Westside can violate so many County plans and policies and still be approved.

231-1 cont.

From: Ross Oliveira <rossoliveira@hotmail.com>
Sent: Monday, October 21, 2024 3:40 PM
To: Clerk of the Board Public Email <BoardClerk@saccounty.gov>
Subject: Upper WestSide Project
Attachments: BRN3C2AF4E42CA1_003269.pdf

Hello Sacramento County Board Clerk,

Please find attached a letter for the third Agenda Item tonight relating to the Upper WestSide Project in Natomas.

Thank you,

Ross Oliveira
4061 Garden Hwy
Sacramento, CA 95834

21 October 2024

County Planning Commission
County of Sacramento
700 H Street, Suite 2450
Sacramento, CA 95814

Dear Members of the Sacramento County Planning Commission,

I am writing to express my serious concerns regarding the proposed Upper Westside Specific Plan and its long-term impacts on our community. As you deliberate this decision, I ask that you carefully consider the broader implications this project will have on the natural resources, local farmland, and public safety of our county. I have grown up and now live on the Garden Hwy and would like to refer to a key statement from the Sacramento County 2030 General Plan:

"The land use strategies and policies of the Sacramento County 2030 General Plan are designed to promote the efficient use of land, encourage economic vitality and job growth, reduce urban sprawl and its impacts, preserve habitat and open space, and protect agricultural and rangeland operations. Two growth boundaries are identified to help implement this vision: the Urban Services Boundary (USB) and the Urban Policy Area (UPA). The USB is the ultimate growth boundary for the unincorporated area. The UPA defines the area within the USB expected to receive urban services in the near term. Together, the UPA and the USB promote orderly growth and the efficient extension of infrastructure and the provision of urban services."

While I support these principles, I am concerned that the Upper Westside project deviates significantly from this vision. Here are my specific reasons for opposing the project:

1. Reduction of the Sacramento River Corridor Buffer: Years ago, during County hearings on the Urban Services Boundary, many residents, as I was in High School at the time, advocated for a miles-wide protection buffer along the Sacramento River corridor to safeguard recreation, open space, habitat, and local farmland. Despite these concerns, the County settled on a one-mile buffer. This project, however, would reduce that buffer to a wholly inadequate 700 feet in some areas, and a maximum of one-half mile in others. This reduction would severely compromise the very protections the buffer was intended to provide. 232-1

2. Irreversible Loss of Open Space and Farmland: The proposed project would result in the significant and permanent loss of open space, wildlife habitat, and already diminished local farmland. Additionally, it would reduce floodplain protections, which are critical in this area. Once these vital community resources are lost, they are gone forever. These impacts would alter the landscape and character of the Natomas area in ways that cannot be undone. 232-2

3. Traffic Safety on Garden Highway: The Environmental Impact Report (EIR) fails to adequately address the severe and dangerous impacts that increased project traffic would have on Garden Highway and its users. The EIR suggests that the project could add 4,000 trips per day, although I think it will be higher, to Garden Highway, a rural, two-lane, undivided road built atop 232-3

a levee, where widening is not feasible. Garden Highway is already half the width necessary for safe traffic use, with blind curves, no shoulders, and no guardrails.

The EIR highlights concerns about traffic safety, including hazardous conditions at intersections, but it fails to address the greatest safety issue—the mixed use of the road by personal vehicles, semitrucks, agricultural equipment, cars pulling boats, golf carts, cyclists, pedestrians, and wildlife. Any of these users can enter the road unexpectedly from farm roads, driveways, or the riverbank, creating dangerous conditions. Adding more traffic to Garden Highway would be unacceptably hazardous. If this project proceeds, a new traffic circulation plan must be required and agreed to by the Garden Highway Community Association, one that discourages additional project-related traffic on Garden Highway.

232-3 cont.

4. Violation of Existing Planning Guidelines: The Upper Westside project is not consistent with several key planning guidelines, including the Sacramento County 2030 General Plan, the Urban Services Boundary (USB), the Urban Policy Area (UPA), the Natomas Basin Habitat Conservation Plan (NBHCP), the SACOG (Sacramento Council of Governments) Blueprint for regional development, and the Metropolitan Transportation Plan/Sustainable Communities Strategy. This project directly conflicts with these established plans and policies, which are designed to promote sustainable growth, protect natural resources, and limit urban sprawl.

232-4

5. Significant and Unavoidable Project Impacts: The Cumulative Impacts section of the project's EIR highlights several significant and unavoidable impacts, including the opening of Natomas to further urbanization, the substantial loss of farmland and wildlife habitat, and a significant increase in traffic and air pollution. These impacts will have long-lasting effects on the environment, community resources, and overall quality of life in the region.

232-5

In light of these concerns, I strongly urge the Board to reject this project or, at the very least, require substantial modifications to protect the community's safety, natural resources, and agricultural heritage. If the project is approved, it should be done in a way that is consistent with the goals of the Sacramento County 2030 General Plan, including maintaining the integrity of the USB and UPA, ensuring traffic safety on Garden Highway, and safeguarding open space and farmland for future generations.

232-6

Thank you for your consideration of this matter. I appreciate your attention to these critical issues, and I hope you will take the necessary steps to protect the long-term interests of Sacramento County.

Respectfully yours,

Ross Oliveira
4061 Garden Hwy
Sacramento, CA 95834
rossoliveira@hotmail.com
(916)719-5650

From: Bobbi NaSal <bobbinaone@msn.com>
Sent: Sunday, October 20, 2024 9:06 AM
To: Clerk of the Board Public Email <BoardClerk@saccounty.gov>
Subject: Upper Westside Project

Please consider our concerns and reject this project.

I am a North Natomas resident and I do not support this project for so many reasons. I cannot even pick one reason that I am opposed to this project as my objections concern all of the following:

- Paving farmland
- Putting developer profits over community health
- Increased traffic congestion on I-5, I-80 and local roads
- Ignoring County infill requirements and not respecting development boundaries
- Destruction of wildlife habitat and to the Pacific Flyway for migrating birds
- Increasing flood danger for current residents

I find my life in North Natomas is already concerning due to the fact if I need to evacuate in an emergency, crowded roads are already an issue. How will we evacuate if you add 9,000 new homes and families without a plan? 233-1

I am increasingly worried that overdevelopment will worsen the climate crisis that impacts every living thing. Our place in the path of migrating birds is so important and to destroy that habitat is beyond comprehension.

I could go on but I believe you can see just a few of my concerns. Please reject this project.
Thank you
Bobbi NaSal
916 202 9349
2617 Heritage Park Lane
Sacramento CA 95835

Sent from my iPad

From: Rick Dow <richard.dow4@verizon.net>
Sent: Sunday, October 20, 2024 3:13 PM
To: Clerk of the Board Public Email <BoardClerk@saccounty.net>
CC: Edith Thacher <egthacher@gmail.com>
Subject: Upper Westside Public Hearing 10-21-2024

Attention: Sacramento County Planning Commission

Being good stewards of the land it is hopeful that members of the Commission will take the following into consideration when making decisions about the Natomas Upper Westside area:

1) The 2,000 acres of farmland help support migratory birds in the Pacific Flyway, and loss of that farmland to development would potentially harm migratory birds that are part of the ambiance of living in the Natomas area. 234-1

2) Loss of farmland would also be a loss of the potential to use farmland as a carbon sink and help fight climate change that is bringing about unusual weather such as severe flooding. 234-2

3) Commercial and residential development would eventually clog the area and possibly lead to panic if evacuation from the area were to occur due to disasters such as flooding, earthquake or fire. There are only three roads to be used for evacuation if the need were to occur for whatever reason. 234-3

These are reasons my wife and I as residents of Natomas oppose the overly ambitious Natomas Upper Westside project proposal.

Sincerely,

Rick Dow, MS Zoology
4318 Don River Lane
Sacramento, CA 95834

Rick Dow
richard.dow4@verizon.net

From: Tristen Griffith <tgriffith@sacramento49er.com>
Sent: Monday, October 21, 2024 8:51 AM
To: Clerk of the Board Public Email <boardclerk@saccounty.gov>
Subject: Upper Westside support
Attachments: Tristen Griffith[89].pdf

Tristen Griffith (she - her - hers)
President
Sacramento 49er Travel Plaza
2828 El Centro Rd.
Sacramento, CA 95833
Office: (916) 927-4774, ext. 253
Fax: (916) 923-1652
email: tgriffith@sacramento49er.com
Web: www.sacramento49er.com

"Success Through Service"

Sacramento Planning Commission
700 H St.
Sacramento, CA 95814

Attention: Chair and Commissioners

Subject: Upper Westside Specific Plan Traffic Improvements

My family has proudly owned the Sacramento 49er Travel Plaza since 1988. For more than 30 years, we've been serving truckers and travelers by offering everything from fueling stations to full-service repair shops and our 49er Diner Restaurant.

I want to address the concerns raised by Environmental Council of Sacramento (ECOS) regarding transportation and traffic impacts associated with the Upper Westside Specific Plan. As a business owner whose livelihood depends on transportation efficiency, I can offer a different perspective on how this project will impact traffic flow and infrastructure.

ECOS raised concerns that the Upper Westside project would increase traffic congestion, particularly on key roads like West El Camino Avenue and El Centro Road. The project provides solutions to the existing traffic challenges by including critical infrastructure upgrades that will improve road capacity and safety.

For example, the expansion of West El Camino Avenue and El Centro Road, both of which are critical routes for truckers traveling from Interstate 80, will alleviate congestion and create smoother traffic flow. This is essential not only for my business but for the many other local businesses and residents who rely on these roads. These improvements are much-needed upgrades that will benefit the entire community.

One of the key transportation improvements as part of the Upper Westside project is the planned upgrade to the Interstate 80/West El Camino Avenue interchange. ECOS's concerns about additional traffic congestion do not fully acknowledge the positive impact these upgrades will have. With these enhancements, truckers and other drivers will experience less delay, reducing the bottlenecks that currently plague the interchange. This means more efficient transportation for goods, improved traffic flow for daily commuters, and better access to essential services like the Sacramento 49er Travel Plaza.

In fact, these improvements will directly benefit the thousands of truckers who depend on timely and efficient routes to serve the broader Sacramento region. By streamlining the movement of goods and people, the project will reduce the overall strain on the local transportation network.

ECOS expressed concerns about the potential for increased auto-dependency and associated environmental impacts. However, the Upper Westside project is taking a

235-1

balanced approach to transportation planning. In addition to road expansions, the project includes improvements to public transit connections and the development of bicycle and pedestrian infrastructure. These enhancements will encourage more sustainable modes of transportation and reduce the reliance on cars for short trips.

Moreover, as a business that has invested in sustainability, such as the Shore Power system and Tesla Superchargers we've installed at the 49er Travel Plaza, I am excited to see the Upper Westside project prioritizing green infrastructure. The inclusion of electric vehicle (EV) charging stations and renewable energy sources in the development aligns with regional goals to reduce carbon emissions and create a greener transportation network. These sustainable features directly address ECOS's concerns about the environmental impact of increased vehicle use, ensuring that the project supports a cleaner, more efficient future for our community.

ECOS is right to point out that Sacramento is growing, but this growth cannot be managed without the infrastructure improvements that the Upper Westside project brings.

The enhanced roadways, expanded intersections, and better public transit options are not short-term fixes—they are long-term solutions that will manage traffic, and transportation needs for decades to come. Without these upgrades, the current traffic congestion and safety issues will only worsen as more residents and businesses move into the area. The Upper Westside Specific Plan is a proactive investment in our region's future, ensuring that transportation infrastructure keeps pace with growth while minimizing environmental impacts.

For my family and the Sacramento 49er Travel Plaza, the Upper Westside Specific Plan represents an opportunity for the entire community to thrive. The transportation improvements included in the project will alleviate traffic congestion, improve safety, and support the long-term growth of our region.

Thank you for your time and consideration.

Sincerely,
Tristen Griffith
Sacramento 49er Travel Plaza

235-1 cont.

From: Z. Wayne Johnson <lifeisgrand9@hotmail.com>
Sent: Monday, October 21, 2024 6:06 PM
To: Clerk of the Board Public Email <BoardClerk@saccounty.gov>
CC: Heather Fargo <h-fargo@comcast.net>; Edith Thacher <egthacher@gmail.com>; Karina Talamantes <KTalamantes@cityofsacramento.org>; David Mansch <dlane1630@gmail.com>; David Brady <davb49@att.net>; Melinda Bradbury <melindabradbury@sbcglobal.net>; Dave and Lois Walker <Gardenhighway@gmail.com>; John Shiels <jshiels01@yahoo.com>; Justin Ozeroff <jozeroff@gmail.com>
Subject: 10/21/2024 Item#3 --- Upper Westside Specific Plan

Dear Commissioners and Supervisors:
Aside from other hats, I am a resident of South Natomas and President of the River Oaks Community Association, and past President of the District 3 Coalition of Community Associations.

We all oppose the proposed project for the following reasons:

1. Traffic currently on West El Camino, the interchange with I-80, plus the intersection of El Camino and El Centro are already a congested and dangerous weave pattern during rush hours particularly, and by the 49ers Truck Stop. Adding an additional 20,000 cars and truck trips will only increase the congestion to unmanageable levels and increase the dangerous weave of full size tractor trailers and passenger cars. 236-1
2. The DEIR states that the project will result in unmitigated environmental adverse impacts to air quality, traffic and protected habitat from prior federal and State agreements. Citing, but not solving the impacts is unacceptable. 236-2
3. Only 4 roads access this area, of which 2 are only 2 lanes cannot widened. 236-3
4. Degrading the air quality, while adding up to 9,000 more residents, including school age children and seniors is ill-advised and poses significant health concerns. 236-4
5. Project adds major amount of additional impermeable surfaces and resultant run-off. Thereby increasing flood control concerns. 236-5
6. With the unaddressed traffic congestion concerns and no identified funding for I80/W. El Camino interchange improvements, we are very concerned about adequacy of Emergency Evacuation routes in case of floods, earthquakes, major fire or other causes. 236-6
7. Project will likely have impact on other, small businesses in South and North Natomas. 236-7
8. The prime benefit is to land developers and ultimate new business stores in the retail sector planned. a lesser benefit to current residents. Sufficient capacity exists in other retail locations and malls to handle the new residents. 236-8
9. Please do not add to urban sprawl and transportation hardships 236-9
10. The County is interested in increasing ratables for tax revenue. Will those revenues cover the infrastructure costs of interchange(s), widening where possible, on going 236-10

maintenance and claims? We think not. The project will benefit well heeled developers and some land owners, while foistering their public improvement costs and responsibility onto the taxpayers. 236-10 cont.

11. Lastly, we are concerned on the response time by fire, police and/or ambulance services with the major traffic increase. 236-11

12. We also believe that the traffic studies do not adequately calculate the cumulative traffic volume and congestion of other projects already approved or in the pipeline. Comparing a single project's new traffic against only the current traffic conditions is understating those impacts. 236-12

We urge your reconsideration of this project and urge a broader look at Area and regional mobility, congestion points and ways to facilitate greater connectivity between county and City residential, business, medical, and residential neighborhoods.

Z. Wayne Johnson
President, River Oaks Community Association
Independent Mediator and Consultant
Consensus Building, HR, EEO, DBE and Labor Relations
Lifeisgrand9@hotmail.com
916.475.3557 cell

From: Gibson Howell <gib@mail.com>
Sent: Monday, October 21, 2024 4:19 PM
To: Clerk of the Board Public Email <BoardClerk@saccounty.net>
Subject: Arthur Gibson Howell comments to County Planning Commission 21 Oct meeting, agenda item 3 (UWSP)

County Planning Commission:

The following items are my comments for the County Planning Commission 21 Oct meeting, agenda item 3 (Upper Westside Specific Plan) and for the UWSP DEIR:

1. Agricultural Resources: The loss of local farmland and local produce (1805 acres) is very significant and irreplaceable. Mitigation Measure AG-1 (replacing on a 1:1 ratio) does not guarantee local farmland will be replaced "locally", with similar "prime soil", or even be actively farmed. Does the developer plan on buying currently unused "prime soil" land locally (1:1) and pay farmers to ensure it is actively farmed as it is today?

2. Cultural Resources: The land planning on being developed in the UWSP was originally part of the watershed for the Sacramento River before the levee was built and was a known area of historical tribal activity and burial site. When any construction on Garden Hwy is planned there is a requirement to investigate "on a parcel by parcel" basis for any historic-era archaeological resources even though all the land on Garden Hwy was elevated by dredging from the river and fill from elsewhere to build the aforementioned levee. Any development in the UWSP will have to excavate into the original watershed to the actual depth (and below) of these culturally significant areas, potentially causing irreparable harm. Is there a plan to investigate via Mitigation Measure CUL-2a and CUL-2b on a "plot by plot" basis based on the size of each new parcel (home/apartment) being built?

3. Noise: The increased traffic noise on Garden Hwy (and other previously low-use roads) will be substantially increased according to the UWSP DEIR. Speed reductions have been tried before but have not been effective and there is no room for any kind of noise wall / barrier. Other than "rubberized asphalt" how does the developer plan on reducing this new, unacceptable noise? The plan proposal of a stadium in the flat geometry of the previous farm land would greatly increase the noise levels as it travels unhindered across the new project.

4. Population and Housing: This project envisions population density equivalent to the most crowded parts of New York City of ~18,000 people per sq mile (taking into account most of the housing will be within 1 sq mile), with no real mass transit and a “job geography” that requires most people to drive. The DEIR states they believe a significant portion of residents will work in the project footprint and walk, bike, Uber, or carpool - but that does not reflect the reality of life in California. Directly from page 15 of the agenda proposal, the proposed UWSP "is ultimately inconsistent with SACOG plans, and thus would be considered to directly induce substantial

237-1

unplanned population growth in the region." This in itself is reason enough to stop this ill conceived project. The SACOG Blueprint was developed for a reason, stick to it. The County's Urban Services Boundary document says, "The County shall not expand the Urban Service Boundary unless there is inadequate vacant land within the USB." There is adequate vacancy inside the Urban Services Boundary for the number of housing units and commercial space the project proposes. Before considering this project, I urge you to hold public hearings on expanding the Urban Services Boundary if truly deemed necessary.

5. Transportation: The proposed addition of substantial traffic to an already bottlenecked I-5/I-80 via the already sub-par and "landlocked" West El Camino interchange is the achilles heel of this entire project. Based on their own "Traffic Conceptual Feasibility Analysis" alone, this project is already not feasible. It shows going from 16,000 daily traffic on the West El Camino / I-80 interchange (which is already gridlocked at certain times of day) to 69,000 with a LOS (Level of Service) of "F". Does this even account for all the new housing recently built to the east of the interchange? The DEIR envisions West El Camino being enlarged to 6 lanes (+ bike, pedestrian). This would also require increasing the width of the on/off ramps to 2 lanes, which there does not appear to be room for based on development already completed surrounding the interchange. Furthermore, what is the point of increasing the capacity of an interchange to a frequently gridlocked freeway that can't handle that capacity? All this development would exasborate the use of surface roads to find alternate access to freeways away from the gridlock. The UWSP DEIR states on page 22-67 that traffic on Garden Hwy from Powerline to San Juan would double from 3300-4700 ADT to 7000-9500 ADT. Many commuters continue down Garden Hwy south of San Juan and thus I believe the additional traffic would constitute all of Garden Hwy from Powerline Rd to the I-5 interchange (near Chevy's restaurant). This is especially so considering all the proposed traffic to Garden Hwy from the new entrances (Radio Rd, Farm Rd [renamed Street 9 since no Farms], and Brytle Bend Rd [by I-80 bridge]) that the UWSP proposes. The DEIR states this volume exceeding 6000 ADT would necessitate a widening of Garden Hwy to conform with current County design standards. This widening could possibly have occured when the adjacent levee was built in the last 10 years, but the County did not fund it and USACE would not approve it. The USACE has very strict levee guidelines and they would not authorize the new power poles to extend into the new widened levee "foot print" past where they currently are. Hundreds of these poles were removed and replaced in the last 10 years for the widened levee, and without removing and replacing them again (which the USACE won't allow) there is no room to upgrade Garden Hwy to the required County standards. The DEIR also states many of their other "required" transportation mitigation strategies require approval from other various agencies outside of County jurisdiction. Does the County plan on approving the UWSP before approval of all required agencies is assured? If this plan is approved I believe we are setting ourselves up for Los Angeles style gridlock on our decidedly smaller Sacramento roads.

237-1 cont.

Unless the aforementioned issues can be resolved and a feasible design for the projected exponential traffic increase can be proven and paid for, any further time and money spent on this project is unwarranted.

Thank you for your time,

Arthur Gibson Howell
Natomas Resident

From: Lalanya Rothenberger <lrothenberger@natomasunified.org>
Sent: Monday, October 21, 2024 4:38 PM
To: Patten. Emma <pattene@saccounty.gov>
Subject: NUSD Comments Upper Westside DEIR

Good afternoon, Mrs. Patten,

Please find attached District's comment letter regarding the DEIR for the UWS project.

Thank you,

Lalanya Rothenberger
Lalanya Rothenberger | Executive Director
Facilities and Strategic Planning
Natomas Unified School District | 1901 Arena Blvd | Sacramento, CA 95834
Phone: 916-567-5467

lrothenberger@natomasunified.org

Natomas Unified School District
Connecting students to their future

Emma Patten
Senior Planner
Planning and Environmental Review
827 7th Street
Sacramento, CA. 95814

Re: Draft EIR for the Proposed Upper Westside Specific Plan

Dear Mrs. Patten,

Thank you for your previous responses to the Natomas Unified School District (NUSD) comments on the last drafts and the opportunity to provide comments on the current drafts of the Upper Westside Facilities Financing Plan (3rd draft) and Urban Services Plan (2nd draft).

NUSD is very appreciative of the efforts to provide for adequate school sites, central to proposed residential areas, with a focus on convenient and safe active transportation routes between proposed residential development and the proposed school sites. We agree with the need for four schools, and believe that the DEIR fundamentally includes them and they are required. The district respectfully requests the County require the evidence of a satisfactory plan that will ensure adequate funding of the schools before approval of the EIR. NUSD wholeheartedly supports the intent of the General Plan and General Plan policies, and we believe that the County's policy framework provides clear guidance for this Specific Plan and implementing documents, including:

> **Land Use Element, page 43 (Intent):** "…Each residential development should have access to a variety of local destinations that provide for residents' daily needs, including retail, employment, recreational amenities, schools, and municipal and social services. The resulting non-automobile street activity will promote human contact and a sense of neighborhood, as well as reduce automobile traffic and the associated impacts."
>
> **Policy PC-6. Infrastructure Master Plan and Financing Plan** (Requirements for Amending the General Plan Land Use Diagram). Required: Inclusion of an Infrastructure Master Plan and Financing Plan that include the following:
> - The Infrastructure Master Plan shall identify required public facilities and infrastructure (including roads, transit, water, sewer, storm drainage, schools, fire, park, library, and

other needed community facilities) and associated costs for the development of the proposed UPA expansion/Master Plan;
- The Financing Plan shall:
  - …Identify the phase or timing for when the facilities are needed;
  - Identify the funding mechanisms proposed to pay for the identified infrastructure and facilities…

Public Facilities Element, page 18 (Intent): "Schools are an important part of any neighborhood. In addition to their central educational role, they serve as a place for meetings, special programs, after-school play, soccer and little league games, and precinct voting. How well the school functions in these various roles depend very much on the school's location with respect to other community uses and how accessible it is… school siting and design should be a key element of a neighborhood planning effort. There remain many opportunities for design innovation and good, sensible planning to achieve neighborhoods which better integrate the school into the fabric of neighborhood life."

Policy PF-29. Schools shall be planned as a focal point of neighborhood activity and interrelated with neighborhood retail uses, churches, neighborhood and community parks, greenways and off-street paths whenever possible.

Policy PF-30. New elementary schools in the urban area should be planned whenever possible so that almost all residences will be within walking distance of the school (one mile or less) and all residences are within two miles of a school.

Policy PF-35. New schools should link with planned bikeways and pedestrian paths wherever possible.

Public Facilities Element, page 20 (Intent): …from a school facilities perspective, school enrollment and the size of the school site are basic requirements… in growing districts the problems of timely school construction and, above all, funding new school facilities requires resolution in order to achieve this objective.

NUSD greatly appreciates the County's efforts to involve us in reviewing draft versions of the Public Facilities Financing Plan and also for the opportunity to review the Draft Specific Plan and Draft Environmental Impact Report (Draft EIR). As we move from draft to final versions of these documents, NUSD believes that the County's General Plan – particularly the direction related to identifying the cost of required public facilities, identifying when public facilities are required, and providing funding for such public facilities – will be very helpful.

NUSD applauds the County's planning efforts here – particularly the greenbelt system placement relative to school sites (summarized on Draft EIR page 2-23) and the strategic planning of school sites so that "over 90 percent of the proposed residential units would be within three-quarters of a mile of a K-8 school site" (Draft EIR, page 2-53).

In the Final EIR, Final Specific Plan, and Final Public Facilities Financing Plan, it will be important to arrive at mutually agreeable language that ensures funding in adequate amounts, and with the right timing such that school sites can be constructed within the Specific Plan Area when schools are needed by Specific Plan Area residents. This is important to meet expectations expressed in the aforementioned General Plan policies, but also because the analysis presented in the Draft EIR relies on the presence of school sites. For example, on page 8-41 of the Draft EIR is a description of the features of the Draft Specific Plan that would reduce vehicular travel demand and associated greenhouse gas emissions, including a note that "the proposed UWSP would include the development of commercial mixed use and employment/highway commercial uses, as well as schools… [and that]…[b]y providing a range of residential, commercial, and school uses within the UWSP area, approximately 22.9 percent of home-based trips associated with the proposed UWSP would be internal." The rate of internal trips used in the air quality, greenhouse gas emissions, transportation, and transportation noise analysis in the Draft EIR would need to be adjusted if school construction is ultimately not feasible as presented in the Draft Specific Plan and Draft EIR.

Specific Comments and Questions

Page ES-15: Toxic Air Contaminants (and page 24-4). On page ES-15, in the Executive Summary table, the toxic air contaminants impact notes that there is a significant impact for exposure of sensitive uses to substantial pollutant concentrations. School uses are identified as being within 1,000 feet of Interstate 80. From the Land Use Plan, it does appear that there is a proposed K-8 school site within approximately 1,000 feet of Interstate 80, though we only have a PDF version of the Land Use Plan and cannot create an accurate estimate of this distance. Would Mitigation Measure AQ-4c apply to this school site – the mitigation measure that requires installation of high-efficiency filtration systems – to this school site? How would the ongoing maintenance, repair, and replacement of such a system (as described in the second bullet of this mitigation measure) apply to this school site?

Page ES-64: Greenhouse Gas Reduction Plan. The strategy for reducing GHG emissions relies on the preparation of Greenhouse Gas Reduction Plans for future project tentative maps (Mitigation Measure CC-1b). The District is interested in how this may relate to school facilities master planning as well as more detailed transportation facilities planning and improvements that ensure safe walking and bicycling routes between homes and school sites within the Specific Plan Area.

Bullet 2 of Mitigation Measure CC-1b identifies a performance standard of 1.42 metric tons of carbon dioxide equivalent per thousand square feet, measured in a future year. Does the estimate proposed in the Draft EIR include non-residential development proposed for school uses? If so, how would the strategies related to a prohibition on natural gas, on-site renewable energy, purchase of zero GHG electricity, tree planting, etc. apply to the proposed school sites? On page ES-64, there is reference to a strategy to reduce vehicular travel demand and associated GHG emissions through an "increase access to common goods and services, such as groceries, schools, and daycare." Would this increase in access be achieved through augmenting the current active transportation plan to increase connectivity and ensure a very low stress active transportation network between proposed homes and school sites? The District is highly supportive of a transportation system that would distribute

traffic and provide very low stress and convenient pedestrian and bicycle routes to the school sites, but we are unclear how an increase would be pursued beyond the estimates presented in the Draft EIR.

Additionally, since the estimates of GHG emissions rely on the presence of the four proposed school sites, what mechanism would be most effective for ensuring adequate funding for these school sites for the Specific Plan and EIR? How would the future GHG Reduction Plans prepared at the tentative map level guarantee adequate funding to provide for school sites?

Page ES-98, Subsequent Review for School Parking Lot Noise (and page 15-46). On this page of the Executive Summary is an overview of an impact related to the placement of proposed noise-sensitive uses near proposed school sites that would have parking areas. Mitigation Measure NOI-4a (page 15-48) suggests that there would be a future acoustical study to evaluate parking lot-generated noise relative to the County's exterior noise performance standards with building placement, buffering through distance, or a sound wall to shield adjacent proposed noise-sensitive uses from parking lot-generated noise. NUSD supports strategies to avoid land use-noise compatibility issues in this Specific Plan – both issues that would affect educational activities at the proposed school sites and issues that could be caused by school-generated noise. However, NUSD is interested in clarifying that, if buffering is required in the future, that this buffer would be required outside of the proposed school sites, if a sound wall is proposed, that this would be constructed by others outside of school property, and that if a sound wall is constructed, that it not interrupt casual surveillance of the area and not interrupt pedestrian and bicycle connectivity in the vicinity of school sites. In addition, it may not be feasible to place buildings in locations that would break the line of site between future parking fields and adjacent noise-sensitive uses.

Page ES-108, Subsequent Review for School Parking Lot Noise (and pages 15-46 and 15-64). NUSD has the same questions about the school parking lot noise discussion and Mitigation Measure NOI-7h on page ES-108 as we have in relation to the discussion on page ES-98 and Mitigation Measure NOI-4a.

Page ES-108 and 109, Subsequent Review for School Playground Noise (and page 15-64). The Draft EIR includes an impact related to the placement of proposed residential uses near possible future playground areas within future school sites. NUSD strongly supports the County's goal to avoid land use-noise compatibility issues that could arise but we do feel that this should be balanced with a goal of making sure that school sites are fully integrated into planned residential areas in a way that supports safe and convenient walking and bicycling to school. Mitigation Measure NOI-7i recommends a minimum 90-foot setback between the center of play areas and adjacent "residential boundaries." NUSD assumes this setback would be from the center of future playground activity areas and outdoor gathering spaces associated with future residential developments, rather than 90 feet from the edge of adjacent residential property boundaries, but this clarification could be helpful. In addition, the proposed mitigation seems to suggest that the recommended buffer would be provided by future school site planning. While such a buffer may be feasible, NUSD must consider a broad range of criteria in site planning, and it may not be possible in all cases to ensure such a buffer on the school property. It may be necessary to relax the referenced exterior and interior

standards for residential dwellings adjacent to school sites or to consider building orientation and the location of outdoor gathering spaces for future residential development in areas adjacent to school sites.

Page ES-109, Subsequent Review for School Stadium and Sports Fields Noise (pages 15-64 and 15-65). On this page of the Executive Summary is an overview of an impact related to the placement of proposed noise-sensitive uses near proposed school sites that would have a stadium and sports fields. Mitigation Measure NOI-7j requires an acoustical study demonstrating compliance with County exterior noise performance standards prior to issuance of a building permit for proposed school uses. NUSD has a somewhat different process for school site planning and permitting that does not involve issuance of a building permit from the County. We are also interested in understanding who would prepare this acoustical study, and whether strategies to reduce noise exposure (distance, intervening structures, etc.) would be the responsibility of adjacent proposed residential tentative maps or other form of residential applications. NUSD absolutely supports the goal of avoiding adverse noise impacts associated with special events and use of sports fields. However, we do not believe that future residential sensitive outdoor areas near the proposed school sites have been identified, and NUSD has not done any programming or site planning for the school sites, either. Therefore, unless the site planning for proposed residential adjacent residential areas occurs in tandem with school site planning and there is flexibility on the placement and methods of noise attenuation, it may be necessary to relax the exterior noise standards for special events and school use of outdoor sports fields. In addition to "operational limits on amplified sound equipment," it may be possible to reduce noise exposure through design of public address systems, such as through the sizing and placement of loudspeakers, but this option involves additional expense, and NUSD is not in a position at this time to determine definitively whether such additional expense would be feasible for future school sites within the Upper Westside Specific Plan Area.

Page ES-113, School Impacts (and page 17-17). In this portion of the Executive Summary, the Draft EIR explains that "the NUSD has existing capacity for the elementary and middle school students generated by the proposed UWSP, it does not have existing capacity for the high school students generated by the proposed project." The Draft EIR goes on to explain that school facilities "impacts are included as part of the analysis of physical impacts to the environment." This is true so long as the school sites that are proposed are developed with school facilities as identified in the Draft Specific Plan and Draft EIR. The Draft EIR assumes the presence of these schools, and impact analysis related to criteria air pollutant emissions, greenhouse gas emissions, transportation noise, and other topics assumes that the proposed school sites are operational for K-8 and high schools. Since the analysis assumes the presence of the planned schools, and since NUSD has provided information on the current cost of school facilities and the need for additional funding to ensure that schools can be provided as identified in the Specific Plan and Draft EIR, it will be important to include language in the County's documents that ensures adequate funding and requires that adequate funding is available for construction of planned schools once they are needed to serve proposed residential development in the Specific Plan Area.

Also, in this part of the Executive Summary, the Draft EIR notes that, "compliance with mitigation measures… would reduce construction-related effects to the extent feasible." NUSD would typically

conduct environmental review for proposed school sites, and in the past, NUSD has coordinated this review with Sacramento County as a responsible agency. Assuming NUSD conducts environmental review of the planned school sites within the Specific Plan Area, this environmental review would require feasible mitigation for potentially significant impacts, including construction-related impacts. It may be helpful to understand which mitigation measures specifically are being referenced here for future school sites in the Draft EIR.

Page 2-59, Phasing. The text on page 2-59 suggests that, "non-residential development anticipated under Phase 1 includes 1.3 million square feet of office development, an elementary school, and a 33.5-acre community park." Certainly, the first phase of development will require school facilities, and the analysis in the Draft EIR relies on the presence of school facilities, but it appears that Plate PD-22 shows the southern half only of a proposed K through 8 site rather than a complete school site. Clarification here could be helpful regarding the details of the phasing (and funding) approach for school sites to serve proposed residential development.

Page 4-18, Lighting Impacts. The Draft EIR discusses the planned high school site and associated outdoor lighting impacts. The Draft EIR identifies that such lighting would be required to comply with "Countywide Design Guidelines and Commercial Lot and Commercial and Institutional Project Development Standards in Chapter 5 of the Zoning Code." NUSD would typically conduct environmental review for proposed school sites, and would include feasible mitigation to address potentially significant impacts. If the future high school site includes outdoor sports lighting standards, and if there could be a potentially significant impact associated with this component of a future high school project, NUSD may indeed require that sports lighting include certain design components to avoid light spillage and glare. However, it would be helpful to have more clarity about any mechanism that would require school sites to comply with the County's Zoning Code.

Page 5-12, Pesticides. The Draft EIR includes a reference to a requirement for agricultural operators to notify schools if their agricultural operation is within a quarter mile from the school boundary and identify all pesticides to be used during the school year. What pesticides are currently applied during the school year in areas near planned school sites? Please provide documentation that sites designated AG-Cropland near the planned school sites will not use pesticides during the school year once these schools are operational.

Page 8-40, Greenhouse Gas Reduction Actions in the 2022 Scoping Plan Update. Appendix D of the 2022 Scoping Plan identifies local actions that can be taken to reduce greenhouse gas emissions, including off-site mitigation (California Air Resources Board 2022 Scoping Plan, Appendix ED, page 30). Among off-site mitigation options is:

> "Off-site EV chargers can increase access to EV charging throughout a community. Some examples could include EV chargers in multi-unit dwellings in disadvantaged or low-income areas, public locations (schools, libraries, city centers), workplaces, key destinations (e.g., parks, recreation areas, sports arenas)."

It may be worth considering identifying the funding of EV chargers within the proposed school sites as an additional greenhouse gas emissions mitigation strategy.

Page 15-49, Sound Generation Area of the Pavilion. There is discussion here of a plan for amplified music events at "the pavilion," but NUSD is unable to find a discussion of this element in the Draft Specific Plan. It may be helpful to understand the location of this planned facility vis-à-vis planned school sites. On page 24-6 of the Draft EIR, there is a discussion of an outdoor pavilion in a proposed 25.8-acre park in the west-central portion of the Specific Plan Area, but NUSD is unable to find any park site of this land area on the Land Use Plan.

Page 17-8, School Downsizing. The Draft EIR includes a statement here that NUSD would like to have clarified: "[t]hrough careful planning, a reduced Plan Area school site could follow the recent trend of school downsizing and meet the Department's criteria."

Page 22-63, Construction of K-8 and High Schools. Here, the Draft EIR includes a statement that "[t]he proposed UWSP would construct K-8 schools and a high school to serve the needs of students generated in the UWSP area." It is our understanding that NUSD would be responsible for construction and operation of the proposed school sites, though it is important to clarify the funding mechanisms for the construction of school sites and to include language requiring that such funding is available in amounts and with the right timing to ensure NUSD schools can serve students in the Specific Plan Area once dwelling units are occupied.

Again, NUSD is very appreciative of the County's collaborative approach on the Public Facilities Financing Plan. We appreciate the opportunity to review the Draft Specific Plan and Draft Environmental Impact Report (Draft EIR). NUSD looks forward to continued collaboration with the County to find mutually agreeable language related to school funding for this ambitious and important development Plan.

Sincerely,

Lalanya Rothenberger

Lalanya Rothenberger
Executive Director, Facilities and Strategic Planning
Natomas Unified School District

From: Prasanna Regmi <prasannaregmi@gmail.com>
Sent: Monday, October 21, 2024 5:35 PM
To: Clerk of the Board Public Email <boardclerk@saccounty.gov>
Subject: October 21 Agenda Item #3, The Upper Westside Specific Plan

Good evening, members of the City Council. Thank you for allowing me to speak today.

I've lived in Natomas for the past 15 years, and I've always loved the area's natural beauty. Before the houses went up in West Shore, I used to take walks and see all sorts of wildlife – jackrabbits, turkeys, even coyotes. The birdsong in the morning is a treat, and it's amazing to watch the different species come and go. Even during my walk this morning I am reminded about the lovely mix of wildlife we are blessed to be surrounded by. While the area has changed a lot, Natomas has been able to maintain its charm. I love biking with my husband and 10-year-old son regularly and appreciate seeing the protected area near us. I think about not just our future, but the future ahead of ours, who will be able to enjoy all that Natomas has to over. My family who have visited from Nepal and Australia rave about our neighborhoods to others and were very impressed by all that the city in the past balanced development with conservation.

If we develop the fields and move forward with the Upper Westside Specific Plan, I worry about the negative impact on our ecosystem. Animals who call this place home will be forced to go elsewhere, potentially ending up in our neighborhoods. The proposed development plans include mitigation strategies, but I think we need more research before making such a big decision. We need to involve more thought partners who can provide us an objective feedback in this matter before we commit to such a massive undertaking.

239-1

Many of my friends are concerned about the flood risk in our area. Our flood insurance reminds us of our vulnerability, and I believe we need a better plan to conserve our soil and vegetation. This would help reduce the impact of flooding if it happens.

239-2

At the last meeting, I heard from other residents who share my concerns. We need more data to support such a significant development. That's why I oppose the new proposal for our area.

Thank you for your time and attention

Prasanna Regmi

From: Megan <chzngrl@sbcglobal.net>
Sent: Monday, October 21, 2024 4:42 PM
To: Clerk of the Board Public Email <BoardClerk@saccounty.gov>
Subject: Upper Westside Specific Plan 10/21/24 PLNP2018-00284

To whom it may concern,

This letter serves as my comment/questions regarding the third item on the Sacramento County Planning Commission's hearing scheduled for 10/21/2024 item number PLNP2018-00284 (Natomas/Patton).

I am a concerned Natomas native writing to OPPOSE the proposed development plan named Upper Westside Specific Plan.

Mainly, how this is even being considered? This violates the Natomas Basin Conservancy Habitat Conservation Plan (NBHCP), adopted in November 1997. This plan was designed to promote biological conservation of the Natomas Basin area. 240-1

According to the environmental impact report there are EIGHTEEN SIGNIFICANT negative impacts, amongst many other negative impacts, that will affect our environment and community here in Natomas. Mainly citing issues with air quality (which this area already struggles to maintain healthy air), major traffic congestion, noise pollution, the PROTECTED Swainson Hawk's, and Coyotes along with all wildlife that utilize this area for survival, and lack of farmable land to supply needed food. How do you plan to address all of these issues? 240-2

Sacramento toots its horn about being "Farm to Fork" while simultaneously trying to cement over the very farmland that affords us that prestigious claim.
You should be ashamed of the greed that entices such projects and overlooks the good of the community at large!

I also have concerns about the increasing heat of the summer months. More cement leads to higher temperatures. This past summer of 2024 we had record breaking heat! More cemented in land and heat producing buildings will only further the warming of our city! 240-3

I would like to know what the plans are for evacuation in the event we have a flood, fire, or earthquake with small two lane back roads? It's already a nightmare as it is with the development that has already been done! 240-4

How will this development affect the airport and the plane routes? 240-5

I believe this development will be a detriment to our environment and community at large. Please reconsider moving forward with this proposal, and in turn be a city of integrity that stands by their claims to protect the diverse biological environment and continue to provide true "Farm to Fork."

Concerned Voter,

Megan Allen

From: Melva Arditti <maarditti@att.net>
Sent: Tuesday, October 22, 2024 7:53 PM
To: Clerk of the Board Public Email <BoardClerk@saccounty.gov>
CC: GHCA Board <ghcaboard@gardenhwy.org>
Subject: Upper Westside speciic olan

There were two highlights to last night's meeting of the County Planning Commission regarding the Upper Westside Project:
1. When one angry farmer in his testimony shouted, "I'm for it for the money!", which doubtless resonated with the investors behind the project who refused to be identified and testify.
2. When another Natomas resident who supports the project shouted "I aint never seen a Swainson's Hawk out here - has anyone else?" and immediately about 50 hands went up in the audience, evidence of support for habitat preservation that would be harmed by the project.

It was reassuring to hear numerous residents in developments other than the Garden Hwy. testify against the project, endorsing their desire for natural habitat and farmland preservation, and citing major traffic concerns.
The Urban Services Boundary, the county's 2030 General Plan and SACOG's Blueprint for Regional Development need to be observed before accepting this development proposal. Allowing development sprawl outside the Urban Seervices Boundary discourages infill development.

Urbanizing a river corridor diminishes one of Sacramento's jewels. Like others, I occasionally get annoyed when I am stuck behind a group of 30 bicyclists on the Garden Highway, and then I remind myself that they're there because it's beautiful, it's fresh air, it's open fields, it's flying hawks and geese, and it's the opposite of urbanization.
Some losses cannot be mitigated away.

241-1

Respectfully,
Melva Arditti

October 3, 2024, Natomas CPAC Public Comments for UWSP Draft DEIR

Speaker 1: Heather Fargo

30:12-32:31

Good evening to the Natomas CPAC, it's nice to see you all here. My name is Heather Fargo. I'm a South Natomas resident and have been for more decades than I want to tell you. So, if you need to use me as a resource down the road when you are looking at more information about the project, please let me know, I can make myself available.

I am also the former mayor here in Sacramento and I was the mayor when the Natomas Habitat Conservation Plan was approved. I was serving Natomas as a City Council Member when the North Natomas Community Plan was approved. I'm also currently the board member of the Environmental Council of Sacramento (ECOS), and I'm sharing their Natomas team. I along with our team are adamantly opposed to this project. We do not want to see it move forward. I want to first start by saying there are number of farmers here, number of property owners. We don't have any opposition to people selling their land. I mean, everyone can do that. If farmers can find someone to buy their land, I think that's fine. Our concerns are what happens in terms of development to that land. So, as you have heard already there are significant and unavoidable impacts. I want you to think about what that term means because they asked us to focus on the EIR, which by the way, was not in the announcement for the meeting. It didn't ask us to focus so not everyone who is speaking on the behalf of the community got that message. But the first issue, is that of aesthetics, the view that people have in Natomas and drive through Natomas, the actual visual impacts really do matter. Valley Vision did a survey and found out that the number one reason people like living in the Sacramento region is the access to open space. So, keep that in mind, that's what people would like to see. The second impact, which obviously could not be mitigated. *[Clerk notes two minutes is up]* Did you just tell me I ran out of time? The loss of farmland, increase in air pollution is a huge issue, they call it traffic, but we call it congestion when you pass by on the I-5 and I-80 and obviously two minutes is not enough. Please deny the project.

Speaker 2: Edith Thatcher

32:31-34:47

My name is Edith Thatcher, I'm a resident of Natomas. The Upper Westside project is a part of 8,000-acres of proposed development in the Natomas Basin. The EIR does not consider cumulative impacts on traffic congestion, the environment, roads, flood, emergency response, evacuation and so on. I provided the Council with a map, you can't see it well, I'm very sorry. There is a black line, black dotted line, that is the Urban Services Boundary. In the most recent County General Plan it describes the Urban Services Boundary as the ultimate growth boundary for the unincorporated area. I mean, the General Plan says that that's the edge of growth. The building occurring in the Natomas Basin, that we see, the apartments, Costco, all that is inside that Urban Services Boundary. But there are 8,000 acres of projects planned outside that boundary. On this map. If you look at page 4 in your handout, there will help you a little bit. Grandpark which is 5,000 acres of residential, commercial. That's basically a small city. Over here we have a Watt EV. Watt EV is about 118 that will be solar charging, solar park. This is Airport South Industrial; that is about 150 acres that is planned

to be over six million square feet of warehouses. And then we have the 2,000 acres of Upper Westside, which is why all of us are here thinking about that. Of those projects, three of them are going to require moving the Urban Services Boundary which is supposed to delineate our *[Clerk notes two minutes is up]* the other thing to think about is the cumulative impacts of all of these projects, not just the Upper Westside. Thank you very much and thank you to the Council.

Speaker 3: Robert Burness

34:53-37:56

Thank you, good evening. I would like to address; my name is Robert Burness. I'm a resident of South Sacramento, but I was also a Planner for the County for 30 years and was very much involved in the development of the policies that we're going to be talking about tonight. I'd like to get into a little bit of detail about the consistency of policy number LU-127, which is about moving the USB. I want to talk briefly about the fact that really the County should not be deciding this project, it should be the City. And thirdly, there are some other risks, issues, and impacts associated with this project that are not adequately dealt with in the Environmental Impact Report.

First of all, Policy LU-127 lays out very specific requirements before the boundary should be expanded. I won't get into detail on it, but I encourage you to look at them closely. It's pretty clear that most of them are not being met in effect. There is an opt out clause which basically says that the Board with a super majority of 4 can approve the project and override these concerns if there is something of extraordinary value associated with the project that merit them making this decision. I've looked and I don't see anything really very extraordinary about it. And if you really have to stretch to find it that's a good reason to consider this inconsistent with the policy. The County should not be approving this project and here's why. When this whole project went to hearing, or rather the General Plan policy went to hearing, it came to the Board with the recommendation of that the entire North Natomas area be included within the Urban Servies Boundary. That was a recommendation of the Planning Commission at the behest of landowners with interest in the area. At the time, Grantland Johnson was a representative on the Board. *[Clerk notes two minutes is up]* And Grantland basically said this should be developed by the City. They will be providing services for the area. They' will be having the most residents living in areas that are being impacted by it. It should be their decision we won't get into it why. *[Clerk asks for comments to be concluded]* But keep in mind as you talk and finally just once, there really does need to be a close look at congestion issues. There's an analysis buried in the environmental document, appendix b that has a whole bunch of numbers about what the traffic will be. You should ask the County specifically *[Clerk asks for comments to be concluded]* for direction of what that impact is. The congestion is your most important issue. Talk about all these projects that are on the table. Thank you.

Speaker 4: Luz Lynn

38:00-40.12

Good evening and thank you for taking our comments tonight. Today, I'm just really going to ask you to consider the housing and climate readiness challenges that are here in Sacramento. And really, what is this project going to address these needs that we have. There's no doubt there is a housing crisis going on and we definitely needing to increase housing, especially affordable housing. But at

the same time, we really need to think about what kind of development is going to be good for the area. We know that vehicle miles traveled, VMT, is the leading cause for greenhouse gases. As we're in a climate crisis right now, we really need to focus on going forward with infill development with dense development around areas where there are existing transit lines and infrastructure. The Upper Westside project area currently does not have the transportation infrastructure that the new community would need. Nor is the area transit priority region so it will take a very long time to actually have this transit infrastructure built. Creating this new community before addressing necessary infrastructure needs will only drive up VMT's and will actually reduce affordability of this housing as an option. I also urge you to consider the importance of working with the agencies that are already leading efforts to increase housing. That includes SACOG and one quote that they had in their comment letters in the Notice of Preparation for this project says the capacity for growth in existing entitled lands far exceeds expected demand for over the next 20 years. Collectively, the region's jurisdictions have entitled or are in the process of entitling two and a half times the region's projected needs for the next ten years. So, we already have people addressing these issues of housing and if we already have that in the works, then how can we justify the removing 2,000 acres of... *[Clerk notes two minutes is up]* How can we justify all of these negative consequences that everybody is speaking to? Thank you.

Speaker 5: Alex Jang

40:38-43:13

Thank you so much for taking our comments. I'm Alex Jang, I've been born and raised here in Natomas specifically. My family has been here since the 1950's just for reference here. And I'm going to comment specifically on, like, the environmental impact. The Natomas has changed a lot over the years. But it's charm and its balance between city and nature is what makes it unique. Sadly, I've noticed the silence of frogs and crickets and the decline of migratory birds, other wildlife. I mean, just the other day I heard some coyotes howling which I didn't hear it for a long time. We would lose that, essentially over time. Now is a perfect time to consider other alternatives to the development plan, like establishing easements or trusts to keep our open spaces safe from overdevelopment. Development is part of what puts Natomas at risk. Recently I saw a lot of residents on Facebook actually talking about the increase of mice in their home. And I think that's due to the development that has happened already. The Natomas Basin Habitat Conservation Plan has also been created to protect vital habitats and various species, like endangered ones that we have here, the giant garter snake and Swainson's hawk. If the development plan continues [...] the development plan does talk about mitigation strategies, but disrupting these critical habitats can still lead to even more declines. Of wildlife populations putting short term profits ahead of long-term environmental care, and it's just not fair to future generations. We should focus on sustainable solutions that utilize existing spaces, address built community needs rather than contributing to urban blight. It's important to note that the Upper Westside Specific Plan is heavily backed by private developers, which raises a conflict of interest and concern. Their financial interests suggest participation of profit over community welfare and environmental sustainability. On top of that, while there's a plan to ease the pressure on local services, traffic is still a big issue. *[Clerk notes two minutes is up]* Our roads need to be able to safely sustain our people here. Sorry. I'm, like, panicking now. May all the victims of our traffic incident in our area rest in peace. We have not been able to sustain and keep our people safe here. Let's not forget that we live in a high flood risk zone. Heavy rains and potential levee failure are real concerns.

Soil and natural vegetation are crucial to flood control. Paving over these elements have disastrous consequences. *[Chair notes time is up]* Thank you so much, and I hope you can continue to be proud of generations to come.

Speaker 6: Josh Harmatz

43:25-45:53

Hi everybody, Josh Harmatz, I'm a 19-year resident in Natomas. I started on Del Paso Road and was fortunate enough to buy on Garden Highway and have lived there for some time. I don't mind the coyotes being gone actually because they keep eating my chickens. [...] Really urge this group not approving it as is. They are glossing over some really important points on mitigation which I'm very concerned about. Mitigation efforts need to be detailed out. I'm going to give you four big points that are very important. By the way, of the public comments, 90 percent of these 24 in support are all from email address and they're all canned emails. So please hear the real voice of the residents here, not the canned emails you're getting likely from the developer, who knows.

So, number one traffic is the most pressing concern. You are talking about the [...] lifestyle of residents. Two roads, one of them is to be maintained by the County [...] and the other annexation. Sacramento County is getting no benefit from this plan. They're not getting the millions in tax revenue that is coming in. And they already lack the ability to navigate the resources that are needed. Access to our beaches, levees, and out river fronts are going to be a problem. 25,000 people now wanting to go to the waterway, which has to be managed by the County. There's no plan in here of how that's going to be dealt with. There's already not enough parking, not enough amenities, no trash service. The Garden Highway Community Association, I'm the former Deputy Director of District Three, has not been consulted. And I urge you to add that in there that the local resident groups, including the Garden Highway Community Association, are required to be consulted on this plan moving forward. Safety is a huge concern for us. During the levee project, we saw a huge uptick in crime and traffic coming to our area. That pales in comparison to a project like this. There's been nothing to address specific mitigation efforts of crime, traffic, remember residents of Garden Highway are managed by the County. It takes up to an hour when you call 911. The County is nowhere close to where we live. Now you are adding 25,000 new residents *[Clerk notes two minutes is up].* Finally, I want to talk about [..recording unclear..] from the crumbling roads over the past decade, things that have not already not been addressed by prior construction. You're exasperating that with no solution and coining mitigation efforts without outlining those things is a serious concerning flaw in this plan. I will say now, I will not support the new 25,000 new residents. Just do the math, look at the infrastructure there, it doesn't work. Thank you very much.

Speaker 7: Ronald Costa

46:10-48:32

My name is Ronald Costa, and I live in South Natomas. Me and my family, we moved from Garden Highway, the land side, over to 3200 block of El Centro Road in 1951. So that puts me at 87 years old and I know the area real well. When I moved in you could count the houses along the riverside at Garden Highway by a couple of hands. There wasn't any. Now, during all that time my parents were two, then the offspring was four, my offspring was four, so I had children, grandchildren, great

grandchildren. It multiplies. Our children need a place to live. If we are going to go procreate and make a lot of children, we have to provide a place for them to live. How are they going to survive? It just got to be done. So not building housing is not an option. [..recording unclear..] In order to house the people, we need to house the people that came from us. I don't think that, I think the plan is well-developed. The environmental impact covers the issues. And if we have to step on a couple of bugs or a couple of snakes or let the bird fly to a different tree and make a nest, so be it. The dinosaurs have been gone for thousands of years and you won't miss them a bit. So, if we lose a few bugs, it won't hurt a thing. We haven't for five thousands [..recording unclear..]. Theres no getting around it, that's a good housing place and biggest job center in the area, *[Clerk notes two minutes is up]* and it's close. So, not building housing is not an option.

Speaker 8: Howard Lamborn

48:410-49:55

Howard Lamborn, I'm a pharmacist. I've been here in Sacramento for 48 years. I used to work for Sacramento, I realized that there are a lot of problems that go along with any development but this one as long as it is done conscientiousness and the concern for the environment, I think would be a very good thing, stimulate people. You all like positive things, we've pretty much talked about the negatives already. It will stimulate the economy, housing, and I think it would be a good thing for Sacramento as long as it's done in view of the environment and i.e. situations like overcrowding etc. But we do need room for people to come here, and they will come here regardless. Sacramento is growing so as long as it done responsibly, I think it's a very good thing. I had a speech all written out, I'm not going to read that I'm going to put it away. I will keep it short and sweet. Thank you very much.

Speaker 9: Joseph Brazil

50:09-53:00

Chair, CPAC members, my name is Joseph Brazil. My family has been farming 120 acres in the Upper Westside Project area for over 80 years. Unfortunately, urbanization and changing conditions, along with many other problematic issues, has made agriculture in this area increasingly, unsustainable and quite frankly, no longer profitable for us. We actually were forced to sell a portion of our land in order to simply keep our farming operations afloat. The prevailing concern is that the land being converted into the Upper Westside development should remain designated as farmland. Anyone who thinks this is prime farmland really needs to talk to my family, who has been farming this for eighty years. In reality, urbanization has surrounded our land, which has created numerous problems for us. So let me share a few points on that issue and bring some truth to light. Number one, we can't leave our tractors or equipment in the fields overnight. People also come onto our fields and trample and steal their crops. Vandalism, this is definitely, definitely a problem and a real issue for us. Increased traffic. This impacts the transport moving of our slow moving tractors up to the heavy equipment, farming restrictions on methods, timing, pesticides, etc. They're all now due to the proximity of all the homes and the businesses all around the area. Water table and soil mineral erosion. This limits our crops. Fences from planting an orchard, keeping agricultural designation for this land ignores the on the ground reality that farming here is no longer practical, sustainable and extremely difficult to profit from. But Upper Westside has solutions. Number one mitigation land. They offer a 1 to 1 mitigation ratio of prime farmland to contribute for every acre developed in the

project. This ensures that while development proceeds, farmland preservation continues in other areas that are much better suited.

[Clerk notes two minutes is up]

Okay, yes, I will wrap it up. Wildlife corridor [..recording unclear..] has a system to ensure that there's an ecosystem for the Swainson Hawk, giant garter snake and other species are intact. Number three housing shortage. This also takes care of the demands for the severe housing shortage that is happening. So, in closing, Upper Westside project offers a forward-thinking solution that balances the nature of development, response to farmland mitigation, and environmental protections. Our family and I fully support the Upper Westside Project thereof and all these benefits, solutions I mentioned, along with others, which had considered as well. I hope you guys consider it as well.

Speaker 10: Yudwinder Singh

53:14-56:16

Good evening, everybody and decision makers. I'm a resident of Sacramento and been living here for the past 25-years and same area the Natomas Sacramento. I'm in support of this site-specific plan, which is why I end up at the meeting today. It's my pleasure to share my opinions of this agenda. For your information, I am managing and running the [..recording unclear..] group for the community group in this area for the last 12 years, more than a decade. And almost all of the members are living here in Natomas. And all of the members we spoke when this project was started, five-six years ago. We made our statements about this project its already in your files. And let me come to the point in short, we still have residence in California and the convenience of Sacramento houses, we need more homes here. My grandson, he lives in an apartment because the home prices are very high. Why are the home prices high? And if that objective can be processed, then the homes can be built over there so that new construction [..recording unclear..]. That's why I support this project which can also predict some percentage of the population. And, this project site is very convenient and very close to the freeways, downtown and get pushed moreover [..recording unclear..]. We will get a few more schools, colleges, and universities in this area. And the hospitals to for the future generations. *[Clerk notes two minutes is up]*

Eco friendly transportation system will be a part of the plan. And the city can attest to the public transit, light rail, and transportation system. Moreover, the commercial, hotels, motels, and the hospitals and clinics are the main market. Everything creates the employment opportunities over there. [..recording unclear..] (clerk ended public comment). *[Clerk notes two minutes is up]*

Speaker 11: Srirama Tanniru

56:23-58:49

Good evening members of the Natomas CPAC Board and members of the public. My name is Srirama, short for Sri. I work for the State of California as an IT project manager. I have been working in the IT industry in the Sacramento area for the past 30 years. And, and I'm here to express my strong support for the Upper Westside Specific Plan project. And I want to share with you all, some of. - there are many reasons just I feel like we should support this project, but a few critical. I'd like to, quickly share, I don't know if I will have enough time. So not in any particular order, first reason, I feel like we

should support this project is because of the shortage of housing that we have, not only in this region, but it's a statewide problem. So, I think that this project will alleviate some of that, shortage, especially, regards to apartments, affordable apartments and duplexes. So that's reason number one. The other reason why I am in strong support of this project is because it's very close to downtown Sacramento, and there are over 200,000 existing jobs close by. And so, this will enable the region to meet its goals of especially people, miles traveled VMT as well as the greenhouse gas emissions. So, those things are going to be satisfied by this project. I got many points. I mean, the other thing I want to point out is, as I've lived here for such a long time. Every time I pass by this area, I also see this area empty and see so many northern area projects being done. I always felt like why can't we develop so close to downtown and so close to job centers meeting smart growth objectives. Thank you.

Speaker 12: Tristen Griffith

59:00-1:01:19

I stand here before you today as a representative of my family's business, the Sacramento 49er shopping plaza, which we've own since 1988. However, our connection to this community goes back even further over 55 years, when our plaza was second to the airport, the number of public pay phones that we had, I remember driving down the road as a little girl and seeing the 49er as, at the time as the only business around for miles. Throughout these years, we dedicated ourselves to serving our guests, whether it's fueling up, getting repairs, staying the night, or enjoying a meal. The price of the growth around us, investing in innovation like short power to make our plazas sustainable. Recently, we completed significant renovations to our restaurant and exterior, repaved facility, upgraded our lighting to enhance the experience for everyone who visits, to name a few. I'm excited about the Upper Westside Plan, which is vital for our future. This project will bring essential infrastructure improvements, including expanding West El Camino Avenue and upgrading Interstate 80 interchange. These changes will reduce congestion, improve accessibility for truckers, and make it easier for travelers to stop by our plaza. I try to exit our plaza, often have to wait several minutes for all the traffic is either pass or stop long enough for my car to exit, let alone a large truck. Moreover, this plan is an investment to our local economy; projected to create thousands of new jobs and foster more growth. More people living and working in this area means more customers for not just the Sacramento 49er Travel Plaza, but for all local businesses that contribute to our commute as someone who has invested in sustainable technology and happy to see that the Upper Westside development prioritizes payments to accommodate these practices. In fact, 49er is on the verge of opening a new Tesla supercharging station any day now. The improvements planned are long-term solutions, including enhanced roadways, expanded intersections, and better public transit connections that will help manage the region's growth rate decades to come. For my family and the Sacramento 49er of Travel Plaza, I'm here to testify in support.

Speaker 13: Bal Soin

1:01:21-1:02:39

My name is Bal Soin. First of all, I want to admire and really appreciate the people who put this project together. And this is the best project it's going to be looking like in that area. I want to thank all of you guys. At least you are looking at the area. Sacramento needs housing. This is the biggest problem we have right now. Sacramento needs the jobs, there are so many, all in a different type of industry, there

a lot of stores, lot of [..recording unclear..], and many people be working in the stores to give us services for people who are in the area. And there's a school, there's a park, what else do we need in the community, what else do we need in the area. Maybe new roads, new projects, new everything. I think this is the best project for the area. Look, if you see now, you see two, three, four, five years. I don't know how long it will take. You guys know better, I can't tell you what to say but I like the project, and I support it.

Speaker 14: Paul Pannu

1:02:57-1:05:10

Good evening, Council Members and fellow residents, my name is Paul Pannu. I'm a long time Natomas resident since 2002. I came to you to express my strong support for the Upper Westside development project. After reviewing their proposal, it's very clear this plan promises to bring substantial benefits to all local residents. Development staff addressed housing diversity with many years of varied densities, this project tackles housing supply while promoting voting, social equity, [..recording unclear..] economic growth, the integration of commerce on all the space and bring local job opportunities, reduced commute times, and fueling our local economy. The town center promotes social interactions, walkable and bike friendly environment. School sites will ensure access to quality education [..recording unclear..], and access to parks, trails, and greenbelts will promote healthier lifestyles, and preserve our connection to nature. The plan also aligns with regional goals to reduce car dependency and decrease greenhouse gas emissions. I would like to highlight the fact that there would still remain an agricultural buffer which will maintain the area's farming heritage while integrating urban and rural land use. The proposed special financing district will ensure sustainable finding of enhanced public services like police and fire and for maintenance. In conclusion, the Upper Westside development project represents a holistic approach to urban planning that addresses our community's current needs while safeguarding the future prosperity. It's really a testament to thoughtful, sustainable growth that will enhance the quality of life for all residents. I urge you to support this transformative project. Thank you.

Speaker 15: Patrice Stafford

1:05:14-1:07:02

Hello, my name is Patrice Stafford, I'm a retired Caltrans and County of Sacramento civil engineer. I have worked in this area and all-around Sacramento in various levels of engineering work and from Caltrans greenway work, sewer and stormwater infrastructure during flooding events around this area. And I'm in support of this development with some considerations. Well, I would appreciate more single-family homes instead of so much urbanized development, but there are a lot of I would in this area. It is very important to develop this because everything around is developed. It needs a good development plan. And there's also many parcels that I have worked on, but they're zoned agriculture. So, some have been allowed to be there for over 50 years but they need to be in alignment with what's going on and providing and they already provide housing. And I do agree with the buffer for agriculture because this area has been, you know, it's a great place to have all the farm stands and also, I love the 49er truck stop. And, when I came out here 30 or so years ago, it was just that and Witter Ranch and the senior mobile home park, and then it's moved up. So, then I would say that's what I would support. And I agree that this should be approved. Thank you.

Speaker 16: Hector

1:07:24-1:07:52

I will say that I support the project as long as it's done responsibly. Give an opportunity to the people that live in the neighborhood, not have people come in and buy all the houses. It's interesting for the community, it has schools, parks, lakes, trails and all that stuff. So that's pretty much it, yeah.

Speaker 17: Dana Schwartz

1:08:06-1:05:57

My name is Dana Schwartz. Besides the many negative impacts of this project, like traffic increase and noise, deterioration of air quality, we need to ask ourselves why is this being built when there is so much infill land within city boundaries that can be developed first. Why are we instead developing open farmland and that has been designated for flood control and habitat and wildlife conservation. This does not make sense and will impact the quality of all residents of South Natomas negatively. I implore you to save our open spaces and not approve this plan. Thank you.

Speaker 18: Simarnjit Malhi

1:09:05-1:09:34

Good evening Natomas Council members. My name is Simarinjit Malhi. I go by Malhi as well. I've been living in Natomas for the past 16 years, since 2008, and ever since I moved to Natomas. Ever since Natomas has been developing, day after day, night after night. So today I'm here to deliver my message once again that I am in favor of another development which is the Upper Westside. So, I'm in favor of the project. Thank you.

Speaker 19: Z Wayne Johnson

1:09:41-1:12:53

Hi, I'm Z Wayne Johnson, everybody simply calls me Z. I'm president of the River Oaks community association and former chairman of the District 3 Community Coalition. We have caveats about this project. Clearly as you heard, traffic is a huge concern. With all due respect and support for the 49ers. When you come off of I-80 on the [..recording unclear..], you come down to El Centro, the weave between cars and trucks is horrible. There have been accidents as well as multiple near accidents that have occurred along the El Centro itself. There's already a two-lane road, absolutely would have to go to four to be able to sustain this level of traffic. There are no budgeted plans for Caltrans with City of Sacramento for substantial improvement to the I-80 ramps that don't [..recording unclear..]. Not in the ten-year plans and not in the twenty-year plan. Destruction of farmland is a mix use, you know, on our farmers in terms of that. But also, we're concerned about what the traffic studies tend to indicate. The most people are going to access and egress from using I-80 off of Arena Drive. That doesn't make sense for those of us that live here and live in close proximity to the those that are closest to West El Camino are going to use West El Camino to get on the I-80 coming and going. That's also not just for cars but also for trucks that are coming in, which will all create an issue of the problem. It is just disingenuous to be able to note that the studies indicate there will be significant impacts, air, cultural and so forth and not mitigate each one of those, you know, say this is a bigger

issue. The air quality effects not only the area directly around but also [..recording unclear..] the air currents that push the pollutants further out. *[Clerk notes two minutes is up]* Actually, I'm done right away. And then lastly, you can't just mention housing. There needs to be a commitment to build affordable housing. Don't use the buzz words because it allows them to move forward. There has to be a commitment to change. And the last comment, again, you talk about change but look at what the quality of life is like in this section of Natomas. And what we want on it versus what we're going to propose. And we have been supportive of various developments. I thank you so much.

Speaker 20: Dave Brady

1:12:58-1:15:21

Hi, good evening, I'm Dave Brady, I also live in the River Oaks, neighborhood. I was gonna call myself a long time Natomas resident, but I can't compare to Heather and so many others here. But I have to say, in the time I've lived here, I've been involved in a lot of community projects, and I've never seen one like this. It struck me as I was sitting in the crowd out there, we're meeting in a silo, and it's very indicative of this project, because the County has been operating in a silo this whole time for this project. They have not engaged with the environmental community. They have not engaged with the City of Sacramento. And most of us live in the City of Sacramento, they represent us and they represent our interest. And so, yeah, the project with the County can go ahead and push it through, they probably will. But you're going to get resistance from other folks in the community if you do that. So, I think the thing that I really want to get across tonight is you need to engage better. This is not going to do it. And I brought two things that I would hope to submit to you tonight. There's been a lot of talk about transportation. In the proposal, there's two comments, and one of them says it's the 2030 County General Plan, and it has a map that says these are four lane arterial roads and I marked six places where that is false. So, I think it's really incumbent of this body to get with the applicants and correct this information. And I wanted to finally - the other item that I wanted to submit tonight, it's a picture I took of the El Camino overpass over I-80 on my way here tonight. This was about two hours ago- wall to wall traffic, and it gets a lot worse than this. But this is the only way, the only logical way you're going to access this site. People are not to drive 20 minutes up to Arena Boulevard and back. So, you guys keep going over this, and I hope you'll consider this. Thank you.

Speaker 21: Pam Davis

1:15:28-1:16:36

I'm not a public speaker. Thank you for allowing me. Just really quickly my concerns. And I'm not involved in anything except I've lived here for 40 years. The major impact to the wildlife habitat that had been promised for so long, and the major traffic impact the existing roads that are mostly two-lane. And like Dave said, the traffic right now on the freeway is insane. Come 3:00 pm here it's a dead stop. And then the lights that make you stop before you get on the freeway -you know- the traffic gets backed up from those. It's insane. To add, I don't remember how many people it said for this housing project. It's just going to impact ten times worst going to impact ten times worse. So that's what I want. And it doesn't say anywhere that housing is affordable and affordable for who, the people from San Francisco?

Speaker 22: Susan Herre

1:16:40-1:19:27

Good afternoon, good evening, Board and everyone, I'm Susan Herre. I'm the president of the Board of Directors for ECOS, that's Environmental Council for Sacramento, and I'm an architect and planner, and South Natomas resident. So, I'd like to thank you and thank everyone who spoke. And summarize briefly the concerns from a neighbor point of view and a from planning point of view. So first, of thank you's to the CPAC members and County staff, and the community members who spoke, and our own Natomas team from ECOS, Heather, [...recording unclear...], and Edith. But the concerns, I'd say they're two. One is, from the neighbor's point of view, and that's increased traffic, loss of use; perhaps if they've got a house that fronts what they were told would be open space in perpetuity, there are lots more people and people have. So, but those are impact issues.

I'd like to talk to you about larger, the bigger picture and larger planning issues. And three things in particular that I would say are really important for our region. And they are planning actions that have been taken over time that have set framework for us here in Sacramento, in the Sacramento region. One has maybe been talked about, the Blueprint from 2004 by SACOG and all the community. It was a smart growth plan. It was considered a model for the nation. And it is really about infill and working around transit, living close in. The second one is the Urban Services Boundary, which has been touched on since 1993, and it was set to protect development from fire and flood, and to preserve Ag and habitat on the outside of it. And the third is the Habitat Conservation Plan, which people have talked about. To protect species in the basin, resident wildlife and much work has gone into making those planning actions. It's something that this region should be really proud of and not toss away lightly. And also, those three things together, if you think of them, they are really guards, defenses, etc., against climate change and for our regional sustainability.

Speaker 23: Shikha

1:21:30-1:42:50

Thank you, I am in favor of the Upper Westside project. My question to you is, or perhaps the planner might be able to address is, you know, I appreciate folks sharing their kind of thoughts around you know, pros and cons. What are the next steps from here on out? What will be the next steps? I've heard the conversations that take place today. And how is that going to kind of circle back to the owners of the parcels?

Speaker 24: Harriet Steiner

1:22:53-1:25:20

My name is Harriet Steiner. I live in North Natomas. This is a matter of history. I was, General Counsel in Sacramento Area Council of Governments when they did the first Blueprint. So, I've been around a long time. And I would say that, like we did the Blueprint, there was a lot of discussion about urban and rural and urban and conservation and why, why and what you develop and what shouldn't. And at the end of that process, which sometimes is contentious, we came up with a plan. The County adopted the Urban Service Boundary and the adopted Natomas Basin Conservancy plan and the Blueprint. And we lived with those for a long time and now we're at a crossroads where different

partners, different developers are coming in and asking, can I build this, can I build that, and they are not in the General Plan. They're outside the Urban Services Boundary and they should at least consider that, but they don't, and I think that's wrong. I think that if we are going to take these plans, which were so thought out and has served us so well and decide to do away with them, we should do it in a more thoughtful manner, and we should do it so that we look at all these different lands and other people who make plans and figure out what should develop if any and what shouldn't develop. And that way we can save our conservation and make sure that we are done with flooding issues, we have horrible traffic as many people will say, and we can deal with that too, but to take and do different EIRs, for little pieces or not so little pieces, and build all these little cities in these little pieces without really being able to grasp all of these areas and yet still do away, and yet still do away with all wildlife conservation with our flooding and take these plans and go with them. And not using them as guidepost, but rather use them as impediments. I just don't think that that's what the County should do, and I don't think that's what the City should do. I think we should go back, and we should look at these plans. Maybe they're good plans but they're not timely. And we all know that they is little bit of housing. But SACOG will tell you, two and half times, the amount of housing we need for twenty years in their land, we just need people to build on it and make sure it's affordable when they do. Anyway, thank you very much.

Speaker 25: Harpreet Banga

1:25:34-1:27:20

My name is Harpreet. Thank you all for being here. And lending your ears. And, I want to tell you, my son was going to come and talk today. He couldn't get through, he's becoming a doctor, and he wanted to give a comment. So, I want to read what he said in the message. He said, hello, I am Raj Banga and I am a resident physician completing training in the Florida and right now I have full intention to return to my hometown of Sacramento after the residency in the next few years. I firmly believe that establishing the Upper Westside community will be a transformative step for the region. It would offer unique amenities, school, and walkability that would make it ideal for families and local business alike. This project helps to address our region's housing shortage, aligns with the smart growth goals, and will create countless valuable opportunities for the community. It will enhance quality of life through expanded recreational facilities, new schools and a welcoming environment for all ages. I look forward to serving this vibrant community in the very near future. I strongly urge you to support this project moving forward. I understand you all are very busy, so thank you for your time and consideration and I am a pharmacist, and my name is Harpreet Banda. I am also in support of this project and all the family and friends; they are here for the support of this project. Just a small thank you so much.

Speaker 26: Caller

1:27:37-1:28:16

I wanted to comment on the inadequate public transit. If this project is going to go forward and need something better than a bus route. People are not going to take the bus. The developer should be required to build a light rail system that goes out there. That would be efficient, and people would actually use it. And that way we wouldn't be overcrowding west El Camino, with cars of everyone

trying to get downtown from that community, because that's the only way they're going to be able to get into downtown. So, the public transit needs to be way better if this is going to go through.

Speaker 27: Liz Bergeron

1:28:34-1:29:27

Hi, my name is Liz Bergeron and I'm a resident. I was twelve when I moved here in South Natomas and I married somebody who works at a California Highway Patrol for 25 years and we've had a lot of conversations about traffic, safety, and congestion. I've spent a lot of time driving up and down Garden Highway and the speed limit is 40 miles an hour and I get passed on a regular basis by people doing 55 miles an hour. Same on Orchard Lane, which actually has a school on it. And I've been passed on Orchard Lane. And if you think the traffic is bad now you have to take to get to your area. Very, very concerned. That's my biggest concern I have. I agree with all the other side of the comments today and I strongly oppose this project.

Speaker 28: Jana Demar

1:29:45-1:31:24

I'm Jana, and I have lived in this area first and have been in this area and my husband has been in this area for over that. We've had property for over 50 years. I pretty much agree with everything that people have said about opposing this project. But there is one thing that only one person really mentioned in here and that was crime. Shortly after we moved in here, we had somebody actively trying to break into your house while we were there and it took the police 45 minutes to get to our house. So, if that was 15 years ago, I can't imagine how long would it take for them to get to my house now. And, I've had several other incidents with criminals where I've had to call the police, but it's a big concern. I noticed on the map that there was one potential police station and one potential fire station. Okay, who's going to man that? Who's going to pay for that? Yeah, they're already plenty police officers and everything like that. So, to me, crime is a big issue along with many other things. And by the way, I don't hear the frogs anymore either. Thank you.

October 21, 2024, Sacramento County Planning Commission
Public Comments for UWSP Draft DEIR

Speaker 1: Louisa Montoya

2:08:27-2:10:08

Board Chambers: My name is Louisa, and I'm here today with my daughters and I've been living in a Natomas for almost 10 years, and I support the Upper Westside plan. It would help aid with the housing crisis that we face today. A lot of apartment complexes in Natomas that have a long waiting list, and as well as houses are selling quick to people that are coming from the outside. So, I feel like this plan will help bring the people that are already in the community like help them out as well as it will help allow for a lot of our children to continue growing in the community that we all love with the school, the community, college parks, and just everything incorporated. It is also a good location. I work 2 like 2 min away from there as well. So, it's a good. I feel like it's a good plan. I feel like everything that was that has been integrated into putting every like. Bringing the plan together will help bring more tax revenue as well with our growing community. And I, just that is all for today. Thank you. Thank you.

Speaker 2: Bal Soin

02:10:22-02:11:38

Yes, my name is Bal Soin. I think this project will be very beneficial for the community. And how can you go wrong with a new park, a new commercial places, the park, the schools, and the housing Sacramento is short of housing. It will give the housing. The more the better thing is, the government will make money. There's a billion dollars. When this project is done. Look at now, it's just a field. There's nothing there, it's not pleasant to see, and when it's done you'll be surprised to see, it'll be one of a kind. It's modern. It's a new and the government will make billions of money will be spent in that place, and the government make more money on that, too. So, the better it is. There will be a park, there will be schools, there will be a commercial places. There will be a lot of new jobs will be available in that area and the surrounding community. It'll be beneficial to them. So, I really admire the people who put this plan together, and I thank you guys. At least you are considering to look at it. Thank you. Thank you.

Speaker 3: Melanie Hartman

02:11:53-02:13:56

What I'm concerned about is that the Corps of Engineers already determined that the levee as it was prior to these multi-billion dollars of investment. The levee was too fragile to protect Natomas. Okay. I'm in reach A, we're in reach A, and the construction is happening right across from us now. But one thing that hasn't been considered is the extra traffic. Every Garden Highway resident that I've spoken to about this. We all get rattled by traffic. We're talking SUVs trucks, and when Semis go by it feels like the road actually distorts in a wave as they move past the house. We rattle. The whole place does everywhere does along the Garden Highway. And so, my concern is with climate change deluges coming down and flooding areas, and with the fact that so many trees have come down on the Garden Highway and busted up the crust of clay that once capped it and made the interior of

the levee secure and can't be washed out. That cap has been broken many, many times by trees and trees have come down, so we're very concerned about liquefaction. Our side will, with all that extra vibration from the traffic on our side. I'm just. I'm just fearful of the extra danger that that vibration on a liquid levee will do to our houses, and if you're a hundred percent sure that reach A is going to protect the entire Natomas basin, then approve this thing, but I don't think it will. I think it's putting too much pressure on the highway.

Speaker 4: Arthur Hartman

02:13:56-02:14:13

We're also in agreement with the many other. Yes. Issues that are going to be brought up tonight in opposition to the size and scope of this project. Thank you.

Speaker 5: Christine Schmeckel

02:14:29-02:15:41

Hi! I'm Christine Schmeckel. You did good. And I'm here in. I lived in. I've lived in Natomas and various areas for about 40 years. So, I've seen it grow, and I now live closer to the Garden Highway and Orchard Lane, and therefore West El Camino, and so my concern are many that are listed there, but particularly the traffic and the safety and the noise and the impact on the Garden Highway. I look at the Garden Highway. I watch the traffic go by. and it's a. This is a safety issue as well. We've, I've lived in this location, for I think, 3 years now, and we've had several horrible accidents on that road. So, adding more traffic to that location has already been said is a big risk. I don't know what the statistics are like, how many thousands of cars equals, how many lives that have possibly been lost. But it's going to be a huge impact, and I do request that you reject this proposal. Thank you.

Speaker 6: Josh Harmatz

02:15:52-02:18:19

So, I had prepared remarks for tonight and was at a community meeting last Sunday on the 13th with our neighbors on the Garden Highway Community Association. On that evening during the middle of the meeting, while we're talking about traffic and safety issues. This happened.

This is from last Sunday night. This is the 4th time in the last 10 years I've had a car run through the front of my property. What else do you do? On Sunday evening at 6 o'clock my oldest son, his chores are to take the trash out to the street. Fortunately, he was at a friend's house that night and was not on the road when this happened. This happens all the time.

The issue for me isn't as much that there is traffic and safety. It's number one. What has the County done about it? We were promised when the levee improvement. I've been there 16 years when the levee was widened. We were promised they were going to repave and Redo Garden Highway and make it a more safer place. Nothing has happened. Now you're talking about adding 25,000 new residents. Look at this photo. I want you to understand what happens with the traffic maps down here people get rerouted on their apps from Waze from Google maps, etc. When this freeway backs up, and this is before 3 million square feet in Metro Air Park and the other places that are currently

being approved have even come into play. This is the most direct route. People cut through Highway 5 and Highway 80 through Garden Highway traveling at very high speeds.

The biggest issue with this is that the current proposal that they've submitted does not provide any planning, any solution for funding or any solutions on how to execute on the plan. Now really important. Here the traffic study but done by the County. If you look at the bottom of page 7, it specifically states Garden Highway needs to meet current county requirements. Current county requirements, as provided by the County, is 2 12-foot-wide lanes with a 6-foot shoulder correct. Our road is 16 feet in total width at the shortest, and at the widest 20 feet in total width, with no room. They just finished the levee improvements. They just moved the power poles. I spoke to RD 1,000. I spoke to the Central Valley Flood Protection Board. The developers did not talk to them about any widening of Garden Highway which is required by the County, so I urge this Commission to delay this approval until these issues can be adequately addressed.

Speaker 7: Mr. [Ross] Oliveira

02:18:34-02:20:44

I am here to express my serious concerns regarding the proposed Upper West Side Specific Plan and its long-term impacts on our community. I've lived on Garden Highway for almost 40 years, grew up. There lived on the land side and the river side. I ask you to carefully consider the broader implications this project will have on the natural resources, local farmland, and public safety of our county.

I specifically want to refer to a key statement from the Sacramento County 2030 General Plan. The land use strategies and policies of the Sacramento County 2030 General Plan are designed to promote the efficient use of land, encourage economic vitality and job growth, reduce urban sprawl and its impacts, preserve habitat and open space and protect agricultural and rangeland operations. Two growth boundaries are identified to help implement this vision. The urban services boundary and the urban policy area. The USB is the ultimate growth boundary for the unincorporated area. This area is all outside of that.

The UPA defines the area within the USB expected to receive urban services in the near term together. The UPA and the USB promote orderly growth and efficient extension of infrastructure and provision of urban services. While I support these principles, I am concerned that the Upper Westside project deviates significantly from this vision. Here are my specific reasons.

Reduction of the Sacramento River corridor buffer. The County finally settled on a 1-mile buffer. This project is going to reduce that to about 700 feet in some areas and a half a mile in others, but I want to ask this basic question. Is there adequate vacancy inside the urban services boundary for a project like this? Has that been analyzed?

Second, irreversible loss of open space and farmland. Talk about protecting habitat! Now we're getting rid of it.

Traffic, safety on Garden Highway which Josh talked about. The DEIR suggested the project could add 4,000 trips per day feeling it's gonna be quite a bit more than that. Violation of existing, planning

guidelines and significant and unavoidable project impacts. I guess that's it for time. Thank you. Thank you.

Speaker 8: Brandon Castillo

02:20:49-02:21:59

I'll be quick. Brandon, Castillo, Garden Highway resident. I want to echo what. Well, first of all, blowing through the urban services boundary. This is an environmentally sensitive area. It's right along the Sacramento River for those of us that live there. We know how sensitive it is, not only for recreation, but for species and habitat we're blowing through farmland. I happen to think it looks great. You may not, but the traffic concerns are significant. Nobody seems to have taken [that] into account. It's become a freeway. Garden Highway has become a freeway. We're now talking about 25,000 residents. I recently lost my dog because cars just fly by and they speed. We take the garbage out. My kids, check the mailbox. You're basically condemning us. If you approve this project, our front yard will become a freeway. It already is horrible. You're talking about, I think, 4 or 5,000 more cars per day. We don't have anywhere to go. This is our front yard. Our driveways lead to the Garden Highway. It'll turn it into a freeway. So, in addition to smashing through environmentally sensitive areas blowing through the urban growth boundary. It's just not a sustainable development, and it's not safe. So, it's both unsustainable and unsafe for our community. So, we urge you to reject it. Thank you.

Speaker 9: Alex Jang

02:22:16-02:24:26

Hello, and thank you for your time. I'm Alex Jang, a native Natomas resident whose family has actually been in Natomas since the 1950s. And I'm here today because I deeply care about our community. Natomas is special because of its balance between environmental stewardship and growth. The Upper Westside Specific Plan threatens that the land is proposed. The land that this plan is proposed on is rich in nutrients, close to the river, and once it's developed, lost forever. Paving over it increases flood risk by reducing natural absorption, and our roads can barely handle the current population. We're already seeing accidents and deaths on fully developed roads due to drivers who neglect rules and show little respect for others. May the victims that even I personally knew rest in peace. And if our current services are not effectively addressing these issues now, what makes us think they'll be able to manage it once we add even more residents. And to add, years ago my neighborhood was alive with the sounds of frogs and crickets at night. Now their silence is a reminder that we're losing this precious wildlife. I also remember seeing herons along the levees. A bird one of our schools is named after, but now they're nowhere to be found. The plan would only further threaten their habitat, and then the Natomas Basin Habitat Conservation Plan was created to safeguard these critical habitats, like those of the endangered giant garter snake, and the Swainson’s hawk, and the proposed mitigation strategies, are inadequate and insufficient to protect our local wildlife. We should remain committed to keeping our word and preserving what's left of our natural environment. Instead of continuing to pave over it. We can be smart about growth, and there's room for development within the current urban services boundary where we can respect the land and resources building outside of these boundaries will strain our roads and put everyone at risk - Drivers, pedestrians, cyclists. And in emergencies we'll be in serious trouble.

Natomas is unique. Let's preserve what makes it special for future generations and create a community we can all continue to be proud of. Thank you so much for your time. Thank you

Speaker 10: Ted Costa

02:24:31-02:26:07

Yes, sir, thank you very much. I have some property there at El Central Road and San Juan and my family moved there in 1917. That's the same year that the levee was completed, and the family has been there ever since. and I support the plan because that's about all that could be done with that property. Now that it's surrounded by houses from aerial applications. I know you know all those arguments. But I would like to make one other thing that. I'm 83 years old, and in 83 years I have never seen a Swanson's hawk on my property, and so I think someone is obligated to say that they have seen one there. If any five of you or your staff, or anyone. Yeah, I know they live along the Garden Highway, and they probably are on the Garden Highway. That's a mile and a half away. But I will be filing with you a legal declaration of what I'm talking about here today, and it'll be much more in there because I did work for the reclamation district for years. and I used to clean the canals, and I know where the garter snakes are, there in the canals, and I will submit that to you a legal declaration, independently of perjury, so that you can use for your consideration, and I challenge anyone to do the same thing if they've seen any of those animals on my property. Thank you very much, sir. Thank you.

Speaker 11: Gary Demar

02:26:20-02:27:36

Yes, my name is Gary Demar. I came here to support my neighbors on the Garden Highway. I was born here. My dad was born here, and you know I was here when, let's see, Bradshaw Road was vineyards, you know, and the Pocket Road was farms. Man, you know, and Elk Grove was going to stop at Elk Grove Boulevard, you know, and it's reached the sky. And then now they've jumped across the road on Elkhorn, and now it's all going out in the rice paddies all the way up, all the way up into Sutter County. There's gonna be thousands of homes up there. They don't need the Garden Highway. We need to keep our farmland. We need the farmland in the country right there. It's the closest thing to the city of Sacramento, and it's the last farmland in Sacramento. There's nothing left. When you take that. It's gone. Once it's gone. You know. I went to the Alhambra Theater, too, you know. Now it's a Safeway store. I know you'd like that. Anyway, I don't know [what] I'm thinking about. If there's some way to do a class action lawsuit and sue the levee people because of the devaluation of our homes. It's a nuclear free zone. We got little wooden stakes every 30 inches, you know, and weeds. So that's what we got left with after the levee. Thank you.

Speaker 12: Jana Demar

02:27:47-02:29:12

So, I'm in agreement with all of those who [are] opposed to this project. I don't think that the developer is in it for anything but his own profit. The issue of the traffic is huge. I have twice almost been hit head on because the oncoming traffic was avoiding the group of bike riders that are always riding down [the] Garden Highway. They have now started the levee work, which has been awful.

The dust and the dirt and the noise, and the everything that we are going through for that. Then, as soon as that's done, and they start this project, we will not have any peace.

The vibrating, the vibrations, and all of that have caused cracks in our house. It's just not a project that should go. We have plenty of places to build homes we have. They're going everywhere. Have you been out to the Folsom area? My gosh, you would not believe what's behind Slough House going up. There is not a lack of housing, maybe affordable housing, but I don't think this is what's going to be planned in this little city that they want to put in Prime Farmland. Thank you.

Speaker 13: Howard Lamborn

02:29:23-02:30:21

Hi! My name is Howard Lamborn. I'm a pharmacist. I've been in Sacramento, living and working, for 48 years. I'm here to express my support for the Upper Westside plan. I think it. It's going to help our housing crisis. We need housing desperately and it'll also bring a balanced approach to land use as it offers smart growth. It offers schools, colleges, parks, and preserving many acres of agricultural buffer. With this plan it will have a positive impact on economic growth and will generate a lot of tax revenue for the Sacramento area. I think growth is inevitable. You can't avoid it. I think this plan has hopefully worked all that out, and it will be a positive thing for Sacramento. Thank you. Thank you.

Speaker 14: Jas Banga

02:30:29-02:32:08

Thank you. My name is Jas Banga, and I have been living in Sacramento last 35 years, about 25 years in Natomas area. Whether this plan is so, I have seen the plan, the proposal. I have read the DEIR. Also, there are a lot of benefits. That's why I support this plan. But of course, there are some side effects. You can say the issues. They can be mitigated. It's in the report so reports is officially on your records with the county that they can be mitigated now. But just going back a few years, 8, 10 years ago, you know, Sacramento City had a big project called Stadium, one Golden [One] Stadium, one right, a lot of people. They opposed it at that time, a lot of people, but, thanks to Kevin Johnson, he made his right decision. He saved the Kings. They were moving to Las Vegas, if you remember now, Sacramento, everybody knows Sacramento. He saved the city of Sacramento Kings and the arena that's his legacy nobody can take away from him after a while. Now we have a project called Upper Westside. It's one of a kind, unique project, and it will make our Sacramento beautiful. And it's just, it's your legacy, the Supervisors legacy. Nobody can take away in the future, when, after 2030, 40 years from now, you won't be here. I won't be here, but this thing will be here. Your legacy will be here. Nobody can take away for centuries, or as long as the city lives. Thank you, and I support this plan, and I urge you to support the plan, please, for our next generations. Thank you. Thank you.

Speaker 15: Harpreet Banga

02:32:20-02:34:23

Members, I'm here today to support this Upper Westside plan. First of all, I want to thank you for being here today, and as we all know the details of this project, and I firmly believe that establishing the Upper Westside community will be transformative step for our region as it offers unique

amenities, schools, colleges, parks, walkability, and would make it ideal for families and local businesses. This development will have a welcoming environment for all ages. This project helps to address our region's housing shortage. We need more housing units where our people have a house place to live. We don't want people getting chased away from California because of this crisis and creating more red tapes to make it difficult to build a house. This plan is a perfect solution for our smart growth goals. It will also offer houses, apartments, condos. Best of all, it will also offer agricultural buffer land. It will create countless valuable opportunities for our community. It is a unique project, and one of a kind project that will make Sacramento more beautiful and will be more visited place in California. It will add to our region's economic growth. Lots of jobs will be created and will generate millions of dollars in revenues. I'm looking forward [to the] development of a vibrant community in the near future, and I strongly urge you all to support this project moving forward. And many of my families and friends and their friends. They are not able to come here tonight to support this project, but I want to thank everybody for consideration. Thank you. Thank you.

Speaker 16: Rosalyn Bryant

02:34:40-02:37:01

Okay. Sorry. I have a little bit of laryngitis. My name is Rosalyn Bryant, and I live in the Riverview Subdivision. That is right off the corner. It's the corner of San Juan and El Centro Road. I moved from South Natomas about 20 years ago, and I'm sorry 10 years ago, and I've been in North Natomas in that area for about 20 years. It was so nice being able to go down El Centro Road, to bike down El Centro Road. It was like a little farm road, and it was so nice. But over the years I have seen it, you know, actually grow. But the nightmare is what I'm looking at is because I live so close to the 49er truck stop! That is a nightmare. There have been times when I have tried to get out of my subdivision, and I've had to wait, I don't know how long, because of all the traffic coming up towards San Juan, and it's a four-way stop, so it just gets bogged up, and it's just, it takes a long, long time to get to get out of my just out of my subdivision.

When we get across San Juan, going down to the truck stop, the truckers are trying to get out, and nobody's, of course, letting them out so that bogs up, and it's very dangerous, and it's just been a nightmare. I was looking at the map, and I don't know if it's coming up to that area or not, you might be able to answer that I couldn't really tell. But if it comes up to that area, it's just really. And even if they widen El Centro Road, El Centro Road is like a raceway. I mean cars just speed down that road, and there's been numerous accidents on that road. There's been pedestrians that have been killed from cycling because it's like a raceway. So, if they widen it, it's still going to be even worse. So, you know, I oppose this project, because, you know, just because it's going to take away so much farmland. And it's just going to be just a nightmare.

Speaker 17: Lynn Randolph

02:37:11-02:39:32

Good evening. My name is Lynn Randolph, and I also reside in Riverview Park, at the corner of El Centro and San Juan Road. I strongly oppose the Upper Westside project as I am a nearly 25-year resident of the area.

I raised my family, boy and girl twins, in Riverview Park. We spent many, many days, holidays, birthdays, [and] play dates at the park. We bought strawberries at Perry's farm. We learned golf at Leader's driving range. I'm sorry. and my children played nearly every day at Bastillo's pumpkin patch in October when they were 8, 9, and 10 years old. All of those places will be gone with this project. We moved to West Natomas for these reasons, as well as many others, and I don't want other families to miss out on the wonderful experiences of knowing that farmland and nature are right in their backyard. There are many other reasons to oppose this project, such as the traffic. Currently, during commute time, it can take as much as 10 minutes just to get through the overpass at West El Camino coming from South Natomas. We would displace wildlife. Lately West Lake residents have been complaining about increased rodents in their neighborhoods, due to the apartment construction at El Centro and Del Paso. That project is probably less than two acres. Imagine what it will be developing thousands. There's also the ability to evacuate in case of an emergency. There's little room to expand and widen existing access roads. There are also many other reasons that my fellow community members have outlined. Please consider our concerns and reject this plan. There are other nearby areas that are approved already to accommodate housing. I wasn't going to mention this, but four years ago my husband was killed on Garden Highway in a motorcycle accident. So, I support my Garden Highway neighbors in their concerns. Please don't pave over what little farmland we have left. Thank you.

Speaker 18: Katie McCammon

02:39:36-02:41:24

Hi! I'm Katie McCammon, and I'm [on] staff with 350 Sacramento, an environmental justice organization. And I support all the other environmental organizations in the area who are in opposition to this plan. I can't really state it better than a lot of the folks who already spoke tonight. So, I want to touch on what I've experienced. I live in Del Paso Heights and since I moved here just a couple years ago, it's been really unique to experience a place that is trying so hard to develop an urban life in the midst of protecting its ecology. That's a very special thing. And this project obviously is going to risk that. And so, take that very seriously. Climate change is happening. There's no doubt about that and mitigating it is our job. You have a really awesome opportunity to continue to protect and expand the ecology here and make Sacramento even more unique than it already is. It's an amazing thing to be next to a highway that has so many problems that we could probably fix and focus on fixing that. But then, right next to that parallel to that is a bike trail where I can go and see cranes and a waterway full of life. And it's truly a magical place. So, if I was a person with kids, I would say, those kids deserve a place like that to grow up in. I couldn't live without nature, and I really hope you think about that and think about the world you want to create for generations to come. Thank you.

Speaker 19: Heather Fargo

02:41:38-02:44:02

Good evening. My name is Heather Fargo, longtime resident of Natomas, and, like so many of my neighbors here, I think Natomas is a special place that deserves special attention. You spend a lot

of time on that cell tower, and this is 2,000 acres. So please give us that level of attention that you gave the cell tower. We think it's worth it like a lot of my neighbors. I am here to strongly oppose the Upper Westside project and to point out to you the many flaws in the environmental impact report. Obviously, with two minutes I can't share with you all of the reasons I oppose this project or all the problems with the EIR. But as planning commissioners, I know that part of your job is to implement the general plan, the county general plan, and to implement county policies and plans. This project is so out of line, not just with the county general plan, but with so many plans and policies that the county, that staff and residents have worked on for decades, not just the Natomas Habitat Conservation Plan, but the Urban Services Boundary Plan, which, by the way, is not mentioned or discussed in the EIR and there are so many impacts to this project that are so severe some of them had mentioned already. We'll certainly be putting a lot of those into our written comments. But when you realize how inconsistent this plan is with the policies and plans of the county. I don't think you have any option but to say no to the project. So, I hope you will do that, and I hope that you also will look closely at so many of the impacts that cannot be mitigated, and that are so severe and just as a final note, I want to say that when the Natomas Vision was initially voted on decades ago, not the county version, but the city county version. The idea was that the city of Sacramento would do the development of neighborhoods in the Natomas Basin, and that the county would take care of the farmland and the airport and those areas outside of the urbanization. And this project is completely contrary to that. So, I only have two minutes I could go on. Thank you for your time.

Speaker 20: Edith Thatcher

02:44:20-02:46:48

There's been a lot of talk this evening about the Urban Services Boundary, and so I thought I would bring a map and show it to you, and so you can see what it looks like in the Natomas basin. So that's the lower part of the Natomas basin. So okay, the poison. It's like we're at the airport flying in and out. The point I'd like to make is that there's not just one project outside of the Urban Services Boundary in the Natomas basin, there are three, and there's one that's already been approved. And so, what I was going to try and ask you to do is to consider that when people are talking about traffic problems, impact on the city services, issues with flooding, it's not just the Upper Westside, Grand Park is 5,000 acres proposed for commercial and residential. We've been told that the DEIR for that will be coming out next summer. This is Airport, South Industrial, that is, 6 million plus square feet of warehousing next to communities and schools. And then we have Upper Westside, also of 2,000 acres, the people speaking before me. Almost all of them have mentioned traffic. Please think about it. It's not just Upper Westside. This is huge, and finally Watt EV, which I think you already know about. It is a charging station for semi-trucks, and that has already been approved. And more traffic. What's being imposed on our roads here is enormous. These fears are real, and the impacts on city services are as well. Thanks for your time. Thank you.

Speaker 21: Steve Schwyer

02:47:19-02:49:26

Good evening, Commissioners. I'm Steve Schwyer. I'm working to protect our natural areas and agricultural lands and reach our statewide national 30 by 30 goals, but our region is severely behind. We only have nine percent of our land protected compared to the Bay area that has 30 percent

already and looking to protect 50 percent. So, we need to catch up. I oppose this project. It's counter to the county's policies to protect open space and farmland.

SACOG recently adopted their Blueprint land use map for the current their current projections, and where we should be building it does not include this project. The general plan states, the county will support implementation of, say, SACOG's Blueprint and the initial planning that was done. It basically relies on this being in the Blueprint. The Draft. EIR attempts to dance around that conflict by stating that somehow it complies by just meeting the goals of that, but doesn't mean it's in the map, right? The region will not meet its greenhouse gas reduction targets. If we develop outside those Blueprint boundaries, and there's already issues where they can't meet that with their projections. Now, which could cause us to lose our transportation funding. The DEIR needs to analyze what the effects of that are. Also, the Natomas Basin Habitat Conservation Plan will be severely undermined. This area was predicated on staying in agriculture, and North Natomas and Metro Airport Park were developed, based on that. Developing this land is incompatible. You'll notice in the Draft EIR there's requests from CDFW, Fish and wildlife service, LAFCO and the city for analysis of how it would impact the habitat conservation plan, which is totally lacking in the DEIR. It removes almost a third of the Swainson's Hawk zone in Sacramento County, which is the one-mile buffer from the Sacramento River. It's critical to the species and diminishes our already impacted areas that the hawks have to forage. Thank you, and we urge your rejection of the project.

Speaker 22: Louis

02:49:33-02:51:41

Hi, good evening, and thank you for the correct name pronunciation. I have many concerns and doubts surrounding the safety and affordability of housing in the project area. Even if the project develops an affordable housing strategy, there are a few site-specific issues that drive up costs of living. These issues will not be addressed in the near future. First, the Upper Westside Specific Plan area is in a flood plain, and, as the DEIR says, it is susceptible to land subsidence or sinking of the land. This project certainly wouldn't help the situation. Developing and increasing the weight load on land that is susceptible to land subsidence will further lower the already low floodplain and consequently drive up the flood risks. This drives up construction costs to build code safe housing and may also have unaccounted impacts on adjacent regions. What is the plan to keep hazard mitigation costs down and make sure that the affordable housing is actually affordable and will regional subsidence impacts be assessed with each project proposal. Could cumulative effects impede full build out of the proposed structures?

Secondly, although the project area is geographically close to existing metropolitan centers. This point is made moot by the lack of transit infrastructure. This is not a high priority transit region, and necessary transit will not be built anytime soon. How affordable will living be if people and their need their own cars for work and everyday necessities, particularly through initial phases of development, when essential resource centers may not be fully built. These issues are fundamental to the project area. We should not forego important regional planning policies to allow development on this land. The SACOG Blueprint states that we are already entitling two and a half times the land for housing that we will need over the next 20 years. We don't need to focus on approving more land. We need to focus on getting housing built in already zoned vacant land within the urban services boundary and on infill in regions that already have the necessary infrastructure. Thank you.

Speaker 23: Susan Herre

02:51:50-02:53:53

Chair Raethel and planning commissioners. I'm Susan Herre, the president of the Board of Directors of ECOS, Environmental Council of Sacramento. We submitted a letter today for your reading. This is Penn Station. It was destroyed in 1963, after passenger traffic declined. There was an international outcry and causing two years later the formation of the New York Landmarks Commission to make sure that nothing like that destruction ever happened again. Now this, of course, is Notre Dame Cathedral in Paris on fire in 2019. It burned. They could have torn it down, but they wouldn't think of it. There would have been an international outcry. But we're in California. Our treasures are different. They are, in fact, nature itself.

We prize our open space. So tonight, we've heard about the Blueprint. we've heard about the urban services boundary and the Natomas Basin Habitat Conservation Plan. These planning actions are like the Landmarks Commission in New York. They're our planning legacy. So, if you go ahead and approve this tonight and keep the process rolling. There won't be an international outcry. but perhaps a couple years down the road. Maybe people will say, never, never again. Thank you.

Speaker 24: Srirama Tanniru

02:54:08-02:57:01

Good evening, chair and members of the Planning Commission. My name is Srirama Tanniru. I currently work for the State of California as a It project manager. I have lived in the Sacramento area for almost 30 years. And as someone who's intimately familiar with this area, I am here to express my strong support for this Upper Westside Specific Plan project, and I have several reasons. I know I have very limited time. Maybe I'll be able to cover all of them. Number one at the top of my list. Anybody paying attention to the economic life of this country, of this state, of this region is fully aware of the housing shortage, especially when it comes to multifamily and duplexes. This project is going to produce upwards of more than 9,000 units, more than half of which are going to be multifamily and duplexes. So, I think this project goes a long way to alleviate some of the homeless problems related to housing shortage in this in Sacramento region. The other thing that makes me strongly support this project is the location. It's less than five miles from the location of this project is about almost 200,000 jobs. And so, as some of the concerns that were expressed about vehicles miles traveled, VMT. Or the greenhouse gas emissions. The fact that you're reducing the commute, I think, will help to meet those goals. The urban town center that is being planned is a pattern along the lines of the Santana Row in San Jose would help with commercial activity as well as create new jobs. There is a proposal for a west side canal, which I think would help with the beautification and provide a unique urban waterfront experience. Finally, this area, this project has been in discussion for more than two decades, and all during this time frame North Natomas has been developed. Projects have been approved in Placer Vineyards and West Roseville. These are locations that are much farther away from the job centers which cause sprawl and cause traffic jams and cause greenhouse gas emissions. So, something that is so close to job centers meeting smart growth principles, I think, should be. I support it. Thank you.

Speaker 25: Joseph Brazil

02:57:13-02:59:49

Commissioners. Thank you. My name is Joe Brazil. My family has been farming 120 acres in the Upper Westside project area for well over 80 years. Now, unfortunately, urbanization, changing conditions and many other problematic issues have made agriculture no longer economically viable or profitable for us. We actually were forced to sell some of our land in order to simply keep our farming operation going. Plainly stated, our land is simply not prime agricultural land, no matter what anyone says. Let me back this up with a few facts. Number 1 theft. We can't leave tractors or equipment in fields overnight. People also come into our fields, they trample and steal the crops and also any of the materials we leave there. Number 2 vandalism. This is definitely a problem in the fields. It's a real issue for our crops and our machinery. Number 3 farming restrictions on our methods, timing pesticides, etc. These are all enacted due to the proximity of all the homes and businesses all around the area. Number 4, water table and soil and mineral erosion. This limits the types of crops we plant and prevents us from planting an orchard. I know you guys are all fond of eucalyptus trees, but unfortunately no eucalyptus trees on our property. Sorry, the good news, though, is that Upper Westside has some solutions. Number 1 mitigation land. It offers a 1-to-1 mitigation ratio of prime farmland, contributed for every acre of developed land in the project. This ensures that while development goes forward, farmland preservation continues in areas that are much more better suited for agriculture. Plus, the project includes a 534-acre agricultural buffer to help with open space and protect the surrounding farmland. Wow. Two minutes. Is that quick. Just one more thing, wildlife. It produces the corridors and habitat restoration efforts as part of the plan. Housing shortage. It will help in that area, and it will create nearly 90,000 new jobs during construction, and also after in the long term. So just in closing. thank you. In closing, I respectfully and humbly request that you support the Upper Westside development along with me and my family, who has dedicated 80 years to farming this land. Thank you.

Speaker 26: Steve Arditti

02:59:49-03:01:25

Mr. Chair and members. My name is Steve Arditti. I reside with my wife Melva, on the Garden Highway. I'm not going to tell you how long, because you'll be able to figure out how old I am. But I want to resonate with all the folks who have expressed concerns and objections frankly to this plan as it currently exists. I remember as well as others here, the development of the current urban limit line services line and so forth, much research back and forth. Input went into the development of that. It had compromises. But it was a thoughtful effort to sort of balance the need for development with the values of preservation, of open space, habitat and agriculture. I've not yet heard an argument for why this particular project needs to ride roughshod over that. Someone raised a question before. Why can this not be done within that those lines to say nothing of other areas of town that are just begging for development? For example, the Railyards, the River District. So, I would urge you to look very carefully at the policies that have been so carefully developed. The compromises and the balancing that's been done and ask yourselves whether there's really a case to just ride a rough shot over that with this new development. Thank you so much. Thank you.

Speaker 27: Lalanya Rothenberger

03:03:02-03:05:06

Good evening. My name is Lalanya Rothenberger, and I'm the Executive Director of Facilities and Strategic Planning for Natomas Unified School District and we've been involved with this project since the beginning, and we appreciate the opportunities that we've been given so far to be part of the process from the Technical Advisory Committee to where we're at now. We did submit comment letters on the urban services plan as well as the public facilities financing plan and on the Draft EIR so in regard to the Draft EIR, I do want to state that all of our schools need to be built in compliance with the California Department of Education and that is the size of the lot of the land, and depending on what the environmental issue is on the site or the proximity to other hazards like gas lines, electrical lines. All that needs to be considered. So, while the plan shows four schools, all four plans show four schools are going to need to be here based off the students that are going to be generated. We need some ability and flexibility and assurances that as we work with the California Department of Education to build these schools, that they're going to be in compliance, that now we're not given a lot of land that's too small or doesn't meet the needs that we need for our students. And then part of your guys' policies, of course, and the framework that you have does require the urban services plan and the public facilities financing plan. And right now, after we've done analysis on best case scenarios. If we were to pass a general obligation, bond and levy the highest amount of developer fees that we could get, and spend it all on the buildout of these schools, we would not have enough money to build these schools, and so the developer, the applicant, has been meeting with us. But right now, there is no policy that requires mitigation of that potential funding gap that can ensure before there's vested entitlements. And before this moves forward that we can meet the need of Natomas Unified School District students in their community. Thank you.

Speaker 28: Marilyn Pendola

03:05:15-03:06:22

When I first moved here, 18-20 years ago Natomas was an uncongested haven for both people and the animals and birds and wildlife that live there. Since then, the natural environment of our beautiful area has been systematically destroyed with mega complexes, apartment buildings, huge industrial complexes, and thousands of new homes. I remember we had red tail hawks and sparrow hawks. We had the sweet little ground owls that would peep up out and look at you. They're all gone. There were rabbits and rodents and foxes and coyotes and an occasional deer because of human development, they are no longer here. We must preserve the open land that is left. We must preserve the open land that is left. We must be stewards of our natural environment. We must be the voice for the creatures who have no voice. I oppose this project, and the degradation of the natural world that it will destroy. Thank you.

Speaker 29: Lori Harmon

03:06:31-03:08:35

Good evening. My name is Lori Harmon. I am a retired sergeant from the CHP. I worked for them for 27, proudly worked for them for 27 years. I will add that I am not in any way representing them tonight. I am not against development. My family's in development. I'm certainly not against our

farmers selling their land. This is, I strongly oppose this project. It's for a lot of reasons, but for one, it's reckless, and it disregards the people who already live here. I've lived in Natomas for 25 years. I've seen how traffic has been impacted. This development proposes 9,000 housing units which should bring about at least 20,000 vehicles to our four roads - West El Camino, El Centro, Garden Highway, and San Juan. Two of those four roads can't be widened. They're levee roads. There's nowhere to put that other. Those extra traffic that we're stuck with it. I've heard countless people talk about accidents that they've seen. I can tell you. I've been there and I've seen them. They're bad. People are impatient at the West El Camino – I-80 interchange. People are impatient. They run that light. It's not safe for pedestrians. I won't even ride my bike over there. I know that emergency response. Time is detrimental. It can save lives. I've been there. I've been a responder, and I know how frustrating it can be 15 minutes, 20 minutes knowing someone needs my help, and I can't get there because of congestion. Because there's no way to pass. There's no way to get around. I want to be clear again. I'm not against the farmers, or I'm not against development. This is a reckless, just, a reckless disregard for the people who have already been there for nothing more than profit. Thank you.

Speaker 30: Liz Bergeron

03:08:45-03:08:54

I've been a resident of Natomas for 17 years, and for the past five years I've lived in Swallow's Nest, which is on the corner of Garden Highway and Orchard Lane. Prior to that I lived in Westlake, and frequently I commuted downtown to my job downtown taking El Centro, San Juan and Garden Highway because I-5 was backed up then, and it's gotten even worse since then. So, my primary concern is traffic congestion. And we've heard a lot about that tonight. But beyond the safety concerns. I'm also troubled by the piecemeal approach being taken with the development projects in the Natomas basin, as Edith mentioned earlier. And the other concern I have is, and I'm not sure how this works. But the traffic impacts seem to be in the city while this project seems to be in the county, so I have real concerns about how to address that. But I think that you need to consider the cumulative effect of the multiple developments across the Natomas basin rather than the piecemeal approach. I have personal experience with this, as in my professional role, I worked for the Pacific Crest Trail Association, and we had a 2,650-mile corridor, and we saw a lot of piecemeal planning. And I've seen the impacts of that. So, I do hope that you will consider that, and I strongly oppose the project. Thank you.

Speaker 31: Deborah Lugo

03:10:26-03:11:58

Yes, hello, thank you. My name is Deborah Lugo, and I've lived in South Natomas for over 35 years and I'm very concerned and opposed to this project. I'm concerned about the traffic mainly on Garden Highway, which you've heard a lot of, and I would urge all of you to maybe drive down there this weekend and take a look at it. This is the city portion, not the county portion, but [the] Army Corps of Engineers is still working on the levee down on the county side, and there are still semi-trucks traveling down Garden Highway, which should be prohibited from doing. And if you go down Garden Highway by all of the businesses, like Chevy's, Virgin Sturgeon, and so forth, you will see a crack down the center of the highway where many years ago, [the] Army Corps of Engineers came

in and put down a 25-foot slurry wall. and that was probably about 12 years ago. They need to go deeper, but they didn't want to touch this, that portion this time, but the road is actually splitting. There's nothing that has been done to any of the outlying roads ever since I've lived there. It's quite a mess, and I would urge you to come and visually look at this, because there is no way, no way that we can support a city running off this road in this area. Thank you.

Speaker 32: Georgia Prescott

03:12:08-03:12:56

Well, I don't want to beat a dead horse, and everybody's talked about traffic, but I feel like probably you need to hear it from everybody. So let me just say that I think this is actually a very interesting project. It's just in the wrong place. I live about a half a block from Garden Highway, and I can tell you the present traffic right now on Garden Highway is a lot, and then you add 30 or 40 bicyclists in a group going. I play a lot of golf in Teal Bend and if you have to get around these bicyclers and the trucks that are there and the cars that are there. And then to add this kind of additional motor vehicle motor cars. You just don't want to do that. So, thank you.

Speaker 33: Dana Schwartz

03:13:21-03:14:06

Well, I will be very brief. I want you to ask yourself, why are they planning this project? Given that the EIR, which is what you want us to talk about, says it will increase noise, air, pollution, create major traffic problems, pave over farmland and destroy wildlife habitat while increasing the potential of flooding. This will not benefit the Natomas community. There is plenty of in-fill land to build on in Natomas and address the housing shortage. So, who is going to profit from this project, I beg you to follow the money and reject this project.

Speaker 34: Harriet Steiner

03:14:14-03:16:58

Good evening. My name is Harriet Steiner, and you're doing a great job pronouncing all of our names. I'm here because I think this project has so many problems and so many problems that those of us who live in Natomas like I do will inherit as this project goes through if it should be approved. I think the EIR ignores the fact that there are planning documents that set urban limit lines and general plans that set development guidelines. and none of them contemplate this project. So first, I would say that the EIR is inadequate because it fails to actually look at the impacts of this project on the rest of Natomas and the rest of the county that were never considered and asked to jump ahead to some, you know right now, and amend all of these plans without any actual global. I'll call it global regional, countywide. Look at this. And the worst offender is the urban services boundary. Now, maybe I feel fondly about that because I was a young attorney when I represented SACOG, and we put the all of those things started to go into effect, and they've served us well. And they served us well because they were boundaries, and things happened within the boundaries and outside the boundaries there was conservation, and there was agriculture, and there was keeping nature together with the development of Natomas. And now we are faced with four different projects, which have thousands of houses and hundreds of thousands of square feet of commercial and

industrial. Each one wants to go forward. Each one doesn't want to look at the other ones, and the county has never looked at what the impacts of all of those changes would be together. And I think that that's really important. And I think it's really important also for the EIR perspective, to have the county really look at what the impacts of the city on the city are, and to say, why is this project going to go forward in the county when all the impacts are in the city, when it has to connect to the city, when the only roads which are woefully inadequate to hold this project go through the city? I think this, as one of the other speakers says, is maybe an okay project but it's in the wrong place, and it's bringing to you lots of traffic generators and lots of other issues without any of the infrastructure necessary to do this. There's a reason why major shopping centers happen next to freeways. And this is not it so? Thank you.

Speaker 35: Carmen Lugo

03:16:58-03:19:40

Hi! I'm Carmen Lugo and I live in the Whittier ranch area. I say, leave Sacramento Green. I oppose the development of the Upper Westside. I do not want to see another Los Angeles area, one city butting up against another. The reason for this proposed development is pure greed on the side of the county and our cities collecting more revenue. Property taxes, permit fees, and for developers it is profits at the expense of residents living here. The increased revenue is a result of the passage of Prop 13. So, the authorities have figured out a backdoor to getting more money. What do we get for the increased revenue? Residents have to contend with increased traffic, air, pollution, crime, crowded living conditions, and, worst of all, the loss of our natural habitat. We cannot destroy the habitat and not have to deal with consequences. The environmental impact report does not include the impact of building on coyotes hunting grounds. Sacramentans are totally unaware of the tyranny that occurs when coyotes come into their neighborhoods. Coyotes have already been seen in Natomas Park, Swanson estates. Cats, small dogs, squirrels, possums, wild turkeys are starting to disappear. The counties, and the city's response to this situation is to keep your pets inside. Shall we keep our toddlers inside, too? Even one attack is too many. What about the free space open for the migratory birds that stop to rest? I love watching those birds land. We do not have a right to that land. It belongs to nature. This is not the Sacramento that we want to live in. Believe me, we don't want to see a concrete jungle, more people and traffic congestion. There is no compromise. Sacramento needs to stay green to protect our way of life. Thank you, miss, and to keep us unique as an area that has a lot of greenery. Do not allow greed to control your way of thinking. Thank you for your consideration. Thank you.

Speaker 36: Charles Waters

03:19:40-03:21:54

Thank you. Good evening. My name is Charles Waters. I'm a longtime Natomas resident, and my wife and I live immediately adjacent to the proposed project area. So, we know it well, we've been following it for five years now since it was introduced. I had concerns initially when I first heard about the project. Now, after reading the EIR, my concerns are magnified exponentially. My wonderful Natomas neighbors have so articulately outlined all of the things, and many more that I'm concerned about. But I'd like to just focus on one number in my comments. 25,460. I'll say it again. 25,460. Every impact that has been articulated tonight stems from that, the number of potential

residents that would be relatively approach, or the pardon me for stumbling over that. But 25,460 is mentioned in the draft environmental impact report as the number of potential residents that would be impacted by this project. So, 25,000 residents would be approximately the size of an LA city like South Pasadena. Do we want to bring South Pasadena to Natomas, El Cerrito in the Bay Area. Do we want to have a city like that size in the Natomas area? I don't think so I think my neighbors have articulately said that we don't want that as well. So, thank you very much. I oppose this project.

Speaker 37: Yadwinder Sandu

03:22:330-0:00:26 (Recording 2)

Yeah, good evening, everybody. and this is Yadwinder Sandhu. I am resident of Natomas Sacramento, for the last, many, many years. And for your kind information I'm also running a soccer group, and a community group composed of about 200 members for the last 15 years. And for your kind information we support, we all. But today I am here from that on behalf of all. And we support this project and this upper Natomas, this should be developed. And let me come to the point. In short, we still have home crisis in California, in millions and in Sacramento in thousands, so that we need more homes to accommodate the population who are not getting the homes right now. A lot of the people could not buy home because of the high prices and prices are high because of home crisis. And therefore, we need a lot of land for the new construction, and we support this Upper Westside plan so that some part of the population can be accommodated in that area. This project site is very convenient to the downtown airport and freeways as well as the environment report. I read that one that's okay with that one that's favorable. And secondly. we will also get a few more schools, colleges, and libraries for the bright future of our kids as per the plan. A lot of the playgrounds, parks, lakes, canals, and greenery, farm greenery, urban farm greenery will boost the environment. Eco-friendly transportation system is also part of this plan. Moreover, commercial zone includes. And these hospitals, clinics, and markets create a lot of employment opportunities to finally, government bodies will generate a lot of revenues through the taxes in the end. Once again, I want to mention that myself and my community, my soccer group, support this strongly, support this Upper West Side project. Thank you very much.

Speaker 38: Lori Tenhope

00:00:33-00:02:09

Good evening. Thank you for staying here so late. I'm Lori Tenhope, a homeowner in Natomas. I have several concerns with this project. Starting with flood risk. We all know we're in a flood basin dependent on a ring of levees that are still undergoing strengthening. We're one of the most at risk cities in the county for catastrophe in the country for catastrophic flooding. I love my neighborhood. But our flood risk is a deep concern to me and my family. A new development of this size puts added pressure on the levees and the entire flood protection, infrastructure by paving over farmland and open space runoff is accelerated. Climate change adds additional uncertainty with unprecedented weather patterns increasing the possibility of a flood protection, failure. A related concern is traffic congestion. How quickly can residents of this proposed project evacuate when also competing with Natomas and Sacramento? Finally, a point of pride for me, and I think many Sacramentans is the connection to our agricultural heritage. The proximity to farms fosters the local farm to fork movement. Let's not pave over this rich Ag land that surrounds the city and provides us with food,

aesthetic beauty, and rich habitat for wildlife. Please consider these comments and reject this project. It's not needed at this time. It'll put undue pressure on adjacent communities and other areas are better suited for development. Thank you.

Speaker 39: Ron Costa

00:02:21-00:04:32

I'm going to start out with the last first. I'm for the project. I think it's badly needed. We went out, and we had all these children. and then they had children, grandchildren. We have to have a place to house them. There is a housing shortage. Our children and grandchildren do not have the wherewithal to go out and start a development. So, it's up to us to do it. It's our responsibility to do it. You can't just cut them loose and then say you're on your own. I got mine. We need to build that housing, and this is a project that has been looked at carefully. They did a beautiful job on the EIR. The EIR addresses the concerns that have been raised here today about hawks and snakes and all that business. So just refer to that booklet, the EIR for the environmental concerns farming. Our family, 1917, was on El Centro and San Juan, right in that vicinity there and we still have the family farm on El Centro. I moved over there when I was in 1951. I'm now 87 years old and I'm in it for the money. You know farming doesn't get it. You'll go broke if you ever try to farm that thing and make a living off of it. So, sell the land and use the money to do some good. So just to wind it up. I am in it for the money.

Speaker 40: Oscar Ballagher

00:04:42-00:07:38

Hi! So, I'm Oscar Ballagher. I'm with 350 Sacramento. It's a climate change advocacy group. We've got a lot of comments. We'll submit written comments. But I'll just mention three of our concerns tonight in the interest of time. First Upper Westside is outside of the UPA, so it relies on land use policies 119 and 120. We believe that the project cannot tear from the General Plan EIR. In regard to those policies, because actually they were not developed, those policies until after the 2010 EIR. For the general plan was completed. and the certification of that EIR, and the findings that the county made in adopting them don't cure the lack of analysis regarded by CEQA. Section 21094. Second, the project's greenhouse gas mitigation is inappropriately considered on a project specific basis, contrary to the county, general plans to the County's 2011 promise to mitigate GHG. Emissions by adopting a climate Action Plan within one year. This was in 2011. The advantages of a CAP over default CEQA. Project-specific mitigation are the reason that that mitigation was credible. Back then the effect of now proceeding on a project specific basis is exactly as if the county had never proposed any mitigation at all. Back in 2011. We don't think that's appropriate, legally or morally. Finally, Third subject mitigate. I used a little of your time to start with, so go ahead. Thank you so much. I'll end up briefly. Third project mitigation for VMT. Assumes full build out. However, such a buildout will be indefinitely delayed because of the vast oversupply of already entitled projects within the UPA. This project is not needed, [it] is not going to bring any new housing to market that wouldn't otherwise be built economically with projects that are already approved and zoned for their development. The county has not substantiated how the modeled build out will occur. Thank you so much.

Speaker 41: Megan Elise

00:07:47-00:10:16

Board Chambers: Megan Elsie also with 350 Sacramento. A climate justice organization. That work, Hurricane Helene. Okay caused somewhere between 30 and 47 billion dollars of damages recently. Why am I talking about something that occurred across the country because it killed people was very expensive and was caused at least in part, by climate change. Climate change happens because of burning fossil fuels, fossil fuels are burned when you increase vehicle miles traveled. This project is outside of the urban services boundary which will increase vehicle miles traveled. Yes, of course we need affordable housing. My son became homeless this summer for a time and is very low income. He needs housing, but it's not this kind of housing that's far out that's away from public transportation. There's plenty of spots to build housing along light rail and established bus routes. Now, places that are accessible to services by public transportation and by bicycles, which this new project will not be. Also, it takes away from agricultural land. Agriculture done correctly, regenerative agriculture can actually sink carbon and mitigate the climate crisis. If you pave it over. There's no chance to do that same with all the hawks and all this beautiful stuff. It's beautiful, but also nature sequesters carbon. So, once you take it away, you lose that ability also. This is a flood zone. So, the chances of increased climate disasters are bigger in this area. The EIR is deficient because it does not consider all these aspects that I've just mentioned. Thank you.

Speaker 42: Harvind Dartsem

00:10:16-00:10:34

Hello, everyone! My name is Harvind Dartsem. I live in Westlake so many years. I just like this plan, and to be proved. I don't want to say too many things. It's too late. And now, thank you for everyone. Thank you.

Speaker 43: Arthur Gibson Howell

00:10:54-00:13:44

Hello! My name is Arthur Gibson Howell, resident specifically on Garden Highway. I was originally a little upset that I got here early and got to hear all about the cell tower, but actually I was quite excited to learn how much you guys negotiate over, or, you know, talk about each other over the little things like the visual aspects of it being 55 foot tall versus 85 foot tall. And what kind of tree it is? Because for this we're talking about 25,000 new residents, 10,000 new homes up to 5 million square feet of resident or built of commercial space. So that will definitely require a lot of discussion as to how that's going to be so as to do with the DEIR. One thing I can talk about is the cultural resources, the land that is planning on being developed in the Upper Westside project, was originally part of the watershed of the Sacramento River before the levee was built and was a known area of historical tribal activity and burial site. When the construct, when any construction on Garden Highway is planned, there is a requirement to investigate on a parcel-by-parcel basis for any historical archaeological resources, even though the land on Garden Highway has been elevated by dredging from the river and fill from elsewhere to build the aforementioned levee. Any development in the Upper Westside Specific Plan will have to excavate into the original watershed to the actual depth and below of these culturally significant areas potentially causing an irreparable harm. My question

is, is there a plan to investigate mitigation measures? CUL-2A and CUL-2B. On a plot-by-plot basis. or just go and say, Well, this is a 20-acre parcel. It looks fine. And then the other part of population and housing the new envision. The new project, envisions, population, density equivalent to the most crowded parts of New York City. Of approximately 18,000 per square mile with no real mass transit and a job geography that requires most people to drive. The DEIR states that they believe significant portions of residents will work in the project footprint and walk, bike, uber, or carpool. But that does not reflect the reality of life in California. And finally, what was mentioned about the Garden Highway needing widening. From what I can tell, the Army Corps is not going to allow it. So, if this project, if the DEIR says it has to be widened, and it cannot. Then that puts an end to this project right there, as far as I can see. But I would like to apply for a permit for a car and passenger ferry in case the project is approved, so I can ferry people from Natomas to downtown via the river. Thank you.

Speaker 44: Patrice Stafford

00:13:53-00:16:25

Board Chambers: Hello! My name is Patrice Stafford, and I'm a retired civil engineer from the county of Sacramento and Caltrans with the county. The last place I worked was the County Sewer Department, and 1997. I popped every manhole in South Natomas to find out where everything was. All the alarms were going off. So, I know the whole area related to where the problems are regarding our water table, and so the levee work will help, because when we plotted the info we plotted the flows along with the rivers, it was just one hole. The water is just underneath the ground right there at the ground. So. But I would say I am in favor of this project, because everything else around it has a specific plan. So, this area needs a specific plan, too. The part about how long it will take for this proposal to come to fruition that could be staged so that the transportation infrastructure could be built at the truck stop, and further along San Juan and El Centro. I just almost saw a big accident on my way here. And so, one of the things is maybe because once it gets built, then maybe these smaller neighborhoods. These people that are using it as a cut through won't do that anymore. So that's one way. But also I see that there's buffer for the environmental protection of Garden Highway and the properties that are already there. And so, I think that it's pretty smart development. And I think, I think it should be approved with a commitment from the County Transportation Department to put in their master plans the work that is required in this area. Thank you.

Speaker 45: Bill Schomberg

00:16:25-00:17:46

I'm Bill Schomberg, and I oppose it. I live on the Garden Highway. Friday, when I was coming home from Woodland, I-5 was backed up from Woodland to who knows that way which towards Sacramento they've added an off ramp at the airport exit that was full of people. I got in line. That line of traffic followed me. I went 45 miles an hour, which is the speed limit down Garden Highway to my residence, and I went to pull into my driveway, in which you have to pretty much stop to get down onto your property, there was 25 cars behind me, all very pissed off, beeping and very upset that I slowed down that flow. Last week I got off of I-80 on El Centro or West El Camino and El Centro was backed up clear past San Juan, clear into the residential district, and I have a video of that. I'm

not sure how to put that on here. Oops. Oh, we don't. We don't need video tonight. We believe you. It's terrible, anyway, I oppose it. Thank you. And I like open space.

Speaker 46: Johanna Williams

00:17:46-00:18:42

All right, Johanna Williams, good evening. I'm Johanna Williams, and I am a homeowner in the Willow Creek area of Sacramento, and I'm here to say that I strongly oppose this project. For all the reasons stated in the DEIR that appear to be unmitigable. The severe damage and the serious impacts that you can't mitigate. And I don't see that I'm really curious about the purpose of this project. It can't possibly be housing, because we've got millions and millions and millions of dollars that we don't even know where it's going for housing projects that are in. That's in the pipeline right now. So, I don't see where this fits in with that. So again, I, for all the reasons previously stated. I strongly oppose this project. Thank you.

Speaker 47: Terry Burns

00:18:47-00:20:56

Thank you. I'll associate myself with the remarks of Mayor Fargo. Those who spoke to the urban services boundaries, those who spoke to the substandard highway, and most particularly those who spoke to the flood issue. Natomas is called the Natomas Basin, because they used to sail ships through it. We are at risk of flooding. Unfortunately, the EIR has very conflicting statements about how it's going to deal with any emergency services, both access for emergency services, personnel, and egress in the situation where there's a flood or some other disaster, I think that's significant part of your concern as well. I'm a former member of the drowning accident rescue team. There's a talk about drainage canals. Drainage canals that are cement and are fixed. Get very slippery and very slick, and I can't tell you the number of children I have pulled out of drainage canals who were dead because they couldn't get out of that drainage canal, so I would like to see some mitigation done there. Likewise, I'm currently a member of the River City Waterways Alliance who does clean-up in the canals and the creeks and the rivers around here. We've taken out millions of pounds of trash. There is nothing in this EIR that talks about the maintenance of those canals, and who will be responsible for pulling out the trash and the other things that go in there and disposing of that trash. So, I would encourage you to and be sure that that is resolved. Again, this is not a destination project. It can be put in any of the places that are currently approved to build housing, I would encourage you to do so. Thanks for your time. Thank you, Miss Birds. all right.