

Affected Environment

3.1 Introduction

This chapter presents the baseline conditions for resources in the study area that would be potentially affected by the Proposed Action. The baseline for analysis of impacts in Chapter 4: Environmental Consequences, is the existing conditions in the study area as of 2001. Using the initial baseline conditions for the USFWS's environmental assessment (EA) prepared for the previous 1997 HCP as a starting point, a land use and habitat database was assembled to update the 1997 conditions. Standard categories of existing land uses and a GIS database were developed to provide a snapshot of existing conditions in the study area as of 2001. Additional information available since 1997 and field data gathered in 2001 were used to supplement and update the 1997 data. The database includes land use data from the Department of Water Resources, the City of Sacramento, and Sutter County. Development of the GIS database and its components is discussed in detail in Section 3.4, Biological Resources.

As described in Section 2.2, the study area for this EIR/EIS comprises the Natomas Basin and Area B. The Natomas Basin is in the northwestern part of Sacramento County and southern Sutter County, and is delineated by the Natomas Cross Canal on the north, Garden Highway on the south, the Natomas East Main Drainage Canal (Steelhead Creek) on the east, and the Sacramento River on the west (see Figure 1-1). Area B includes approximately 60,000 acres in southeastern Sutter County (see Figure 2-3).

The environmental analysis is focused on the following key resources of concern:

- **Geology and Soils.** Section 3.2 presents the general geology and soil characteristics of the study area, focusing on erosion potential.
- **Water.** Section 3.3 describes water supply, water quality, and flood control conditions in the study area.
- **Biological Resources.** Section 3.4 presents the habitat conditions in the Natomas Basin and a list of species considered in the analysis.
- **Cultural Resources.** Section 3.5 describes known archaeological and historical resource conditions in the study area.
- **Land Use.** Section 3.6 summarizes relevant local land use plans and policies. In addition, this section describes baseline land use conditions, including agricultural resources.
- **Socioeconomics.** Section 3.7 describes local and regional social and economic conditions (e.g., population, employment).
- **Traffic.** Section 3.8 presents traffic conditions in the study area.
- **Noise.** Section 3.9 describes ambient noise levels in the study area.

- **Air Quality.** Section 3.10 describes regional air quality conditions.
- **Public Health and Safety.** Section 3.11 presents the regulatory setting regarding the potential conflicts between waterfowl and air traffic from Sacramento International Airport.

Preliminary review of potential impacts of the Proposed Action and the other alternatives concluded that several categories of impacts would be less than significant. These categories and the reasons they would be less than significant are briefly described below, but additional analysis is not warranted. This determination is consistent with the CEQA criteria for establishing effect (CEQA Appendix G, Environmental Checklist Form).

- **Aesthetics.** Impacts from implementing the habitat conservation measures of the Proposed Action would not result in significant impacts primarily because the habitat reserves would not significantly alter the existing visual landscape or the existing visual character of the study area. The HCP conservation measures would not change the existing visual landscape, and the creation of habitat reserves would result in a visual condition that is similar to the existing agricultural land use. Development of habitat reserves is also anticipated to include agricultural operations and activities that are consistent with existing agricultural practices conducted under the No Action Alternative. Both the City and Sutter County determined that the visual and aesthetic impacts of the new urban development in the Natomas Basin would be less than significant with mitigation.
- **Mineral Resources.** Mineral resource values in the study area are low. In addition, development of the habitat reserves would not preclude the extraction of mineral resources.
- **Public Utilities and Services.** With the exception of water resources (discussed in Section 3.3), development of the habitat reserves would not affect public utilities and service systems such as sewer, solid waste, police, fire, and school services because the criteria for reserve acquisition, as specified in Section IV C.2.a of the HCP, specify setbacks from urban areas and other considerations that are designed to avoid impacts on significant public utilities. Creation of habitat reserves would not generate demand for schools and would not substantially affect rural police and fire services. Impacts associated with urban development were found to be less than significant, with mitigation, by the City and Sutter County.
- **Recreation.** The HCP conservation measures do not include residential development that would increase demands for recreation facilities. A slight beneficial impact is expected if public use of the habitat reserves is allowed. The City determined that recreation impacts associated with urban development would be less than significant, and Sutter County determined that there would be no impact.

The affected environment discussion in Chapter 3 summarizes information on the resources in the study area. This information is largely based on the following reports that address the resources of the Natomas Basin in relation to planned development activities:

- *Draft EIR for the City of Sacramento General Plan Update* (City of Sacramento, 1987)
- *Draft Supplement to the 1986 North Natomas Community Plan EIR* (City of Sacramento, 1993)

- *Draft EIR for the South Natomas Community Plan* (City of Sacramento, 1988c)
- *Draft EIR for the Sutter County General Plan Revision* (Sutter County, 1996c)
- *Draft EIR for the North Natomas Comprehensive Drainage Plan* (City of Sacramento, 1996b)

If other sources of information particular to a certain resource are used, then these sources are noted in the specific resource section.

3.2 Geology and Soils

This section describes the geology and soil types of the study area and potential geologic and soil hazards.

3.2.1 Area Geology

The study area is within the Great Valley geomorphic province, which is a geologic term that describes the Central Valley of California. The study area is typical of the gentle flatlands of the Sacramento Valley and is at a general elevation of 20 feet.

The Great Valley province is composed of thick, generally flat-lying sedimentary rock overlain by alluvial soils. Surface sediments within the study area are primarily comprised of the Victor Formation, recent floodplain deposits, and recent basin deposits. Formed of a variety of river-borne sediments during the Ice Age, the Victor Formation extends in a broad plain between the Sacramento River and Sierra Nevada. Subsequent weathering has formed a near-surface hardpan within the Victor Formation, enabling only moderate to low rainwater infiltration.

Floodplain deposits consist of unconsolidated silts, sands, and clays formed from the flooding of the American and Sacramento rivers prior to construction of drainage channels within the last 135 years. Deposits are distributed proximate to the current river channels and extend throughout the Natomas Basin. Basin deposits are beds of unconsolidated clay formed in sink areas of low permeability.

3.2.2 Area Soil Types

The study area is composed of predominantly clayey soils that are somewhat poorly to poorly drained. There is a seasonally high water table throughout the area, and the soil is protected from flooding by a system of levees. The topography is level to nearly level resulting in low runoff potential. The soils are deep to very deep with a cemented hardpan or duripan.

Lime, silica, and manganese concretions are common. Montmorillonitic clays cause slickensides and high shrink-swell potential. High clay content and hardpans cause many of the soils to have moderately slow to slow permeability. Siltstone underlies these soils formed from mixed alluvium. Common soil series are the Clear Lake and Capay series (USDA, 1993).

Floodplain soils are closest to the Sacramento River in the Natomas Basin and the Bear River in Area B. Floodplain soils can be sandy, silty, loamy, or clayey. Flooding over time washes much sediment downstream resulting in varied and constantly changing soils. Backswamps

create soils with high organic matter. Examples of floodplain soils are the Columbia, Cosumnes, and Scribner soil series (USDA, 1993).

On the east side of the Natomas Basin, the San Joaquin soil series exists on low terraces. The San Joaquin series has a fine sandy loam to silt loam surface over a clay pan. It is moderately deep and moderately well drained, but is slowly permeable (USDA, 1993).

3.2.3 Geologic and Soil Hazards

3.2.2.1 Faults and Seismicity

Active and potentially active faults generally are classified based on evidence of surface displacement within a period of time. Active faults generally have shown evidence of surface displacement within the last 11,000 years (within the Holocene epoch). Potentially active faults generally have shown evidence of surface displacement within 1.6 million years (within the Quaternary period). Faults that do not meet the criteria for being classified as active or potentially active are not necessarily permanently inactive. Additionally, a significant number of the small to moderately large earthquakes occur on unrecognized faults. There are no known active faults in Sutter County, the City of Sacramento, or Sacramento County, but earthquakes within the region can produce ground motion within the study area.

3.2.2.2 Liquefaction

Liquefaction occurs when granular sediment (such as sand) undergoes strong shaking and the behavior of the sediment becomes like a liquid. Liquefaction can create hazardous situations because buildings can sink or become structurally damaged as a result. Sandy areas paralleling the Sacramento River, occurring under conditions of low relative density and a high water table, have a high liquefaction potential. In the Sacramento Valley, certain areas where granular layers with higher relative densities exist have a moderate potential for liquefaction, including portions of Sutter County. The Natomas Basin is considered to have a moderate to high liquefaction potential.

3.2.2.3 Slope Stability and Landslides

Slope stability is dependent on several factors, including slope degree, rock/soil type, the presence of water and/or vegetation, and previous occurrences of landslides. The California Division of Mines and Geology has classified slope stability by zone on a scale that ranges from nil (no or very little hazard of slope stability) to high. Sutter County (with the exception of the Sutter Buttes) is rated in a nil zone. The potential for landslides in the City and County of Sacramento within the vicinity of the study area is minor due to the flat terrain. This does not preclude localized slope instability hazards, however.

3.2.2.4 Erosion

Erosion typically occurs under conditions with increased slope, increased precipitation, and decreased vegetation. Erosion can contribute to the degradation and loss of agricultural land and degradation of waterbody water quality. The U.S. Natural Resources Conservation Service groups potential erosion hazards for natural soil types in three generalized categories: slight, moderate, and high. The majority of Sutter County's natural soil types have a slight vulnerability to erosion. No highly erodible soils are present within the City.

The major soil associations in the Natomas area of Sacramento County are not prone to erosion (USDA, 1993).

3.2.2.5 Subsidence

Subsidence is the vertical, downward sinking of a large ground surface area, typically as a direct result of the withdrawal of groundwater, oil, or natural gas. Although subsidence is common in several areas of California, including the Sacramento Valley, it does not generally occur in Sutter or Sacramento counties.

3.2.2.6 Expansive Soils

Expansive soils may undergo significant changes in volume, either shrinking or swelling. The degree to which a soil will undergo changes in volume depends on the moisture and clay content of the soil. Soils containing clay have the potential to undergo expansion, and are grouped into three basic categories: low, moderate, and high potential for expansion. The majority of the study area within Sutter County has a high potential to be affected by expansive soils. Expansive soils are scattered through the City and County of Sacramento and vary substantially in their potential for expansion (USDA, 1993). Soils within most of the Natomas Basin are considered to be expansive soils.

3.3 Water Resources

This section describes flooding and drainage, water quality, and water supply conditions in the study area, and presents key features of the water delivery and drainage infrastructure. Alterations in drainage patterns, as they pertain to land use and habitats, are also discussed in Section 3.4.1. Alterations in drainage patterns, as they pertain to land use and habitats, are also discussed in Section 3.4.1.

3.3.1 Flooding and Drainage

The Natomas Basin is a low-lying, historic floodplain area located along the east side of the Sacramento River upstream of its confluence with the American River. Drainage from the northeast side of Sacramento historically collected in the low-lying Natomas Basin area, supporting permanent water bodies such as Fisherman's Lake, Fiddymont Lake, and Bush Lake. Winter rains caused regular flooding over a broad area, with Bannon Slough and Second Bannon Slough providing surface drainage to the Sacramento River. Flood risk and limitations of internal drainage have historically acted as limits to development in the Natomas Basin. Early flood control improvement by the Natomas Company allowed for reclamation of land for agriculture, but urban development was generally limited to the less flood-prone areas on the east side of the Basin. In 1994, the Sacramento Area Flood Control Agency (SAFCA) proposed a flood control project for the Natomas Basin that was subject to the jurisdiction of the ACOE. The ACOE's authorization for SAFCA's flood control project was approved with the condition that a habitat conservation plan be prepared for the Natomas Basin (see Section 1.2.1).

3.3.1.1 Flood Risk

Flood control within the Natomas Basin is based on the surrounding levees and the internal system of drainage canals operated by RD 1000. Historically, this system was adequate for

agricultural use. The urbanization of the basin has resulted in the need for an increased level of flood protection, and recent efforts have focused on strengthening the existing system of levees and canals. Regional projects, completed and ongoing, include improvements to flood control operations at Folsom Dam and strengthening local levees. These projects are expected to result in flood conditions in the Natomas Basin that exceed the criteria established by the Sacramento Area Flood Control Agency (i.e., at least 200-year flood protection). Efforts have included the implementation of the City's Comprehensive Drainage Plan, which has improved the level of flood protection provided to the North Natomas area by upgrading the capacity of the RD 1000 drainage system. A local flood control project under the direction of SAFCA was completed in 1998, granting North and South Natomas a 100-year level of flood protection. Consequently, the flood insurance rate maps have been revised, and the City can now authorize development without flood plain restrictions in this area. For Sutter County, local flood control improvements in the Industrial-Commercial Reserve have been limited to date, with existing development relying on the RD 1000 drainage system and onsite improvements (e.g., detention ponds).

Localized flooding is also an issue of concern in Area B, primarily along Bear River Drive and Pleasant Grove Road during local storm events. Portions of these areas are within the federal 100-year floodplain. Area B is generally protected from catastrophic flooding by the primary levee system along the Sacramento and Bear Rivers.

3.3.1.2 Drainage System

Canals and drains are located throughout the Natomas Basin, and serve the dual purpose of providing flood control and irrigation water. RD 1000 operates the primary drainage canals within the Natomas Basin and is the agency responsible for conveying and pumping nonurban storm runoff from the basin. Runoff from agricultural lands within the Natomas Basin flows into numerous local drainage ditches that ultimately drain into the primary RD 1000 canals. RD 1000 canals also receive runoff from the City's storm drainage system in the developed areas of the Natomas Basin. As described above, these interior drains are also an important component of the local flood control system. RD 1000's primary system of interior drains includes the following facilities:

- **East Drain.** The East Drain conveys drainage water from the northern and eastern Natomas Basin to its confluence with the Main Drainage Canal northwest of the I-80/I-5 interchange.
- **West Drain.** The West Drain conveys drainage water from the western Natomas Basin northwest of Sacramento International Airport to its confluence with the Main Drainage Canal. Fisherman's Lake, a natural slough, is a portion of the West Drainage Canal.
- **Main Drain.** The Main Drain conveys the combined flows of the East and West Drainage Canals from their confluence northwest of the I-80/I-5 interchange through South Natomas west of I-80. Drainage water from the Main Drainage Canal is pumped into the Sacramento River near the intersection of Garden Highway and Orchard Lane.
- **North Drain.** The North Drain is an interior canal that conveys drainage water from Sutter County northward, where it is pumped into the Cross Canal.

Development of North and South Natomas has followed comprehensive drainage plans that have resulted in local flood-control improvements and increased storm-drainage capacity in the area. These improvements are ongoing as development occurs. Comprehensive storm drainage plans for the South Sutter County Specific Plan are under preparation; to date, site-specific developments (e.g., along Pacific Avenue) have completed onsite stormwater detention facilities.

Area B contains both natural drainage features and drainage canals. The eastern portion of Area B contains seven named creeks that drain the low foothills region to the east. Auburn Ravine, Coon Creek, and Yankee Slough are the largest of these creeks. Most of this area drains into the East Side Canal, which channels drainage into the Cross Canal. Drainage in the western portion of Area B is managed by RD 1001, which operates a drainage system similar to the RD 1000 system. Flood flows and agricultural runoff are channeled into RD 1001's Main Canal, which is pumped into the Cross Canal.

3.3.2 Water Quality

The water quality requirements affecting the study area are primarily related to the established objectives for water quality in the Sacramento River, which receives agricultural and urban drainage from the study area. Water quality in the Sacramento River is regulated primarily by the Central Valley Regional Water Quality Control Board (RWQCB). The Central Valley RWQCB has established narrative and numeric standards for the Sacramento River in its Basin Plan (CVRWQCB, 1998). The Basin Plan designates beneficial uses for Sacramento River water that include, in the segment of the river adjacent to the study area, municipal and domestic supply, irrigation, recreation (including water-contact recreation), navigation, and fish and wildlife habitat. In accordance with the requirements of the federal Clean Water Act, the State Water Resources Control Board has determined that beneficial uses in the Sacramento River are impaired by high concentrations of diazinon (related to agricultural and urban runoff), mercury (related to mining in the upper watershed), and unknown toxicity (SWRCB, 1998). Specific beneficial uses and impairments to those uses have not been identified for the system of agricultural canals and drains internal to the Natomas Basin. Agricultural drainage water contributes salts, nutrients, pesticides, trace elements, sediments, and other by-products that could affect the water quality of the Sacramento River.

Urban stormwater runoff contains pesticides, oil, grease, heavy metals, polynuclear aromatic hydrocarbons, other organic chemicals, and nutrients. Stormwater discharges are generally controlled through National Pollutant Discharge Elimination System (NPDES) permits, which require the implementation of the best available pollution control technology prior to discharge of drainage water. The City (together with Sacramento County and other local agencies) has received a permit for stormwater discharge from the Central Valley RWQCB under the NPDES program. In addition to the control of municipal stormwater discharges, the Central Valley RWQCB also requires participation in the statewide NPDES permit for construction activities. Under this permit, the City requires adherence to its erosion control standards and practices during project construction activities. To date, urban development in the Sutter County portion of the Natomas Basin has addressed construction-phase stormwater quality on a case-by-case basis.

Groundwater in the Natomas Basin is generally of good quality. Water quality in the deeper zones (300 to 500 feet below ground surface) generally has lower total dissolved solids values than shallow zones.

3.3.3 Water Supply

Farmlands within the Natomas Basin are irrigated with surface water delivered by Natomas Mutual, and with private surface water diversions and groundwater. Irrigation water also includes return flows from rice fields, which is conveyed to downstream users through the RD 1000 drainage system. Natomas Mutual manages the consolidated riparian and appropriative water rights in the area, and serves approximately 238 landowners covering approximately 36,000 acres. Following the development of the federal Central Valley Project (CVP), Natomas Mutual entered into a contract with the Bureau of Reclamation to establish water delivery requirements in a river system now substantially affected by the CVP. This “settlement contract” quantifies base supply diversions of 98,200 acre-feet per year and provides up to 22,000 acre-feet of CVP water per year. In addition to this contract water, Natomas Mutual has an entitlement to divert Sacramento River water during the nonirrigation season for wetland and rice straw decomposition. Natomas Mutual is considered to be one of the most senior water rights holders in the Sacramento River Basin (e.g., senior to both the federal CVP and the State Water Project), with priority dates extending back to 1916. Natomas Mutual’s water deliveries could be reduced by up to 25 percent in critically dry years (critically dry years are defined as years when annual inflow to Shasta Lake is less than 3.2 million acre-feet). Natomas Mutual has, in recent years, been able to serve all of their water users fully during periods of drought-related water supply reductions.

Natomas Mutual operates five surface water diversions: the Prichard Lake, Elkhorn, and Riverside pumping plants on the Sacramento River, and the Northern Main and Bennett pumping plants on the Cross Canal. The average historical diversions from these five plants is approximately 80,000 acre-feet per year. Primary Natomas Mutual distribution facilities are as follows:

- **Northern System.** The Northern Main Pumping Plant diverts water from the Cross Canal into the Northern Main Canal, which conveys water throughout the northeastern portion of the Natomas Basin, south to approximately Elverta Road.
- **Bennett System.** The Bennett Pumping Plant diverts water from the Cross Canal into the Bennett Main Canal, which conveys water in the northwestern portion of the Natomas Basin, entirely in Sutter County.
- **Central, or Pritchard Lake, System.** The Pritchard Lake Pumping Plant diverts water from the Sacramento River into the Central Main Canal and Pullman Canal. The Central Main Canal conveys water across the central portion of the Natomas Basin, ultimately to agricultural land in North Natomas (now under development). The Pullman Canal serves the Pullman subsystem in northwestern Sacramento County and southwestern Sutter County.
- **Elkhorn System.** The Elkhorn Pumping Plant diverts water from the Sacramento River into the Elkhorn Main Canal, which parallels Garden Highway in Northeastern Sacramento County. The Elkhorn System provides water to the area between the Sacramento River and Sacramento International Airport, and provides a direct water supply to the airport.

- **Riverside System.** The Riverside Pumping Plant diverts water into the Riverside Canal and to a system of laterals that provide water supply to the area along Garden Highway, generally from Powerline Road south to the city limit. Water in the Riverside System is also supplied by drainage water at RD 1000's Pumping Plant No. 3.

Recent improvements in the drainwater recirculation system have contributed to a substantial improvement in water management by providing a more flexible matching of supply and demand throughout Natomas Mutual's service area. The recirculation system includes 30 pumping stations at various locations throughout the basin that recapture water for reuse either directly into fields or back into the main canals. Drainwater is now a major source of irrigation water supply in the Natomas Basin, with average drainwater use of approximately 36,000 acre-feet per year.

The groundwater basin underlying the Natomas Basin is part of a larger, highly productive groundwater basin that underlies the Central Valley. In the Natomas Basin, the aquifer consists of higher-permeability sands with some gravels and discontinuous intervals of lower-permeability silt and clay. Locally, these discontinuous units separate the aquifer into multiple zones where groundwater quality and conditions can vary. Groundwater is found at depths that range from less than 10 feet to up to 50 feet below grade. In general, in the Natomas Basin, groundwater flows from the Sacramento River to the east, toward the cone of depression located in the McClellan/North Highlands area. Natomas Mutual owns two small groundwater wells, producing less than 200 acre-feet per year to supplement surface water supplies. Approximately 50 private irrigation wells are located throughout the northern portion of the Natomas Basin. These wells are usually shallow, lower-production wells supplying individual residences with potable water, but also include larger irrigation wells. It is estimated that over 4,000 acres in the Natomas Basin are irrigated with groundwater, using an average of 20,000 acre-feet per year of water. The long-term, reliable yield of the aquifer has not been determined.

The City of Sacramento supplies water to developed lands in North and South Natomas. The City operates an interconnected municipal water system primarily with surface water diverted from the American and Sacramento rivers. Surface water is diverted by the City pursuant to riparian and pre-1914 rights, and pursuant to five post-1914 appropriative water rights. In 1957, the City and the Bureau of Reclamation entered into a settlement contract (see above discussion regarding Natomas Mutual), which quantified the City's water delivery requirements to be a maximum of 326,800 acre-feet per year by 2030. In addition to surface water supplies, the City operates 29 groundwater wells. Six of the City's active groundwater wells are located in the Natomas Basin, all in the Northgate and Gardenland neighborhoods of South Natomas. Sacramento County currently operates five groundwater wells in the panhandle annexation area of North Natomas.

The full extent of water use within the city limits (including the City's permit area) was assessed as part of the recently completed Sacramento Water Forum, which considered the City's water supply needs in buildout conditions. The City's future water demands were estimated by the Water Forum to be 130,600 acre-feet per year (City-County Office of Metropolitan Water Planning, 1999). Following the completion of the Water Forum plan, the City approved environmental documents for reconstruction of its water supply intakes on the Sacramento and American Rivers (City of Sacramento, 2000a) and expansion of its Sacramento River and Fairbairn Water Treatment Plants and associated distribution

facilities (City of Sacramento, 2000b). The city also has an Urban Water Management Plan (City of Sacramento, 2001), adopted in accordance with the State's Urban Water Management Planning Act. The Urban Water Management Plan describes water demand and supply within the City, evaluates methods related to the conservation of water, presents an urban water shortage contingency plan, and provides information on the availability of reclaimed water and its potential for use as a water source in the City. With the expanded facilities, water supply would be reliably provided to all areas of the City under buildout conditions (Brent, pers. comm.). Growth of the City's water supply system is intended primarily to meet the City's needs within its service area (including North and South Natomas), and also to facilitate regional programs to conjunctively manage surface and groundwater supplies as part of the ongoing Water Forum implementation effort.

There is currently no municipal water service provider to developed lands in Sutter County's permit area (e.g., along Pacific Avenue). As described above for Natomas Mutual, these areas are currently served by individual, private groundwater wells. The recently approved South Sutter County Specific Plan (Sutter County, 2001) establishes policy direction for the development of a community water system based on groundwater and the establishment of a County Service Area to fund, construct, and maintain the necessary infrastructure. The groundwater system is planned to consist of 13 supply wells and three 2.5-million-gallon reservoirs, all to be constructed within Sutter County's permit area (Musallam, pers. comm.). Prior to the development of the community water system, individual new industrial/commercial development projects would likely develop private, onsite wells and storage, with the requirement to connect to the community water system when completed.

3.4 Biological Resources

This section describes the biological resources in the Natomas Basin, including the habitat-based land use GIS database developed to identify and assess project-specific impacts to biological resources in the study area. Additional land use discussion that focuses on the local land use planning goals and policies in the study area are presented in Section 3.6, Land Use. This section focuses on current land use and habitat acreage in the City of Sacramento, unincorporated Sacramento County, and Sutter County, which is a key component of the impacts analysis in Section 4.4. The methodology for quantifying land use and habitat acreage is summarized in this section. This section also describes the special-status species considered in the analysis.

3.4.1 Land Use and Habitats in the Natomas Basin

The Natomas Basin is a low-lying area in the Sacramento Valley, California, located east of the Sacramento River and north of its confluence with the American River. The Natomas Basin 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 Drainage Canal) and on the south by Garden Highway. For this analysis, the Natomas Basin is defined as the area within the interior of the surrounding levees. Prior to modern reclamation efforts, drainage off the western slopes of the Sierra Nevada produced regular flooding and created areas of highly fertile, alluvial soils in the Sacramento Valley, including the Natomas Basin and other areas (e.g., Sutter Basin, Butte Basin, Colusa Basin). Since 1914,

land reclamation and reclamation facilities, canals, levees, and pumping stations have allowed most of the Natomas Basin to be converted to agricultural production.

Today, the predominant crops produced in the Natomas Basin are rice, corn, sugar beets, grain, tomatoes, and pasture lands (Figure 3-1). The overall topography remains – the basin is still a shallow bowl – but the irregular small-scale topographic features of the original landscape have largely been eliminated by agriculture. The drainage pattern of the basin has been altered so that runoff is pumped into the RD 1000 system of drains and into the Sacramento River at several places. Even with pumping, portions of the area are subject to shallow flooding from rain falling in the basin that cannot be conveyed quickly enough to external drainage systems.

Natural vegetation is interspersed throughout the agricultural areas of Natomas Basin. Natural vegetation is found primarily along RD 1000/Natomas Mutual canals and drains, pastures, and uncultivated fields (Figure 3-2). Borders of canals and drains often have narrow strips of emergent vegetation (cattail and bulrush) or wooded riparian areas. The presence of the water-conveyance systems, operated by RD 1000 and Natomas Mutual, among the mosaic of agricultural fields and riparian areas provides important nesting, feeding, and migration-corridor habitat for a variety of wildlife species inhabiting the basin.

To obtain an understanding of the existing land uses and habitat types in the study area, and to assist in the analysis of expected habitat changes (see Chapter 4), standard categories of existing land uses were developed. Eighteen land use/habitat categories were identified and are described in Table 3-1. This land use classification system was incorporated into a GIS database. Agricultural use categories and acreages reflect 1997 conditions because the agricultural use can change annually, depending on decisions made by individual land owners.

The year 1997 is the initial year in which land use characteristics are considered because the previous take permits were approved in 1997. Additional information available since 1997 and field data gathered in 2001 were used to supplement and update the 1997 data. The database includes land use data from the Department of Water Resources, the City of Sacramento, and Sutter County. Development of the GIS database and its components is summarized below.

To develop the GIS database, digital aerial photos were obtained from the U.S. Geological Survey and assembled into a mosaic containing the entire Natomas Basin. The boundary of the basin was set at the toe of the surrounding levees. Land use data from the Department of Water Resources (DWR) was added to the GIS database, and the DWR categories were translated to match the 18 land use categories developed for the project (Table 3-1). The resulting land use map was modified based on field data collected by May & Associates, resulting in a greater level of detail (a one-acre minimum “polygon”) and a more accurate map. Municipal boundaries were then added to the GIS database.

An additional component of the GIS database is the system of canals and drains owned and maintained by RD 1000 and Natomas Mutual. Existing digital information on the canals and drains was obtained from RD 1000 and Natomas Mutual and added to the database as linear features. Based on field data and information from Natomas Mutual, the canals and drains were divided into four categories: Class I (the Canal land use category including the

primary drainage system), Class II (large – wetted area greater than 10 feet wide), Class III (medium – wetted area between 5 and 10 feet wide), and Class IV (small – wetted area less than 5 feet wide).

Prior to urban and agricultural development, much of the Natomas Basin consisted of seasonal and permanent marshes as the basin would flood seasonally. Currently, native marsh habitats are virtually absent from the Natomas Basin. Remaining areas of native marsh habitat occur as small and isolated patches scattered throughout the basin (see Figure 3-2). The habitat classification of ponds and seasonally wet areas was used to represent wetlands. Formal wetland delineations were not conducted as part of this environmental analysis. The ponds and seasonally wet areas habitat classification encompasses a range of wetland habitats. Some of the areas with this habitat designation could be jurisdictional wetlands.

Vernal pools are another wetland type that could occur in the Natomas Basin. May & Associates (2001) reports one small cluster of vernal pools northeast of the intersection of I-5 and Del Paso Road; no other vernal pools are confirmed in the Natomas Basin. It is likely that vernal pools existed historically in the Natomas Basin, especially in the upland areas along the eastern edge of the basin, but most upland areas in the basin have been converted to agricultural production (nonrice crops). Because vernal pools in the Sacramento area associated with grassland areas, vernal pools could occur within the grassland land use class that occurs primarily along the eastern edge of the Natomas Basin.

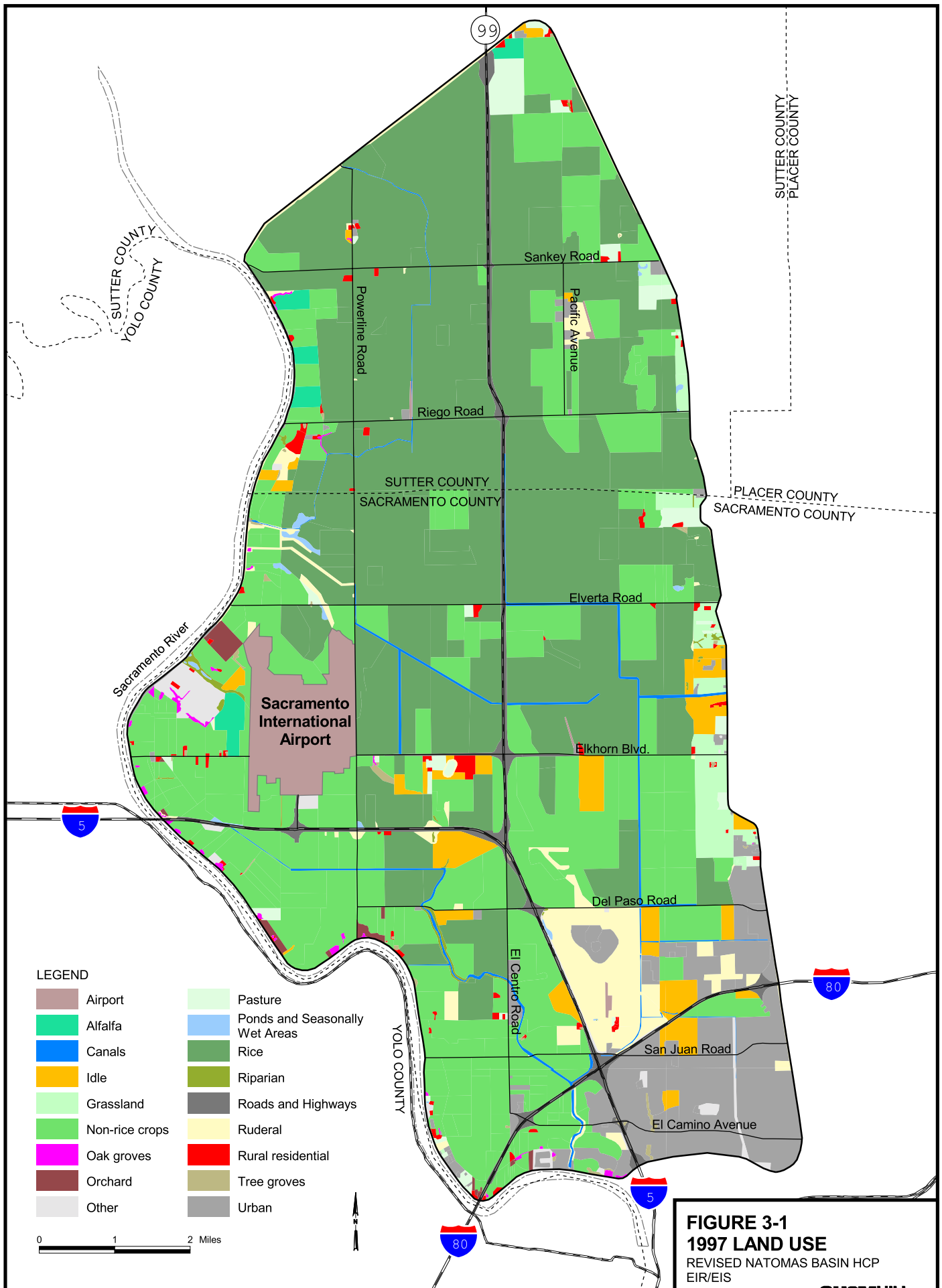
3.4.1.1 City of Sacramento

Table 3-2 lists the land use and habitat types in the City's permit area, including the panhandle annexation area. Urban land, as it existed prior to the approval of the 1997 HCP, was primarily located in South Natomas and in several areas north of I-80 including Arco Arena. Nonurban land uses in the incorporated City include nonrice crops north of Del Paso Road and west of I-5 and ruderal lands surrounding Arco Arena. Land uses within the panhandle annexation area are primarily grassland. The distribution of RD 1000 and Natomas Mutual canals and drains within the City's permit area is presented in Table 3-3.

Natural marsh habitats (ponds and seasonally wet areas) are limited to approximately 7 acres located in two small locations in the Arco Arena area east of I-5 (see Figure 3-2).

Approximately 987 acres of rice lands occur in several locations in North Natomas, but are not the dominant land use. These rice lands, including several miles of smaller canals and drains, could be used by species associated with aquatic and marsh habitats. In addition, the City's permit area includes several of the larger RD 1000 drains in the Natomas Basin, including the entire Main Drain and substantial portions of the East Drain and West Drain (including Fisherman's Lake). These Class I canals could also be used by species associated with aquatic and marsh habitats.

Upland habitat occurs throughout the City's permit area, including 413 acres of grasslands in the panhandle annexation area. Upland habitat values in the City permit area are also provided by other land use types, primarily including the nonrice crop lands (e.g., row and field crops) that are prevalent throughout the City's permit area (approximately 4,905 acres), and idle farmlands and ruderal areas that generally occur adjacent to developed areas (see Figure 3-1).



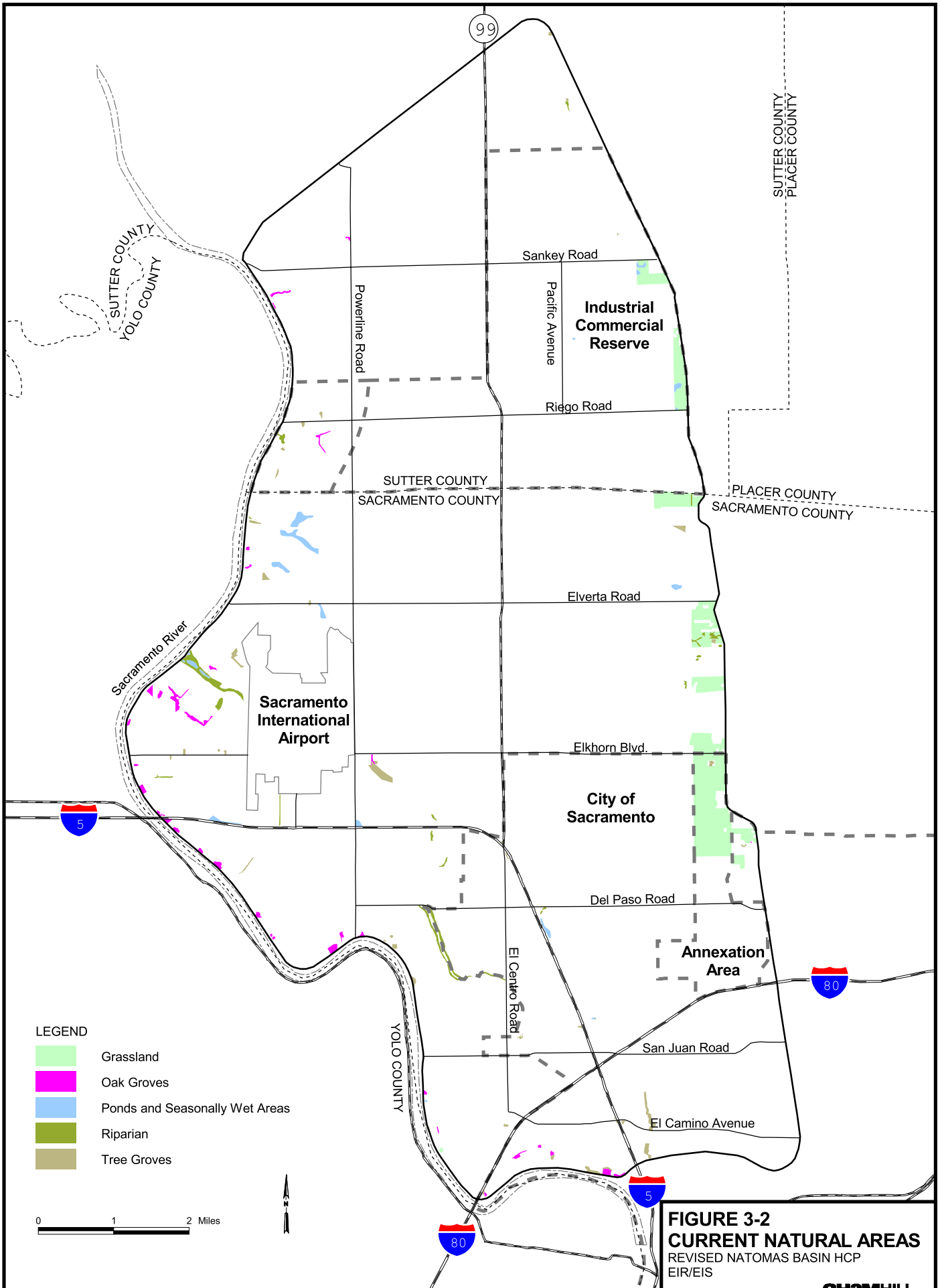


TABLE 3-1
Description of Land Use/Habitat Categories

Category	Description
Airport	Lands within the Sacramento International Airport primary fenceline, including all land use types (e.g., facilities, runways, and open lands, and farmlands adjacent to runways) within boundary. Does not include airport buffer lands (e.g., south of I-5). Also includes several small rural airstrips.
Alfalfa	Based on a subset of the DWR “pasture” land use category that includes alfalfa production. Includes known alfalfa fields along Garden Highway in Sutter County.
Canals	The largest of the canals and drains (including adjacent maintenance roads) in the Natomas Basin, primarily those already digitized for the DWR land use maps. Includes the East Drain, West Drain, Main Drain, North Drain, and the Central Main Canal. Does not include smaller canals and drains, which are recorded in the project database as linear features.
Grassland	Based on DWR “native vegetation” land use category with additional information provided by May & Associates field data and aerial photo interpretation. Includes known uncultivated grasslands, primarily along the eastern border of the Natomas Basin.
Highways	Includes Interstates 5 and 80, S.R. 99/70, and interchanges, including all areas within medians.
Idle	Based on DWR “idle” land use category—agricultural lands temporarily out of production.
Nonrice Crops	Based on the DWR land use categories of “grain and hay crops,” “field crops,” and “tilled lands.” In the Natomas Basin, this category includes primarily wheat, corn, safflower, and tomatoes.
Oak Groves	Includes several isolated pockets of mature oak trees east of Garden Highway as well as many numerous small groves.
Orchard	Based on the DWR land use categories of “deciduous fruits/nuts” and “citrus and subtropical.” In the Natomas Basin, this includes primarily pear, peach, and walnut orchards adjacent to Garden Highway.
Other	Miscellaneous land uses not captured by other land use categories. Includes Teal Bend Golf Course, the wastewater plant at Sacramento International Airport, and several utility substations.
Pasture	Based on DWR “pasture” land use category, including primarily irrigated pasture in the Natomas Basin.
Ponds and Seasonally Wet Areas	Wetland/marsh areas including Prichard’s Lake and several isolated locations throughout the Natomas Basin. Based on DWR’s “water surface” land use category and some “riparian vegetation” categories, with additional information provided by May & Associates data and aerial photo interpretation.
Rice	Based on DWR’s “rice” land use category.
Riparian	Based on DWR’s primary “riparian” category, with additional information provided by May & Associates data. Includes cottonwood/willow areas along primary canals and drains, including the Fisherman’s Lake area.
Ruderal	Includes former agricultural lands that are no longer in production, primarily due to proximity to urbanized areas (e.g., surrounding Arco Arena). Includes DWR’s “barren” and “vacant” land use categories. Ruderal lands typically consist of nonnative grasses, and most are occasionally tilled for fire control.
Rural Residential	Includes farmhouses and farm equipment yards. Includes DWR’s “semi-agricultural” land use category, with additional information provided by aerial photo interpretation.
Tree Groves	Includes nonriparian stands of trees other than mature oaks. Based on DWR’s “native vegetation” land use category, with additional information by May & Associates data and aerial photo interpretation.
Urban	Urbanized areas. Primarily in the City of Sacramento, but also including unincorporated areas along El Centro Road in Sacramento County and Pacific Avenue in Sutter County.

TABLE 3-2
Land Uses/Habitat Categories in the City of Sacramento and Annexation Area (acres)

Land Use Class	City of Sacramento Nonexempt	City of Sacramento Exempt	Annexation Area Nonexempt	Annexation Area Exempt	Total
Airport	18	0	0	0	18
Alfalfa	0	0	0	0	0
Canals (Class I)	0	123	0	7	129
Grasslands	14	28	413	0	454
Highways	0	437	0	13	450
Idle	675	115	0	49	839
Nonrice Crops	4,614	92	50	149	4,905
Oak groves	6	9	0	0	15
Orchard	13	0	0	0	13
Other	31	117	0	0	148
Pasture	4	12	20	0	35
Ponds and Seasonally Wet Areas	7	0	0	0	7
Rice	820	16	149	1	987
Riparian	24	0	0	0	24
Ruderal	1,135	188	2	104	1,429
Rural Residential	42	3	4	0	49
Tree Groves	8	26	3	0	36
Urban	0	2,820	0	478	3,298
Total	7,410	3,986	640	801	12,836

Source: Habitat and Land Use Assessment Database (CH2M HILL, 2002).

TABLE 3-3
Canals in the City of Sacramento and Annexation Area (miles)

Canal Type	City of Sacramento Nonexempt	City of Sacramento Exempt	Annexation Area Nonexempt	Annexation Area Exempt	Total
Class I	0	12.9	0.2	0.8	12.9
Class II	3.6	0.4	0.0	0.0	4.0
Class III	12.1	3.0	0.0	0.0	15.1
Class IV	2.8	1.5	0.8	0.0	5.1
Total	18.5	17.8	1.0	0.8	37.1

Source: Habitat and Land Use Assessment Database (CH2M HILL, 2002).

Riparian habitat in the City is limited to the eastern perimeter of Fisherman's Lake (about 23 acres) and a small area near the northbound offramp from I-5 to Del Paso Road (about 1 acre). Approximately 15 acres of oak groves are located in the City's permit area, primarily in South Natomas. Six of these acres occur in three isolated groves in the Willow Creek area, which is included in the City's 8,050 acres of authorized development. A small vernal pool area is known to occur northeast of the I-5/Del Paso Road interchange (May & Associates, 2001). Other vernal pools are not known to occur within the City portion of the Natomas Basin, but the grassland area in the northern portion of the panhandle annexation area could support vernal pools.

3.4.1.2 Sacramento County

Land uses in unincorporated Sacramento County are listed in Table 3-4. Primary land use types within this area include rice fields (primarily to the north of the city limits) and nonrice cropland (primarily to the west of the city limits). Sacramento International Airport is also in this area. Agricultural lands are generally smaller and more diverse, with inclusions of native habitat, along the Sacramento River levee and just west of Steelhead Creek. The distribution of canals and drains within unincorporated Sacramento County is presented in Table 3-5.

Natural marsh habitat occurs on approximately 79 acres, including 4 acres within Metro Air Park (see Figure 3-2). Key natural marsh areas include Pritchard Lake north of Sacramento International Airport and the area adjacent to Natomas Mutual's Elkhorn Pumping Plant. Other natural marsh areas are scattered in approximately five small areas throughout unincorporated Sacramento County. Rice lands are prominent throughout unincorporated Sacramento County (totaling approximately 9,968 acres), including 1,541 acres shown in Metro Air Park in the predevelopment (i.e., 1997) condition. Rice lands, including several miles of smaller canals and drains, could be used by species associated with aquatic and marsh habitats. Unincorporated Sacramento County also includes substantial portions of RD 1000's East and West Drains as well as Natomas Mutual's Central Main Canal. These Class I canals could also be used by species associated with aquatic and marsh habitats.

Upland habitat in unincorporated Sacramento County is primarily located west of the City's permit area, and primarily consists of nonrice field and row crops (8,591 acres as shown in Table 3-4). Other upland habitat types include scattered pasture, idle, and ruderal lands, and also include 293 acres of grassland habitat adjacent to Steelhead Creek.

Riparian habitat in unincorporated Sacramento County occurs in 12 areas throughout the Natomas Basin, totaling 93 acres. Notable riparian habitat areas include the vicinity of Natomas Mutual's Elkhorn Pumping Plant, the west side of Fisherman's Lake, and a cluster of small sites south of Elverta Road near Steelhead Creek. Unincorporated Sacramento County contains substantial oak grove areas, primarily in the Swainson's Hawk Zone near the Sacramento River, but only two acres are located in a planned development area (Metro Air Park). Vernal pools are located on the Conservancy's Betts-Kismat-Silva reserve in the northeastern portion of unincorporated Sacramento County's portion of the Natomas Basin. Other vernal pools are not known to occur, but could occur the grassland areas adjacent to Steelhead Creek that are similar in habitat to the Betts-Kismat-Silva reserve.

TABLE 3-4
Land Uses in Unincorporated Sacramento County (acres)

Land Use Class	Metro Air Park	Other Sacramento County	Total
Airport	0	1,512	1,512
Alfalfa	0	137	137
Canals (Class I)	0	308	308
Grassland	0	293	293
Highways	0	414	414
Idle	50	480	530
Nonrice Crops	325	8,591	8,916
Oak groves	2	70	72
Orchard	0	169	169
Other	0	305	305
Pasture	22	261	283
Ponds and Seasonally Wet Areas	4	75	79
Rice	1,541	8,427	9,968
Riparian	0	93	93
Ruderal	6	261	267
Rural Residential	10	170	180
Tree Groves	23	39	62
Urban	0	229	229
Total	1,983	21,836	23,819

Source: Habitat and Land Use Assessment Database (CH2M HILL, 2002).

TABLE 3-5
Canals in Unincorporated Sacramento County (miles)

Canal Type	Metro Air Park	Unincorporated Sacramento County	Total
Class I	0	15.0	15.0
Class II	4.0	18.0	22.0
Class III	3.5	50.5	54.0
Class IV	4.1	31.4	35.5
Total	11.6	114.9	126.5

Source: Habitat and Land Use Assessment Database (CH2M HILL, 2002).

3.4.1.3 Sutter County

Land uses in the Sutter County portion of the Natomas Basin are primarily rice lands, with nonrice croplands and isolated areas of grassland and pasture located along the Sacramento River east levee and Steelhead Creek. Land uses in Sutter County are listed in Table 3-6. Development is limited primarily to the agricultural-industrial businesses along Pacific Avenue, and also includes scattered rural residential areas including Rio Ramaza. Class I canals in Sutter County primarily consists of RD 1000's North Drain, and also include a small portion of the East Drain (Table 3-7). Several miles of smaller canals and drains are located throughout Sutter County lands in the Natomas Basin, primarily in the central portion where rice is the predominant land use type.

TABLE 3-6
Land Uses in Sutter County

Land Use Class	Sutter County ICR – Nonexempt	Sutter County ICR – Exempt	ICR Buffer	Other Sutter County	Total
Airport	21	0	0	0	21
Alfalfa	0	0	64	170	234
Canals (Class I)	0	39	5	22	66
Grasslands	134	5	0	0	138
Highways	0	428	0	143	571
Idle	8	0	54	32	94
Nonrice Crops	1,529	53	247	1,037	2,866
Oak Groves	0	0	4	7	11
Orchard	0	0	0	0	0
Other	0	8	7	0	15
Pasture	101	2	0	252	355
Ponds and Seasonally Wet Areas	10	0	0	0	10
Rice	5,577	228	514	5,418	11,737
Riparian	0	0	5	2	6
Ruderal	88	0	51	135	274
Rural Residential	0	67	40	40	148
Tree Groves	0	0	5	2	8
Urban	0	276	18	33	327
Total	7,467	1,108	1,015	7,294	16,881

ICR Industrial-Commercial Reserve

Source: Habitat and Land Use Assessment Database (CH2M HILL, 2002).

Natural marsh habitat occurs on approximately five small areas totaling 10 acres, mostly along the far eastern boundary of the Sutter County permit area (see Figure 3-2). Rice lands are prominent throughout Sutter County in the Natomas Basin, totaling 11,737 acres. Rice lands, including several miles of smaller canals and drains, could be used by species associated with aquatic and marsh habitats. Class I canals in Sutter County (primarily RD

1000's North Drain) could also be used by species associated with aquatic and marsh habitats.

TABLE 3-7
Canals in Sutter County (miles)

Canal Type	Sutter County ICR - Nonexempt	Sutter County ICR - Exempt	Sutter County ICR Buffer	Other Sutter County	Total
Class I	0	2.3	0.9	3.9	7.1
Class II	13.9	0.2	0.0	10.4	24.5
Class III	8.5	0.5	1.5	18.0	28.5
Class IV	9.3	7.6	0.7	4.7	22.3
Total	33.9	8.3	3.1	37.0	82.3

ICR Industrial-Commercial Reserve

Source: Habitat and Land Use Assessment Database (CH2M HILL, 2002).

Upland habitat in Sutter County is primarily located along the eastern and western perimeter of the Natomas Basin (2,866 acres total). Other upland habitat types include scattered pasture, idle, and ruderal lands, and also include 138 acres of grassland habitat adjacent to Steelhead Creek.

Riparian habitat is generally absent from Sutter County, limited to two small areas (both outside of Sutter County's permit area) totaling approximately 6 acres. Oak groves occur on 11 acres, all outside of the permit area. Vernal pools are not known to occur in the Sutter County portion of the Natomas Basin, but the grassland areas adjacent to Steelhead Creek (both within and outside of Sutter County's permit area) could support vernal pools.

3.4.2 Special-Status Species

Special-status species include: (1) those listed or proposed for listing by state or federal agencies as Rare, Threatened, or Endangered; (2) federal Species of Concern or state Species of Special Concern; or (3) species listed by the California Native Plant Society (CNPS) with a designation of 1B (indicating species that are rare or endangered in California and elsewhere) or Category 2 (indicating species that are rare or endangered in California but more common elsewhere).

Early in the HCP process, the USFWS provided a list of special-status species with the potential to occur in the Natomas Basin (Appendix B). A total of 101 special-status species were identified, consisting of 23 plant, 11 invertebrate, 11 fish, 4 amphibian, 6 reptile, 34 bird, and 12 mammal species. Table 3-8 presents a list of these special-status species identified as potentially occurring in the Natomas Basin. This table includes the habitat types that could support these species as well as the potential for occurrence in the basin. The list of species includes those listed as threatened or endangered that have special requirements under the state and federal ESAs and other non-listed special-status species that could become listed in the future. Any special-status species whose suitable habitat(s) are present within the Natomas Basin area were evaluated for potential impacts from construction and operation.

Of the 101 special-status species identified, 22 species (7 plant, 4 invertebrate, 2 amphibian, 2 reptile, and 7 bird) were chosen for coverage by the HCP (see Table I-1 of the HCP). Most of the remaining 79 species are not known to inhabit or use the Natomas Basin. Eighteen special-status species (3 plant and 15 bird) that are not proposed for coverage under the HCP, however, have some potential to occur in the Natomas Basin and are therefore considered in detail in this EIR/EIS. The species for which the applicants are seeking coverage are noted in the “Habitat and Range” column of Table 3-8.

TABLE 3-8

List of Special-Status Species Identified by USFWS as Potentially Occurring in the Natomas Basin

Species	Status	Habitat and Range
Mammals		
Greater western mastiff-bat <i>Eumops perotis californicus</i>	Fed: SC CA: SSC	Roosts in crevices in cliffs (Bat Conservation International, 2001). Because roosting habitat does not occur in the Natomas Basin, this species is not expected to occur.
Small-footed myotis <i>Myotis ciliolabrum</i>	Fed: SC	Suspected to roost in cliffs and rock crevices, including rock piles on the ground (Bat Conservation International, 2001). Suitable habitat could be present in the Natomas Basin, but the species is not known to occur in the project area.
Long-eared myotis <i>Myotis evotis</i>	Fed: SC	Associated with coniferous forests at higher elevations (Bat Conservation International, 2001). Because suitable habitat does not occur in the Natomas Basin, this species is not expected to occur.
Fringed myotis <i>Myotis thysanodes</i>	Fed: SC	Uses a variety of habitats. Suitable habitat may be present in the Natomas Basin, but the species is not known to occur in the project area.
Long-legged myotis <i>Myotis volans</i>	Fed: SC	Occurs primarily in coniferous forests at higher elevations (Bat Conservation International, 2001). Because suitable habitat does not occur in the Natomas Basin, the species is not expected to occur.
Yuma myotis <i>Myotis yumanensis</i>	Fed: SC	Roosts primarily in buildings and bridges (Bat Conservation International, 2001). Although known primarily from forested areas, the Yuma myotis may also occur in riparian areas along waterways (Bat Conservation International, 2001). Although suitable habitat could occur, it has not been reported in the Natomas Basin.
Marysville Heerman's kangaroo rat <i>Dipodomys californicus eximus</i>	Fed: SC CA: SSC	Known from two records in the Sutter Buttes. Not expected in the Natomas Basin.
San Francisco dusky-footed woodrat <i>Neotoma fuscipes annectens</i>	Fed: SC CA: SSC	Generally absent from cultivated land and open grassland in the Central Valley (Zeiner et al., 1990a). Unlikely to occur in the project area.
Riparian (San Joaquin Valley) woodrat <i>Neotoma fuscipes riparia</i>	Fed: Endangered CA: SSC	Known only from one population in San Joaquin County (65 FR 8881-8890). Unlikely to occur in project area.
San Joaquin pocket mouse <i>Perognathus inornatus inornatus</i>	Fed: SC	Known to occur throughout the Central Valley, preferring loose soil for burrowing (Harvey and Ahlborn, 1982). Not known to occur in the Natomas Basin.

TABLE 3-8

List of Special-Status Species Identified by USFWS as Potentially Occurring in the Natomas Basin

Species	Status	Habitat and Range
Birds		
Cooper's hawk <i>Accipiter cooperi</i>	CA: SSC	A woodland raptor that occurs year-round in appropriate habitat throughout most of the United States (Rosenfield and Bielefeldt, 1993). In the Natomas Basin, Cooper's hawks occur along Sacramento River margins and in other tree groves.
Tricolored blackbird <i>Agelaius tricolor</i>	Fed: SC CA: SSC	Occurs in several areas throughout the Central Valley. It breeds near fresh water, preferably in emergent wetland with tall, dense cattails or tules, but also in thickets of willow, blackberry, wild rose, and tall herbs. One tricolored blackbird colony is known to occur in the Natomas Basin, on the Conservancy's Betts-Kismat-Silva reserve. <i>Covered species.</i>
Grasshopper sparrow <i>Ammodramus savannarum</i>	Fed: SC	Primarily a species of midwestern and eastern grasslands, this species has not been recorded in the Sacramento area, although it may occur in grasslands along valley margins near the Coast Ranges and Sierra foothills. Not expected to occur in the Natomas Basin.
Short-eared owl <i>Asio flammeus</i>	Fed: SC CA: SSC	A ground-nesting owl that prefers open habitat areas (Holt and Leasure, 1993). Known to occur throughout the Sacramento area.
Burrowing owl <i>Athene cunicularia</i>	Fed: SC CA: SSC	A year-long resident of open, dry grassland and desert habitats, and also in grass, forb, and open shrub stages of pinyon-juniper and ponderosa pine habitats. Two burrowing owl occurrences are known from the Natomas Basin, one from the Conservancy's Betts-Kismat-Silva reserve, and the other along the east side of Pacific Avenue. <i>Covered species.</i>
American bittern <i>Botaurus lentiginosus</i>	Fed: SC	Associated with marsh habitat. Known to occur in the Natomas Basin.
Aleutian Canada goose <i>Branta canadensis leucopareia</i>	Fed: SC (recently delisted)	Nests in the western Aleutian Islands and traditionally occurs during migration along coastal Oregon and in Del Norte and Humboldt counties in northern California (Gregg et al. 1988). The Aleutian Canada goose winters in the San Joaquin Valley near Modesto, and is an occasional winter visitor in the Natomas Basin. <i>Covered species.</i>
Ferruginous hawk <i>Buteo regalis</i>	Fed: SC CA: SSC	A winter resident of open, grassland habitats in the Central Valley (Bechard and Schmutz, 1995). Known to occur in the Natomas Basin, but not a common species.
Swainson's hawk <i>Buteo swainsoni</i>	CA: Threatened	Occurs in California primarily during the breeding season (March through September) and winters in South America. The current Swainson's hawk nesting distribution is limited to extreme northeastern California, the Central Valley, and a few isolated locations in the Owens Valley (CDFG, 1992, 1994b). Swainson's hawks prefer large nesting trees with a panoramic view of their foraging grounds. Foraging habitats (open fields and grasslands) need to be within flying distance and large enough to support the high densities of microtine rodent populations and insects upon which they feed. <i>Covered species.</i>

TABLE 3-8

List of Special-Status Species Identified by USFWS as Potentially Occurring in the Natomas Basin

Species	Status	Habitat and Range
Western snowy plover <i>Charadrius alexandrinus nivosus</i>	CA: SC	Interior population known to be genetically distinct from federally threatened Pacific Coast population (58 FR 12864 - 12874). Inland population known to occur year-round in the San Joaquin Valley and Southern California, primarily from alkaline and saline ponds (Page et al., 1995). May occur rarely in the Natomas Basin, but suitable habitat is generally absent.
Mountain plover <i>Charadrius montanus</i>	Fed: Proposed Threatened CA: SSC	Most winter in California but breed primarily in Colorado and Montana (64 FR 7587-7601). The Natomas Basin could support wintering mountain plovers. Primary habitat in the project area would include grasslands.
Black tern <i>Chlidonias niger</i>	Fed: SC CA: SSC	The breeding range is primarily in the northern United States and Canada, but breeding also occurs in the Central Valley (Dunn and Agro, 1995). The black tern breeds in wet, marshy areas, and is known to use artificially wet areas such as rice fields as breeding habitat (Dunn and Agro, 1995). The species is uncommon in the Natomas Basin.
Lark sparrow <i>Chondestes grammacus</i>	Fed: SC	Fairly common in the Sacramento area and is likely to occur in undeveloped areas throughout the Natomas Basin.
Yellow-billed cuckoo <i>Coccyzus americanus</i>	CA: Endangered	Limited suitable habitat (riparian forest) in the Natomas Basin. No known occurrences in the Natomas Basin.
Black swift <i>Cypseloides niger</i>	Fed: SC CA: SSC	Requires steep, rocky cliffs for nesting. Will forage over almost any terrain but avoids arid regions such as the Great Basin, southern deserts, and the Central Valley. This species is not likely to occur in the Natomas Basin.
Hermit warbler <i>Dendroica occidentalis</i>	Fed: SC	Breeds in coniferous forests in the central and northern Sierra Nevada (Pearson, 1997). Not expected to occur in the Natomas Basin.
Snowy egret <i>Egretta thula</i>	---	Common in the Sacramento area and found in undeveloped areas throughout the Natomas Basin.
White-tailed kite <i>Elanus leucurus</i>	Fed: SC CA: Fully Protected	Common in the Central Valley and found throughout the open country in the Natomas Basin.
Pacific-slope flycatcher <i>Empidonax difficilis</i>	Fed: SC	Somewhat common in the Sacramento area during migration in late spring and early fall, but usually associated with riparian forests at higher elevations.
Little willow flycatcher <i>Empidonax trailii brewsteri</i>	Fed: SC CA: Endangered	Uncommon in the Sacramento area. Usually associated with riparian forests at higher elevations. Could occasionally occur in riparian habitat in the Natomas Basin.
American peregrine falcon <i>Falco peregrinus anatum</i>	Fed: SC (recently delisted) CA: Endangered and Fully Protected	Favors cliffs, bluffs, rock outcrops, and similar high points overlooking open ocean, grasslands, or fields for nesting. In summer, this species is found primarily along the California coast, extending the length of the state from Oregon to the Mexican border. It is less commonly observed in the Central Valley, and occasionally winters in the low-lying foothills of northeastern California. Could occasionally forage in the Natomas Basin.

TABLE 3-8

List of Special-Status Species Identified by USFWS as Potentially Occurring in the Natomas Basin

Species	Status	Habitat and Range
Greater sandhill crane <i>Grus canadensis tabida</i>	CA: Threatened and Fully Protected	Winters primarily in the Sacramento and San Joaquin valleys from Tehama County south to Kings County (Grinnell and Miller, 1944), where they frequent annual and perennial grassland habitats, moist croplands with rice or corn stubble, and open, emergent wetlands. Greater sandhill cranes tend to return to historic wintering grounds, with large flocks congregating in the Butte Sink area of Sutter County and in the Sacramento-San Joaquin Delta. The Natomas Basin is not a known wintering area for greater sandhill cranes.
Bald eagle <i>Haliaeetus leucocephalus</i>	Fed: Proposed for Delisting CA: Endangered and Fully Protected	Associated with aquatic habitats for foraging, occasionally preying on waterfowl. Occasional winter migrant in the Natomas Basin.
Least bittern <i>Ixobrychus exilis hesperis</i>	Fed: SC CA: SSC	Uses dense, emergent vegetation for cover and nesting, and feeds in dense vegetation and small openings. Found primarily in the eastern United States, but a small Central Valley breeding population has been recorded (Gibbs et al., 1992). Not known to occur in the Natomas Basin.
Loggerhead shrike <i>Lanius ludovicianus</i>	Fed: SC CA: SSC	Occurs in grasslands, agricultural lands, open shrublands, and woodlands (Bent, 1950). It prefers areas with perch sites (Zeiner et al., 1990). The loggerhead shrike is a widespread breeding species in North America. It occurs from the southern Canadian provinces south across most of the United States and into Mexico (American Ornithologists Union, 1957). The shrike is a resident species throughout the lowlands and foothills of California (Grinnell and Miller, 1944). <i>Covered species.</i>
California black rail <i>Laterallus jamaicensis coturniculus</i>	Fed: SC CA: Fully Protected	Not known to occur in the Central Valley (Eddleman et al., 1994).
Lewis's woodpecker <i>Melanerpes lewis</i>	Fed: SC	Found in open forests and known to occur along valley margins near the Coast Ranges and Sierra foothills (Tobalske, 1997). Not expected in the Natomas Basin.
Long-billed curlew <i>Numenius americanus</i>	Fed: SC CA: SSC	Fairly common in the Sacramento area, especially during the winter months. Suitable habitat exists in undeveloped areas throughout the Natomas Basin.
White-faced ibis <i>Plegadis chihi</i>	Fed: SC CA: SSC	Prefers extensive marshes for nesting (Zeiner et al., 1990a). Large tule stands surrounded by open water provide high-quality nesting habitat for the species. It occurs in two disjunct populations, one largely in western North America and the other in central and southern South America. The largest North American breeding colonies of white-faced ibis are in Utah, Nevada, Oregon, and coastal Texas and Louisiana. The largest breeding colonies in the Central Valley have been reported in the Mendota Wildlife Area and the Colusa National Wildlife Refuge. <i>Covered species.</i>

TABLE 3-8
List of Special-Status Species Identified by USFWS as Potentially Occurring in the Natomas Basin

Species	Status	Habitat and Range
Bank swallow <i>Riparia riparia</i>	CA: Threatened	Colony nester that nests primarily adjacent to riparian habitats. This species prefers vertical banks/cliffs with fine-textured/sandy soils in which to dig nesting holes near streams, rivers, lakes, and oceans. There are very few known breeding colonies of this species in California, with the primary breeding area described as the banks of the Sacramento River, from Shasta County south to Contra Costa County. <i>Covered species.</i>
Rufous hummingbird <i>Selasphorus rufus</i>	Fed: SC	Breeds in the Pacific Northwest and winters primarily in Mexico and along the Gulf Coast (Calder, 1993). Primarily occurs in mountainous and foothill regions that support nectar-producing flowers (Calder, 1993). Known to occur in the Natomas Basin during migration.
Red-breasted sapsucker <i>Sphyrapicus ruber</i>	Fed: SC	A woodland species, normally associated with higher-elevation habitats, but somewhat common in the Sacramento area during the winter months. Riparian areas and oak tree groves provide potential habitat.
Brewer's sparrow <i>Spizella breweri</i>	Fed: SC	Closely identified with sagebrush country, but has been occasionally recorded in the Sacramento area.
Bewick's wren <i>Thryomanes bewickii</i>	Fed: SC	A common, permanent resident in the Sacramento Valley. Breeds in brushy areas and thickets, including riparian areas (Kennedy and White, 1997).
Reptiles		
Silvery legless lizard <i>Anniella pulchra pulchra</i>	Fed: SC CA: SSC	Occurs throughout the southern Coast Ranges, including coastal-dune as well as other habitats (Zeiner et al., 1988). The species is not known to occur in the Sacramento Valley.
Northwestern pond turtle <i>Clemmys marmorata marmorata</i>	Fed: SC CA: SSC	Occurs in quiet waters of lowland ponds, marshes, lakes, and reservoirs, and in streams with deep pools. Rocks, logs, and streamside vegetation provide escape cover and basking sites (Stebbins, 1972). Northwestern pond turtles are generally found from San Francisco Bay north to the Columbia River drainage in Oregon and Washington. Covered by the HCP.
Southwestern pond turtle <i>Clemmys marmorata pallida</i>	Fed: SC CA: SSC	The Natomas Basin is considered outside of the range of the southern subspecies of the western pond turtle.
San Joaquin coachwhip (whipsnake) <i>Masticophis flagellum ruddocki</i>	Fed: SC CA: SSC	Found primarily in the western San Joaquin Valley and the adjacent inner Coast Ranges, although a coachwhip was found in the Sutter Buttes (California Department of Fish and Game, 1994b). No occurrences are reported in the Natomas Basin; the nearest reported occurrence is in the Sutter Buttes.
California horned lizard <i>Phrynosoma coronatum frontale</i>	Fed: SC CA: SSC	The range of this lizard includes habitats in the Central Valley, but the species prefers loose, sandy soil conditions for burrowing (Zeiner et al., 1988). These conditions do not occur in the Natomas Basin, and the species is not expected to occur.
Giant garter snake <i>Thamnophis gigas</i>	Fed: Threatened CA: Threatened	Inhabits marshes; rice and waterways, such as irrigation and drainage canals; rice lands; sloughs; ponds; small lakes; low-gradient streams; and adjacent uplands in the Central Valley. This species prefers freshwater marshes and low-gradient streams, and has adapted to drainage canals and irrigation ditches for habitat. <i>Covered species.</i>

TABLE 3-8

List of Special-Status Species Identified by USFWS as Potentially Occurring in the Natomas Basin

Species	Status	Habitat and Range
Amphibians		
California tiger salamander <i>Ambystoma californiense</i>	Fed: Candidate CA: SSC	Inhabits valley and foothill grasslands and open woodlands usually within one mile (1.6 km) of water. Tiger salamanders breed in reservoirs, ponds, vernal pools, small lakes, and slow-flowing streams that do not support predatory fish (Stebbins 1972, Zeiner et al., 1988). Currently, the California tiger salamander occurs in the Central Valley and Sierra Nevada foothills from Yolo County south to Tulare County, and into the coastal valleys and adjacent coastal foothills from Sonoma County, south to Santa Barbara County (Zeiner et al., 1988). <i>Covered species.</i>
California red-legged frog <i>Rana aurora draytonii</i>	Fed: Threatened CA: SSC	Assumed to be extirpated from the Central Valley floor (61 FR 25813 – 25833).
Foothill yellow-legged frog <i>Rana boylei</i>	Fed: SC CA: SSC	Highly aquatic and closely associated with rocky streams (Zeiner et al., 1988). These habitat conditions do not occur in the Natomas Basin, and therefore this species is not expected to occur.
Western spadefoot toad <i>Scaphiopus hammondi</i>	Fed: SC	Associated with seasonal wetlands and other temporarily ponded areas in low-lying grasslands, fields, washes, river floodplains, alluvial fans, alkali lakes, and playas. Also found in adjacent foothill and mountain habitats. The range of this species includes the Central Valley and adjacent foothills, and the area spanning the southern Coast Ranges to northern Baja California, extending from sea level to about 4500 feet in elevation. <i>Covered species.</i>
Fish		
Green sturgeon <i>Acipenser medirostris</i>	Fed: SC CA: SSC	The proposed action would not affect fish species in the Sacramento River.
Delta smelt <i>Hypomesus transpacificus</i>	Fed: Threatened CA: Threatened	The proposed action would not affect fish species in the Sacramento River or Delta.
River lamprey <i>Lampetra ayresi</i>	Fed: SC CA: SSC	The proposed action would not affect fish species in the Sacramento River.
Kern brook lamprey <i>Lampetra hubbsi</i>	Fed: SC CA: SSC	Does not occur in the vicinity of Natomas Basin.
Pacific lamprey <i>Lampetra tridentata</i>	Fed: SC	The proposed action would not affect fish species in the Sacramento River.
Central Valley steelhead <i>Oncorhynchus mykiss irideus</i>	Fed: Threatened	The proposed action would not affect fish species in the Sacramento River.
Central Valley fall-/late-fall run chinook salmon <i>Oncorhynchus tshawytscha</i>	Fed: Candidate CA: SSC	The proposed action would not affect fish species in the Sacramento River.
Spring-run chinook salmon <i>Oncorhynchus tshawytscha</i>	Fed: Threatened CA: Threatened	The proposed action would not affect fish species in the Sacramento River.
Winter-run chinook salmon <i>Oncorhynchus tshawytscha</i>	Fed: Endangered CA: Endangered	The proposed action would not affect fish species in the Sacramento River.

TABLE 3-8
List of Special-Status Species Identified by USFWS as Potentially Occurring in the Natomas Basin

Species	Status	Habitat and Range
Sacramento splittail <i>Pogonichthys macrolepidotus</i>	Fed: Threatened CA: SSC	The proposed action would not affect fish species in the Sacramento River.
Longfin smelt <i>Spirinichus thaleichthys</i>	Fed: SC CA: SSC	The proposed action would not affect fish species in the Sacramento River and Delta.
Invertebrates		
Antioch Dunes anthicid beetle <i>Anthicus antiochensis</i>	Fed: SC	Prefers sandy beaches within a few hundred yards of water. Known only from Contra Costa County, and not known to occur in the Natomas Basin.
Sacramento anthicid beetle <i>Anthicus sacramento</i>	Fed: SC	Known to occur primarily in sand dune areas in the Delta region, and not known to occur in the Natomas Basin.
Conservancy fairy shrimp <i>Branchinecta conservatio</i>	Fed: Endangered	Inhabits vernal pools and swales with highly turbid water. Occupied pools are usually large. There are no known occurrences in Sutter or Sacramento Counties.
Longhorn fairy shrimp <i>Branchinecta longiantenna</i>	Fed: Endangered	Associated with clear, moderately deep (20 to 40 centimeters) pool depressions in sandstone bedrock outcrops in Contra Costa and Alameda Counties. There are no records of this species' occurrence in the Natomas Basin.
Vernal pool fairy shrimp <i>Branchinecta lynchi</i>	Fed: Threatened	Most often observed in vernal pools, although it is also observed in a variety of other natural and artificial habitats, including: seasonal wetlands, alkali pools, ephemeral drainages, stock ponds, roadside ditches, vernal swales, and rock outcrop vernal pools (Helm, 1998). Vernal pool fairy shrimp have one of the broadest distributions of the California endemic fairy shrimp species. <i>Covered species.</i>
Midvalley fairy shrimp <i>Branchinecta mesovallensis</i>	---	Occurs in grassland pools and intermound pools within mound-inter-mound topography. This species has been found inhabiting the most ephemeral of seasonal wetland types, presumably because it matures quickly (Helm, 1998). This species has been found in scattered localities in the middle portion of the Central Valley from Sacramento County to Fresno County (Helm, 1998). <i>Covered species.</i>
San Joaquin dune beetle <i>Coelus gracilis</i>	Fed: SC	The adult spends most of its time in sandy soils, whereas the larval form is found exclusively in loose sands. Currently, this beetle is restricted to small, isolated sand dunes along the western edge of the San Joaquin Valley. Does not occur in the Natomas Basin.
Valley elderberry longhorn beetle <i>Desmocerus californicus dimorphus</i>	Fed: Threatened	Closely associated with blue elderberry, an obligate host for beetle larvae. The elderberry beetle's habitat range extends from Redding at the northern end of the Central Valley, south to the Bakersfield area (Barr, 1991). <i>Covered species.</i>
Delta green ground beetle <i>Elaphrus viridis</i>	Fed: Threatened	Occurs in vernal pools, but is known only from one population in Solano County (45 FR 52807 - 52810).
Curved-foot hygrotus diving beetle <i>Hygrotus curvipes</i>	Fed: SC	Currently only known to occur in ponds, ditches, and canals in Contra Costa, Alameda, and San Joaquin counties.
Vernal pool tadpole shrimp <i>Lepidurus packardii</i>	Fed: Endangered	Associated with vernal pools on alluvial fan, basin, basin rim, floodplain, marine terrace, high terrace, stream terrace, very high terrace, low terrace, and volcanic-mudflow landforms (Helm, 1998). <i>Covered species.</i>

TABLE 3-8

List of Special-Status Species Identified by USFWS as Potentially Occurring in the Natomas Basin

Species	Status	Habitat and Range
Plants		
Suisun marsh aster <i>Aster lentus</i>	CNPS: 1B	Perennial herb of freshwater wetlands (CalFlora, 2001). Twenty-five records in Sacramento County, primarily in the Delta region, and one in Sutter County near Knight's Landing. No record of occurrence in the Natomas Basin, but suitable habitat could be present.
Alkali milk-vetch <i>Astragalus tener var. tener</i>	CNPS: 1B	Annual herb of grasslands and vernal pools (CalFlora, 2001). No record of occurrence in Sacramento or Sutter Counties; closest recorded occurrences come from Yolo County.
Brittlescale <i>Atriplex depressa</i>	CNPS: 1B	Annual herb, primarily associated with alkali soil (e.g., chenopod-scrub habitat) (CalFlora, 2001). Not known to occur in Sacramento or Sutter Counties, but several sites are recorded east of Woodland in Yolo County, about 8 miles west of the Natomas Basin.
Valley spearscale <i>Atriplex joaquiniana</i>	CNPS: 1B	Annual herb, primarily associated with alkali soil (e.g., chenopod-scrub habitat) (CalFlora, 2001). Not known to occur in the project area, but several sites are recorded east of Woodland in Yolo County, about 8 miles west of the Natomas Basin.
Palmate-bracted bird's-beak <i>Cordylanthus palmatus</i>	CNPS: 1B Fed: Endangered CA: Endangered	Known from very few occurrences in chenopod scrub habitat (51 FR 23765 - 23769). Not known to occur in the Natomas Basin, or elsewhere in Sacramento or Sutter counties. Several sites are recorded east of Woodland in Yolo County, about 8 miles west of the Natomas Basin. Not likely to occur in the project area because of lack of suitable habitat.
Dwarf downingia <i>Downingia pusilla</i>	CNPS: 2	Annual herb, occurs in wet grassland areas and vernal pools (CalFlora, 2001). One occurrence is known from the Natomas Basin, near the west levee of Steelhead Creek and south of Elverta Road. Several occurrences of the species are also known from the Rio Linda area, east of the Natomas Basin.
Tuolumne coyote-thistle <i>Eryngium pinnatisectum</i>	CNPS: 1B	Annual/perennial herb that may grow in vernal pools, but is known to occur only at higher elevations (CalFlora, 2001). Tuolumne coyote-thistle is not expected to occur in the Natomas Basin.
Boggs Lake hedge-hyssop <i>Gratiola heterosepala</i>	CNPS: 1B CA: Endangered	Occurs in shallow waters or moist-clay (adobe) soils, in vernal pools, and along lake margins. Potential habitat occurs where riparian vegetation or emergent-marsh vegetation exists, in sloughs, marshes, and unmaintained agricultural canals. <i>Covered species.</i>
Rose mallow <i>Hibiscus lasiocarpus</i>	CNPS: 2	Yellow-flowering shrub that is most commonly found near wetlands (CalFlora, 2001). One known occurrence in the Natomas Basin, in the interchange area of West El Camino Avenue and Interstate 80.
Northern California black walnut <i>Juglans californica var. hindsii</i>	CNPS: 1B	Native tree with only a few native stands remaining, none of which are located in the project area. Does not occur in the Natomas Basin.
Ahart's rush <i>Juncus leiospermus var. ahartii</i>	CNPS: 1B	Annual herb of vernal pool habitats (CalFlora, 2001). Extremely rare and not known to occur in the Natomas Basin.

TABLE 3-8

List of Special-Status Species Identified by USFWS as Potentially Occurring in the Natomas Basin

Species	Status	Habitat and Range
Legenere <i>Legenere limosa</i>	CNPS: 1B Fed: SC	Found along lakeshores and in vernal pools, marshes, and other seasonally inundated habitats. There are no reported occurrences in the Natomas Basin, although potentially suitable vernal-pool habitat occurs along the far eastern boundary of the project area, north of Del Paso Road. <i>Covered species.</i>
Heckard's pepper grass <i>Lepidium latipes var. heckardii</i>	CNPS: 1B	Annual herb that occurs in alkali soils in valley grassland habitats (CalFlora, 2001). Two sites are known east of Woodland in Yolo County, approximately 8 miles from the project area. Not reported in the Natomas Basin.
Delta tule pea <i>Lathyrus jepsonii</i> spp. <i>Jepsonii</i>	CNPS: 1B Fed: SC	Associated with alluvial-floodplain soils of deltas and major river systems. The species is most commonly associated with both brackish- and freshwater-marsh vegetation, but can root near the water and extend into riparian and upland areas, such as roadside ditches. Delta tule pea is found along the floodplain of rivers and sloughs in Contra Costa, Fresno, Lake, Lassen, Marin, Napa, Plumas, Sacramento, San Benito, Santa Clara, San Joaquin, and Solano Counties. No occurrences of this species are known from the Natomas Basin (CDFG, 2001). <i>Covered species.</i>
Mason's lilaeopsis <i>Lilaeopsis masonii</i>	CNPS: 1B CA: Rare	Perennial herb of freshwater and brackish marshes and riparian scrub habitat (CalFlora, 2001). Known to occur in Sacramento County, primarily in the Delta region. Not known to occur in the Natomas Basin.
Veiny monardella <i>Monardella douglasii</i> spp. <i>venosa</i>	CNPS: 1B	Annual herb that occurs in heavy clay soils in valley and foothill grasslands (CalFlora, 2001). Considered very rare by CNPS. Thought to be extirpated in Sacramento and Sutter counties.
Pincushion navarretia <i>Navarretia myersii</i> spp. <i>Myersii</i>	CNPS: 1B	Annual herb of vernal pool habitats (CalFlora, 2001). Considered extremely rare by CNPS. One Sacramento County occurrence is recorded from the Folsom area; not known to occur in the Natomas Basin.
Colusa grass <i>Neostapfia colusana</i>	CNPS: 1B Fed: Threatened	Usually found in fairly monotypic stands in the drying beds of larger vernal pools (Stone et al., 1988). It usually occurs in the deepest portions of the pools. No known occurrences of this species in the Natomas Basin (CDFG, 2001). Limited potential habitat occurs in the vernal pools along the eastern edge of the Natomas Basin. <i>Covered species.</i>
Antioch Dunes evening-primrose <i>Oenothera deltoides</i> spp. <i>Howellii</i>	CNPS: 1B Fed: Endangered CA: Endangered	Known only from Contra Costa County, near Antioch. (43 FR 39042 - 39044).
Sacramento Orcutt grass <i>Orcuttia viscida</i>	CNPS: 1B Fed: Endangered CA: Endangered	Typically occurs in medium to large vernal pools, with relatively long inundation periods. The species is associated with very old alluvial surfaces, such as historic floodplains of prehistoric rivers and creeks. Sacramento Orcutt grass is known from only nine occurrences in California, all of which are reported from Sacramento County, one of which is presumed extirpated (CDFG, 2001). There are no records of Sacramento Orcutt grass in Sutter County, and no known occurrences of this species in the Natomas Basin (CDFG, 2001). <i>Covered species.</i>

TABLE 3-8

List of Special-Status Species Identified by USFWS as Potentially Occurring in the Natomas Basin

Species	Status	Habitat and Range
Slender Orcutt grass <i>Orcuttia tenuis</i>	CNPS: 1B Fed: Threatened CA: Endangered	Typically occurs in medium to large vernal pools with relatively long inundation periods. The species is associated with very old alluvial surfaces (also referred to as high terrace landforms), such as historic floodplains of prehistoric rivers and creeks. Of the 70 extant occurrences, two are reported from Sacramento County, and no occurrences are reported from Sutter County. No known occurrences of this species in the Natomas Basin (CDFG, 2001). <i>Covered species.</i>
Hartweg's golden sunburst <i>Pseudobahia bahiifolia</i>	CNPS: 1B Fed: Endangered CA: Endangered	Annual herb that occurs in clay soils in valley grassland and foothill woodland habitats, and is known to prefer the upper slopes of "Mima" mounds in vernal-pool areas (USFWS, 1997). Historic range included the Sacramento Valley area, but the species is now known to occur only in the eastern San Joaquin Valley, with strongholds in Madera and Stanislaus Counties. Not expected to occur in Natomas Basin.
Sanford's arrowhead <i>Sagittaria sanfordii</i>	CNPS: 1B Fed: SC	Found in ponds, ditches, vernal pools, sloughs, and other slow-moving waterways. Of the known occurrences, 26 extant occurrences are reported from Sacramento County and none are reported from Sutter County. No occurrences of this species are known from the Natomas Basin (CDFG, 2001). <i>Covered species.</i>

Status Codes:

- Fed: Endangered—Listed as Endangered under the federal Endangered Species Act
- Fed: Threatened—Listed as Threatened under the federal Endangered Species Act
- Fed: Proposed Threatened—Proposed to be listed as Threatened under the federal Endangered Species Act
- Fed: Proposed for Delisting—Currently being considered for delisting from the federal Endangered Species Act
- Fed: Candidate—May be proposed for listing under the federal Endangered Species Act
- Fed: SC—Federal Species of Concern
- CA: Endangered—Listed as Endangered under the California Endangered Species Act
- CA: Threatened—Listed as Threatened under the California Endangered Species Act
- CA: Candidate—May be proposed for listing under the California Endangered Species Act
- CA: Rare—Listed as a rare plant under the California Endangered Species Act
- CA: SSC—California Species of Special Concern
- CNPS: 1B—List 1B of the California Native Plant Society (Rare or Endangered in CA and elsewhere)
- CNPS: 2—List 2 of the California Native Plant Society (Rare or Endangered in CA, more common elsewhere)

Descriptions of the special-status species known to occur or that could occur in the Natomas Basin are provided in text.

3.4.2.1 Species to be Covered Under the ITPs

Delta Tule Pea (*Lathyrus jepsonii* var. *jepsonii*)

The Delta tule pea is considered a Species of Concern by the USFWS, and is on List 1B of the CNPS (rare or endangered in California and elsewhere). Delta tule pea is a perennial herb that, like other members of the pea family, has a large, brightly colored pink to lavender flower, with a distinctive banner and keel. The species, like other peas, has grasping tendrils and a climbing habit. Delta tule pea is most commonly associated with both brackish and freshwater marsh vegetation, but can root near the water and extend into adjacent riparian and upland areas.

Delta tule pea is known primarily from the Sacramento-San Joaquin River Delta. Most known occurrences are recorded from Solano (39 records), Contra Costa (15), Sacramento (14), and San Joaquin (9) Counties (CalFlora, 2001). All Sacramento County occurrence records are from

the Delta region, with the nearest reported occurrences in the Walnut Grove area (CDFG, 2001). Delta tule pea is not known to occur in Sutter County. Little information is known about the population status of the Delta tule pea, but the species is considered by the California Native Plant Society to be threatened by agricultural practices, water diversions, and erosion (Skinner and Pavlik, 1994).

Sanford's Arrowhead (*Sagittaria sanfordii*)

Sanford's arrowhead is considered a Species of Concern by the USFWS, and is on List 1B of the CNPS (rare or endangered in California and elsewhere). Sanford's arrowhead is an aquatic perennial that occurs under shallow-water conditions in freshwater marshes. Sanford's arrowhead is known primarily from the Central Valley, although the species has been found in other areas of California. Most known occurrences are recorded from Sacramento (30 records), Merced (11), Fresno (10), Butte (8), and Tehama (6) Counties (CalFlora, 2001). In Sacramento County, several occurrences are reported along the American River Parkway along small oxbows and sloughs (CDFG, 2001). Sanford's arrowhead is not known to occur in Sutter County. No occurrences are reported in the Natomas Basin.

Sanford's arrowhead is an endemic species, but is considered mostly extirpated from the Central Valley (Skinner and Pavlik, 1994). The species is considered by CNPS to be threatened by agricultural practices, water diversions, and erosion (Skinner and Pavlik, 1994).

Boggs Lake Hedge-hyssop (*Gratiola heterosepala*)

Boggs Lake hedge-hyssop is a state-listed Endangered species. Boggs Lake hedge-hyssop is a small, semi-aquatic, herbaceous annual plant found in six widely disjunct areas in California: Boggs Lake in Lake County; Rio Linda and Elk Grove in Sacramento County; near Roseville in Placer County; Big Table Mountain in Fresno County; Kennedy Table in Madera County; and near the Pit River in Shasta County (CDFG, 2001). It has also been reported at one site in Lake County, Oregon (Skinner and Pavlik, 1994).

Boggs Lake hedge-hyssop occurs in shallow waters or moist-clay (adobe) soils, in vernal pools, and along lake margins. Populations are usually composed of scattered individuals and are often associated with bractless hedge-hyssop, coyote thistle, hairy clover-fern (*Marsilea vestita*), and slender Orcutt grass (*Orcuttia tenuis*). At higher elevations, such as Boggs Lake in Lake County and near the Pit River in Shasta County, this species is found in close proximity to foothill woodland species, such as black oak (*Quercus kelloggii*) and foothill pine (*Pinus sabiniana*), and northern juniper woodland species, respectively. There are no known occurrences of this species in the Natomas Basin, although limited potentially suitable vernal pool habitat occurs along the eastern boundary of the basin north of Del Paso Road. This species has been identified in Rio Linda, approximately 2 miles east of the Natomas Basin (CDFG, 2001).

Sacramento Orcutt Grass (*Orcuttia viscida*) and Slender Orcutt Grass (*Orcuttia tenuis*)

Sacramento Orcutt grass is listed as Endangered by both the state and federal Endangered Species Acts and is considered rare, threatened, or endangered in California and elsewhere (List 1B) by the CNPS (Skinner and Pavlik, 1994). Slender Orcutt grass is listed as Threatened under the federal Endangered Species Act, Endangered under the state Endangered Species Act, and is considered rare and endangered (List 1B) by the CNPS (Skinner and Pavlik, 1994). These grasses (*Orcuttia viscida*, *O. tenuis*) are gray-green annual grass species, typically

occurring in medium to large vernal pools with relatively long inundation periods. These species are associated with very old alluvial surfaces (also referred to as high-terrace land forms), such as historic flood plains of prehistoric rivers and creeks. Associated species include vernal pool-endemic plants, such as common spikerush (*Eleocharis macrostachya*), rayless lasthenia (*Lasthenia glaberrima*), and coyote thistle (*Eryngium vaseyi*).

Sacramento Orcutt grass has been identified at nine sites in Sacramento County; there are no known occurrences of this species in the Natomas Basin (CDFG, 2001). The closest known occurrences are reported in the vicinity of Kiefer Road in eastern Sacramento County, approximately 8 miles southeast of the Natomas Basin.

Slender Orcutt grass is currently recorded at 74 locations in Lake, Plumas, Sacramento, Shasta, Siskiyou, and Tehama counties (CDFG, 2001). Of these occurrences, two are reported from Sacramento County and no occurrences are reported from Sutter County. There are no known occurrences of this species in the Natomas Basin (CDFG, 2001). The closest known occurrences are in eastern Sacramento County, between Kiefer Road and Rancho Seco.

Colusa Grass (*Neostapfia colusana*)

Colusa grass is both a federally- and state-listed Endangered species. It is also considered rare and endangered (List 1B) by the CNPS (Skinner and Pavlik, 1994). Colusa grass is a low, tufted annual plant. Colusa grass is usually found in fairly monotypic stands in the drying beds of larger vernal pools, usually occurring in the deepest portions of the pools (Stone et al., 1988; May Consulting, unpubl. record). When Colusa grass is present, other vernal-pool plants are often sparse or absent. When found with other species, Colusa grass is often associated with Hoover's spurge or Orcutt grasses (Stone et al., 1988).

There are currently 59 known occurrences of Colusa grass in California. Of these, none is reported from Sacramento and Sutter Counties. There are no known occurrences of this species in the Natomas Basin (CDFG, 2001).

Legenere (*Legenere limosa*)

Legenere is considered a federal Species of Concern and rare and endangered (List 1B) by the CNPS (Skinner and Pavlik, 1994). Legenere is found below 500 feet (152.4 m) elevation (Hickman, 1993), along lakeshores and in vernal pools, marshes, and other seasonally inundated habitats. Legenere is commonly associated with stipitate popcornflower, common spikerush, rayless lasthenia, and coyote thistle (May Consulting, unpubl. record).

Currently, there are 49 known occurrences of legenere in California. Of these, 18 are reported from Sacramento County, and none are reported from Sutter County. There are no reported occurrences in the Natomas Basin, although potentially suitable vernal pool habitat occurs along the eastern boundary of the Natomas Basin, north of Del Paso Road.

Valley Elderberry Longhorn Beetle (*Desmocerus californicus dimorphus*)

The valley elderberry longhorn beetle (VELB) is listed as Threatened under the federal Endangered Species Act. The VELB is a distinctive black and red-orange beetle, with long antennae. The USFWS's *Conservation Guidelines for the Valley Elderberry Longhorn Beetle* (USFWS, 1999) describes its habitat needs as follows:

The valley elderberry longhorn beetle is completely dependent on its host plant, elderberry (*Sambucus* spp.), which is a common component of the

remaining riparian forests and adjacent upland habitats in the Central Valley. Use of the elderberry by the beetle, a wood borer, is rarely apparent. Frequently, the only evidence of the elderberry's use by the beetle is an exit hole created by the larva just prior to the pupal stage. The life cycle takes one or two years to complete. The animal spends most of its life in the larval stage, living within the stems of an elderberry plant. Adult emergence is from late March through June, about the same time as an elderberry produces flowers. The adult stage is short-lived.

The known range of the VELB is limited to the Central Valley of California (USFWS, 1999). The USFWS designated critical habitat for the VELB, located along the American River Parkway in two places, upstream of the S.R. 160 overcrossing and in the Goethe Park area. In addition, the Recovery Plan designates the area along the American River, east of Nimbus Dam, as essential habitat, as well as an area along Putah Creek in Solano County (USFWS, 1984).

Information on the historical distribution and abundance of VELB is scarce. The substantial reduction in Central Valley riparian vegetation in the last 150 years suggests that the beetle's range has contracted and that remaining populations are discontinuous (USFWS, 1984). The USFWS's *Programmatic Formal Consultation Permitting Projects with Relatively Small Effects on the Valley Elderberry Longhorn Beetle within the Jurisdiction of the Sacramento Field Office, California* (USFWS, 1996a) describes population densities of the beetle as follows:

Population densities of the beetle are probably naturally low (USFWS, 1984); and it has been suggested, based on the spatial distribution of occupied shrubs (Barr, 1991), that the beetle is a poor disperser. 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.

The California Natural Diversity Database lists 168 occurrences of the VELB in California; none is located in the Natomas Basin (CDFG, 2001). Potential habitat (i.e., elderberry shrubs), however, is located along the outside perimeter of the Natomas 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 VELB are not known; however, based on the extent of riparian habitat loss in the area (primarily because of land reclamation in the early 1900s), it is likely that populations have declined.

Although the historical abundance of VELB is unknown, extensive loss of riparian habitat and, to a lesser extent, upland habitats in the Central Valley during the past 150 years has reduced the amount of habitat available to the species, and likely decreased and fragmented the species' range (USFWS, 1984). Loss of riparian habitat is attributable to flood control projects (e.g., levee construction, stream and river channelization, placement of riprap), land reclamation, and urban development. Additional factors affecting the VELB include grazing practices, herbicide spraying, and predation by nonnative species.

Additional information about the VELB can be found in the HCP (Section II.C.4.a.), in the *Federal Register* notice (45 FR 52803; August 8, 1980) that lists the species as Threatened

under the ESA (USFWS, 1980), and in the USFWS's Recovery Plan for the species (USFWS, 1984).

Vernal Pool Fairy Shrimp (*Branchinecta lynchi*)

The vernal pool fairy shrimp is a federally listed Threatened species. The vernal pool fairy shrimp is a small (less than 1 inch), freshwater crustacean belonging to the order of Fairy Shrimp (Anostraca). Vernal pool fairy shrimp have one of the broadest distributions of the California endemic fairy shrimp species. This species is most often observed in vernal pools (79 percent of observations), although it is also observed in a variety of other natural and artificial habitats, including seasonal wetlands, alkali pools, ephemeral drainages, stock ponds, roadside ditches, vernal swales, and rock-outcrop vernal pools (Helm, 1998). The species occurs on many geologic formations and landforms. Regardless of the landform, this species is most often found in small (less than 200 meter square) and shallow (5 centimeters deep) habitats, although it also can occur in large and deep vernal pools (Helm, 1998). Vernal pool fairy shrimp often occur with California linderiella, vernal pool tadpole shrimp (*Lepidurus packardi*), and occasionally with Conservancy fairy shrimp in the Vina Plains Preserve, and are never numerically dominant (Eng et al., 1990).

There are 270 reported occurrences of vernal pool fairy shrimp in California, 50 of which are reported from Sacramento County and one of which is reported from Sutter County (CDFG, 2001). There are no vernal pool fairy shrimp occurrences in the Natomas Basin, although there are several occurrences east of the Natomas Basin in Elverta and Rio Linda (CDFG, 2001). Potential vernal pool fairy shrimp habitat occurs in the vernal pools on the east side of the Natomas Basin, north of Del Paso Road. Additional potential habitat occurs in other ponds and seasonally wet areas in the Natomas Basin (see Figure 3-2).

Vernal Pool Tadpole Shrimp (*Lepidurus packardi*)

The vernal pool tadpole shrimp is a federally listed Endangered species. The vernal pool tadpole shrimp is a small (less than 3 inches in length) aquatic crustacea within the tadpole shrimp order (*Notostraca*). The common name "tadpole shrimp" presumably addresses the general shape of the creature when viewed from above. Vernal pool tadpole shrimp is one of the three most common large branchiopods occurring in the Central Valley (Helm, 1998). It generally occurs in very small (i.e. 2 meters square) to very large (i.e. 356,253 meters square) vernal pools with a variety of depths and volumes of water during the wet cycle (Helm, 1998). The species is associated with vernal pools on the following geomorphologic surfaces: alluvial fan, basin, basin rim, floodplain, marine terrace, high terrace, stream terrace, very high terrace, low terrace, and volcanic-mudflow land forms (Helm, 1998). The vernal pool tadpole shrimp has been observed in stock ponds, vernal pools, pools in old alluvial soil in grass-bottom swales or mud-bottomed pools, and other seasonal wetlands (Helm, 1998). This species occurs with California linderiella, vernal pool fairy shrimp, and Conservancy fairy shrimp (Helm, 1998). Unlike many of the fairy shrimp eggs, the vernal pool tadpole shrimp eggs do not need to go through a freezing or drying period to hatch (Ahl, 1991).

There are 154 reported occurrences of vernal pool tadpole shrimp in California, of which 54 occurrences are reported from Sacramento County and four are reported from Sutter County. There are no reported occurrences within the Natomas Basin (CDFG, 2001), although there are two nearby occurrences located southwest of the intersection of Sankey Road and Pleasant Grove Road, and one occurrence at the intersection of Pleasant Grove

Road and Howsley Road. Suitable tadpole shrimp habitat occurs along the eastern edge of the Natomas Basin, north of Del Paso Road.

Midvalley Fairy Shrimp (*Branchinecta mesovallensis*)

The midvalley fairy shrimp has no official state or federal listing, although it appears to meet the status of rare, threatened, or endangered under CEQA. The midvalley fairy shrimp is similar in morphology to the vernal pool fairy and is also a freshwater crustacean belonging to the order of fairy shrimp (*Anostraca*). This species occurs in grassland pools and intermound pools within mound-inter-mound topography. This species has been found inhabiting the most ephemeral of seasonal wetland types, presumably due to its ability to rapidly mature (Helm, 1998). This species appears to be a vernal pool obligate species, as it was observed to occur in vernal pools 93 percent of the time, and in vernal swales only 7 percent of the time (Helm, 1998). This species is associated with the smallest (less than 2 meters square) and most ephemeral (average ponding depths of 10 centimeters) vernal pools (Helm, 1998). There are 14 known occurrences of midvalley fairy shrimp reported in California, of which one is reported from Sacramento County. No occurrences of midvalley fairy shrimp are reported from Sutter County and the Natomas Basin; however, suitable seasonal wetland and vernal pool habitat occurs along the extreme eastern edge of the Natomas Basin.

California Tiger Salamander (*Ambystoma californiense*)

The California tiger salamander is a federal Candidate species, and state Species of Special Concern and a protected amphibian. California tiger salamander is distinguished from other salamanders by its distinctive coloration consisting of spots or bars of white, cream, or yellow on a black background. This species frequents slow-moving waters of swales, ponds, and shallow lakes.

California tiger salamanders inhabit valley and foothill grasslands and open woodlands usually within one mile (1.6 km) of water (Brode and McGinnis, pers. comm., as reported in the HCP). Adults spend much time underground. Adult California tiger salamanders are found under objects such as boards, rocks, brush or other wood debris, or in rodent burrows near water. Tiger salamanders breed in reservoirs, ponds, vernal pools, small lakes, and slow-flowing streams that do not support predatory fish (Stebbins, 1972; Zeiner et al., 1988). Adult salamanders migrate from upland habitats to aquatic breeding sites during the first major rainfall events of the fall and early winter. Adults return to upland habitats after breeding. Juveniles disperse from aquatic breeding sites to upland habitats after metamorphosis. California tiger salamanders may not reproduce during years of low rainfall (Jennings and Hayes, 1994).

There are 465 known tiger salamander occurrences in California (CDFG, 2001). Of these, four occurrences are in Sacramento County and one occurrence is in Sutter County; however, none of these occurrences is in the Natomas Basin. The nearest known tiger salamander occurrences are in northern Yolo County near Dunnigan and near Rancho Seco in southeastern Sacramento County. Vernal pools could occur in grassland areas along the eastern edge of the Natomas Basin. These pools are considered potential, but marginal, tiger salamander breeding habitat, based on their disturbed condition and limited extent in the Natomas Basin.

Western Spadefoot Toad (*Scaphiopus intermontanus*)

The western spadefoot toad is a California Species of Special Concern and a protected amphibian. This species occurs in shallow, seasonal wetlands (which are essential for breeding and egg-laying) in valley and foothill grasslands, open chaparral, and pine woodlands below 3,000 feet in elevation. This species is associated with seasonal wetlands and other temporarily ponded areas in low-lying grasslands, fields, washes, river flood plains, alluvial fans, alkali lakes, and playas, but is also found in adjacent foothill and mountain habitats. Western spadefoot toads prefer slow-moving waters such as pools and plunge pools of small creeks, and short grasses with sandy or gravelly soils.

There are 173 known western spadefoot occurrences in California, of which five are in Sacramento County and none in Sutter County. There are no records of western spadefoot toads in the Natomas Basin (CDFG, 2001). The nearest known occurrences are in Placer County at Fiddymont and Phillip roads (about 6 miles east of the Natomas Basin) and at Mather Field in central Sacramento County. Some suitable spadefoot toad breeding habitat (i.e., vernal pools) occurs along the eastern edge of the Natomas Basin; however, there are no records for this species in this area to date.

Giant Garter Snake (*Thamnophis gigas*)

The giant garter snake is listed as Threatened under both the federal Endangered Species Act and the California Endangered Species Act. The giant garter snake is endemic to wetlands in the Central Valley of California. Historically, giant garter snakes were found from the vicinity of Butte County southward to Bakersfield in Kern County. Today, populations of the giant garter snake are found in the Sacramento Valley and in isolated pockets of the San Joaquin Valley. There are 168 recorded occurrences of the giant garter snake in California, 38 of which are from the Natomas Basin (CDFG, 2002).

The giant garter snake inhabits marshes, sloughs, ponds, small lakes, low gradient streams, irrigation and drainage canals, riceland, and adjacent uplands in the Central Valley. Essential habitat components consist of: (1) adequate water during the snake's active season (early spring through mid-fall) to provide adequate permanent water to maintain dense populations of food organisms; (2) emergent, herbaceous wetland vegetation such as cattails (*Typha* spp.) and bulrushes (*Scirpus* spp.) 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 upland habitats for cover and refuge from flood waters during the snake's inactive season in winter (Hansen, 1988; Brode and Hansen, 1980, 1992; Hansen and Brode, 1992). The giant garter snake feeds on aquatic prey, including small fish and frogs, carp, mosquitofish, bullfrogs, and treefrogs.

In the Natomas Basin, giant garter snakes begin entering their winter retreats in rodent burrows excavated in the banks of canals and drains, rubble piles, and other upland sites by the end of October. After emergence from winter retreats (late March or early April), giant garter snakes use canals and drains with water that persists through the summer months. These canals and drains could contain adequate emergent aquatic vegetation and steep, vegetated banks that provide cover and a food supply. Rice fields are also used by giant garter snakes after rice growth is sufficiently high to provide cover. Following pre-harvest rice field draining, giant garter snakes move out of rice fields and re-enter canals and drains, where they feed on the high concentration of prey species that wash out from the rice fields into the canals and drains. Following the heavy feeding, they enter winter retreats.

Giant garter snakes are known to use rice fields and associated features of the Natomas Basin's rice-growing landscape for some of their habitat needs (Hansen and Brode, 1992), including RD 1000 and Natomas Mutual canals and drains, the higher ground of levees, and sloughs and marshes. The irrigation canals and drains, together with their associated levees and adjacent embankments, are important components of giant garter snake habitat in the basin. Although giant garter snakes can apparently fulfill their life history requisites in rice fields and the associated canals and drains, marshes are their natural habitat and snakes make extensive use of marsh habitat when it is available.

Canals and drains can provide all the habitat components described above and create dispersal corridors allowing garter snakes to move from one area to another in search of mates, new territories, and summer habitat. Canals and drains comprised 50 percent of all habitat use by giant garter snakes radio-telemetered by the U.S. Geological Survey's Biological Resources Division (BRD) at Gilsizer Slough, which is outside of the Natomas Basin (Wylie and Casazza, 2000). Hansen and Brode (1992) also provide data illustrating use of water-conveyance structures by giant garter snakes. Giant garter snakes move around to find suitable habitat as conditions in the rice fields, marshes, and canals and drains change, especially during the dry summer months. Thus, connectivity between canals and drains in different areas and between these systems and other habitat types could be important for genetic interchange and ability to find summer habitat.

Previous surveys and other historical information indicate a fairly widespread distribution of giant garter snakes within the Natomas Basin. Virtually all these sightings are from areas where rice is grown. Within these areas they are strongly associated with the rice fields themselves and the associated canal/drain components of the water conveyance system. On this basis, a reasonable surrogate variable for estimating the total amount of giant garter snake habitat in the Natomas Basin is the amount of rice fields in the basin and canal/drain habitat embedded in the rice landscape. These are estimated at 22,692 acres of rice fields and about 245.9 miles of canals and drains in the basin. A BRD study conducted from 1998 to 1999 recorded 277 individual giant garter snakes in the Natomas Basin (Wylie and Casazza, 2000). It should be noted that these occurrences are in addition to the 38 recorded in the California Natural Diversity Database as reported above. Giant garter snakes were found in a network of ditches and rice field habitats, including several occurrences in Fisherman's Lake and other RD 1000 canals within the basin (Figure 3-3). The most recent giant garter snake survey information (Wylie, 2001) showed that fewer giant garter snakes were captured relative to previous years, but this does not necessarily mean that the giant garter snake population in the Natomas Basin is in decline (USFWS, 2002).

Northwestern Pond Turtle (*Clemmys marmorata marmorata*)

The northwestern pond turtle is considered a Species of Concern by USFWS and is a state Species of Special Concern. The northwestern pond turtle is uncommon to common in suitable aquatic habitat throughout California, west of the Sierra-Cascade crest.

Northwestern pond turtles are active all year where climates are warm but are known to hibernate in cold climates. This species is typically associated with permanent or nearly permanent water in a wide variety of habitat types, including permanent ponds, lakes, streams, irrigation ditches, or permanent pools along intermittent streams. Primarily omnivorous, the northwestern pond turtle feeds on aquatic plant material, including pond lilies, beetles, and a variety of aquatic invertebrates, as well as fish, frogs, and carrion

(Stebbins, 1972; Nussbaum et al., 1983). Northwestern pond turtles require basking sites such as partially submerged logs, rocks, mats of floating vegetation, or open mud banks.

Hibernation in colder areas occurs underwater in bottom mud. Breeding occurs in large slow-moving streams; eggs are deposited in nests constructed in sandy banks. Northwestern pond turtles are highly aquatic but leave the water for basking and egg-laying. Egg-laying may occur along sandy wetland margins or at upland locations as far as 1,300 feet (396.3 m) from water (Holland and Bury, 1992). Hatchling and adult turtles have the potential to winter in upland sites (D.C. Holland, pers. comm., as reported in the HCP).

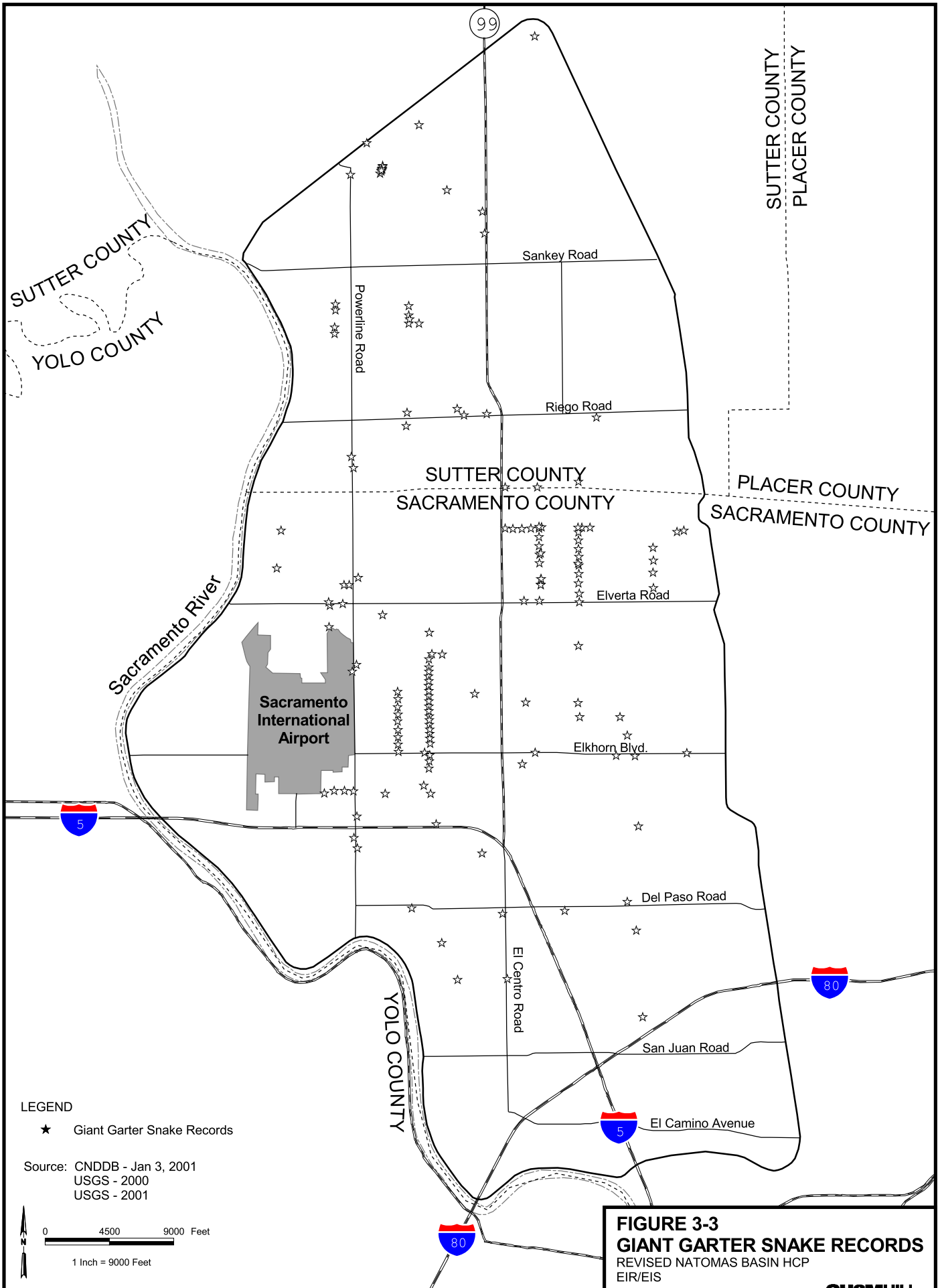
The northwestern pond turtle occurs in suitable aquatic habitats west of the crest of the Sierra Nevada in California and in parts of Oregon, Washington, and Mexico (Stebbins, 1985; Zeiner et al., 1988). However, populations are declining throughout the range (Holland and Bury, 1992) and local populations, particularly of the southwestern subspecies, have been

extirpated from many areas within this range (57 FR 45762, October 5, 1992). The northwestern subspecies, generally found from San Francisco Bay north to the Columbia River drainage in Oregon and Washington (57 FR 45761-45762, October 5, 1992), still occupies most of its historic range. The few remaining areas in the northwestern pond turtle's range that support moderate to large viable populations of the northwestern pond turtle are considered threatened (57 FR 45761-45762, October 5, 1992).

There are 13 known pond turtle occurrences in Sacramento County and 2 known pond turtle occurrences in Sutter County. The canals and drains throughout the Natomas Basin are considered suitable aquatic habitat for pond turtles. Currently, there are about 250 miles of canals and drains in the Natomas Basin. Fisherman's Lake in the southwestern portion of the basin is high-quality aquatic habitat for pond turtles. Because most of the basin is developed agricultural land or commercial/residential development, many of the potential breeding habitats have been eliminated. Despite this, potential breeding habitat probably occurs along many of the canals and aquatic habitats. During the habitat mapping surveys of March 2001 (May & Associates, 2001), many pond turtles were observed along the Main Drain.

White-faced ibis (*Plegadis chihi*)

The white-faced ibis is considered a Species of Concern by the USFWS and is a state Species of Special Concern. The white-faced ibis is found in the Sacramento area during its migration. This species forages in fresh emergent wetland, shallow flooded pond margins, and muddy ground of wet meadows and irrigated, or flooded, pastures and croplands. The white-faced ibis requires extensive marshes for nesting (Zeiner et al., 1990). Large tule stands surrounded by open water provide high-quality nesting habitat for this species. The white-faced ibis typically nests in dense tule and cattail stands, but will sometimes nest in trees with other colonial-nesting species (Eckert, 1981). The white-faced ibis winters mainly in San Joaquin Valley and Imperial Valley, but is recorded widely as a transient (Zeiner et al., 1990). The largest breeding colonies in the Central Valley have been reported from the Mendota Wildlife Area and the Colusa National Wildlife Refuge. The wintering population concentrates near Los Banos in Merced County (McCaskie et al., 1979). Historically, the white-faced ibis was a locally common summer resident in California and its breeding distribution was centered in the San Joaquin Valley. White-faced ibis populations have declined in California, probably due to habitat deterioration or removal.



There are seven known occurrences (rookeries) in California (CDFG, 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 nesting habitat occurs in the Natomas Basin for white-faced ibis, although approximately 20,000 acres of suitable winter foraging habitat (i.e., rice, alfalfa, and other agricultural fields) exists in the Natomas Basin for this species (Metro Air Park Property Owners' Association, 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. In 1996, Hickey and Shufford estimated that a minimum of 10,000 to 11,000 ibis were in the Sacramento Valley (Metro Air Park Property Owners' Association, 2000). White-faced ibis populations in the Sacramento Valley have increased, and white-faced ibis are now common winter visitors to the Natomas Basin.

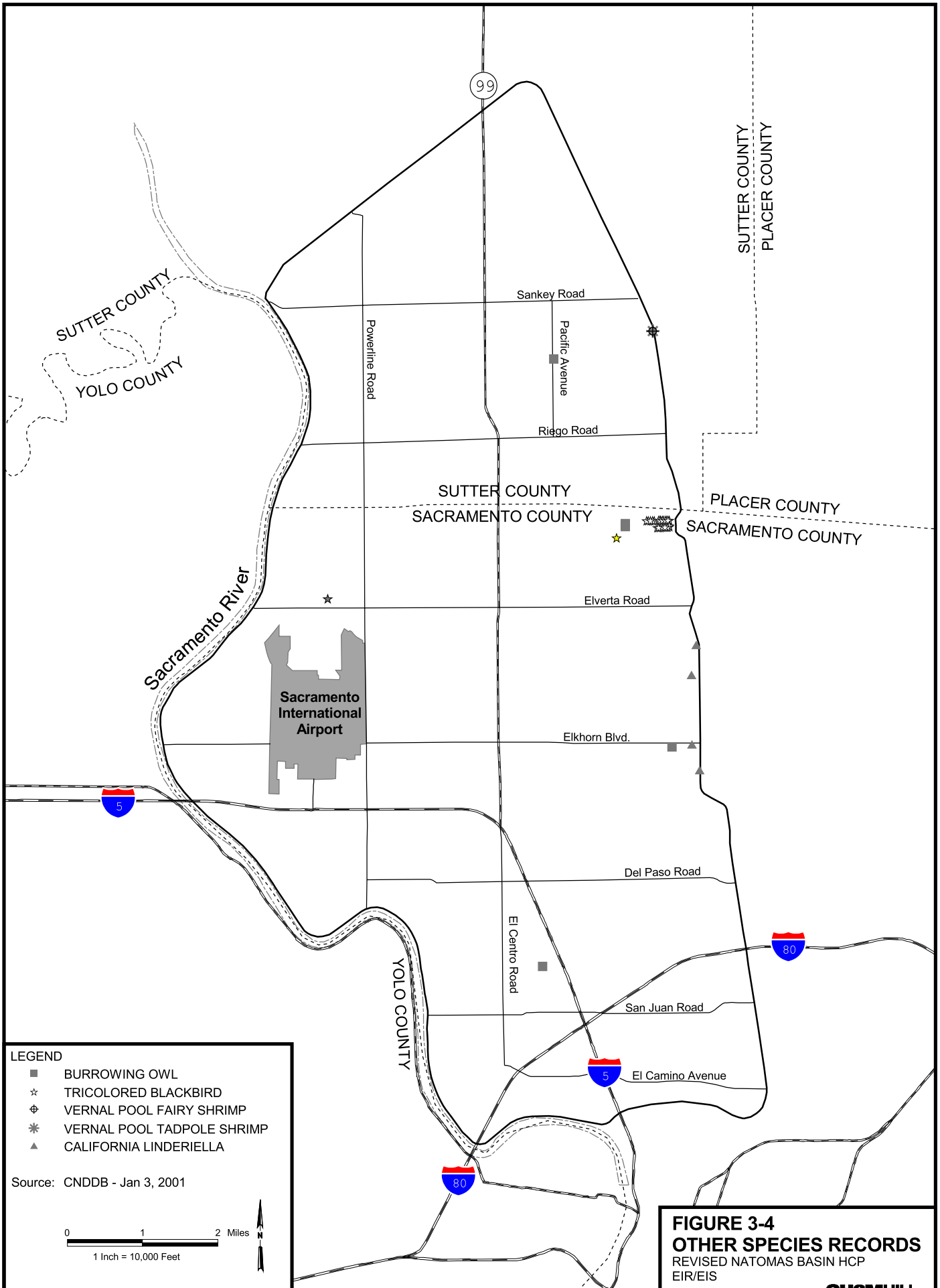
Tricolored Blackbird (*Agelaius tricolor*)

The tricolored blackbird is considered a Species of Concern by USFWS and is a state Species of Special Concern. The tricolored blackbird is a year-long resident throughout the Central Valley. This species breeds in large colonies near fresh water, preferably in emergent wetland with tall, dense cattails or tules, but also in thickets of willow, blackberry, and wild rose. Tricolored blackbirds forage on the ground in croplands, grassy fields, flooded land, and along edges of ponds (Zeiner et al., 1990). Tricolored blackbirds eat mostly insects, and selection of colony sites is primarily a function of proximity to concentrated insect food supplies (e.g., grasshoppers [*Orthoptera*], beetles and weevils [*Coleoptera*]) (Beedy and Hayworth, 1991). Emergent wetland vegetation, cattails and tules, and adjacent trees and shrubs provide cover. During fall, tricolored blackbirds may become nomadic, seeking food. In winter, flocks become more widespread in the Sacramento River Delta. Tricolored blackbirds often leave the immediate vicinity of their nesting colonies and concentrate in huge roosts in marsh habitat (Grinnell and Miller, 1944).

There have been nine documented occurrences (seven extant, two extirpated) in Sutter County. The two extirpated occurrences are located slightly northwest of the confluence of the Sacramento River and the Feather River, northwest of the basin. Tricolored blackbirds were located 0.2 mile below the Sacramento/Sutter County line, west of Natomas Drain Levee Road.

A 1997 tricolored blackbird survey conducted by Ted Beedy and Bill Hamilton found approximately 230,000 breeding tricolored blackbirds in California (Metro Air Park Property Owners' Association, 2000). A follow-up survey conducted in 1999 found fewer than 95,000 breeding individuals in California. A nesting colony is located on the Conservancy's Betts-Kismat-Silva reserve in the eastern edge of the Natomas Basin (Figure 3-4). The population of this nesting colony has increased in recent years (Roberts, pers. comm.).

The basin supports scattered copses of emergent marsh vegetation mostly within agricultural ditches and abundant rice and other agricultural fields that could provide nesting habitat for the species. Emergent marsh is the preferred nesting habitat for the species; however, because of the paucity of this habitat in the basin, the species has sought alternative nesting sites in agricultural fields. Unfortunately, routine agricultural practices can result in significant mortality of eggs and young birds. The behavior of nesting in less-than-optimal habitat indicates that the Natomas Basin has a very limited carrying capacity for the species, largely because of extensive conversion of marshland to agricultural



uses. In the absence of significant marsh habitat, the Natomas Basin currently offers little to the conservation of the species.

Swainson's Hawk (*Buteo swainsoni*)

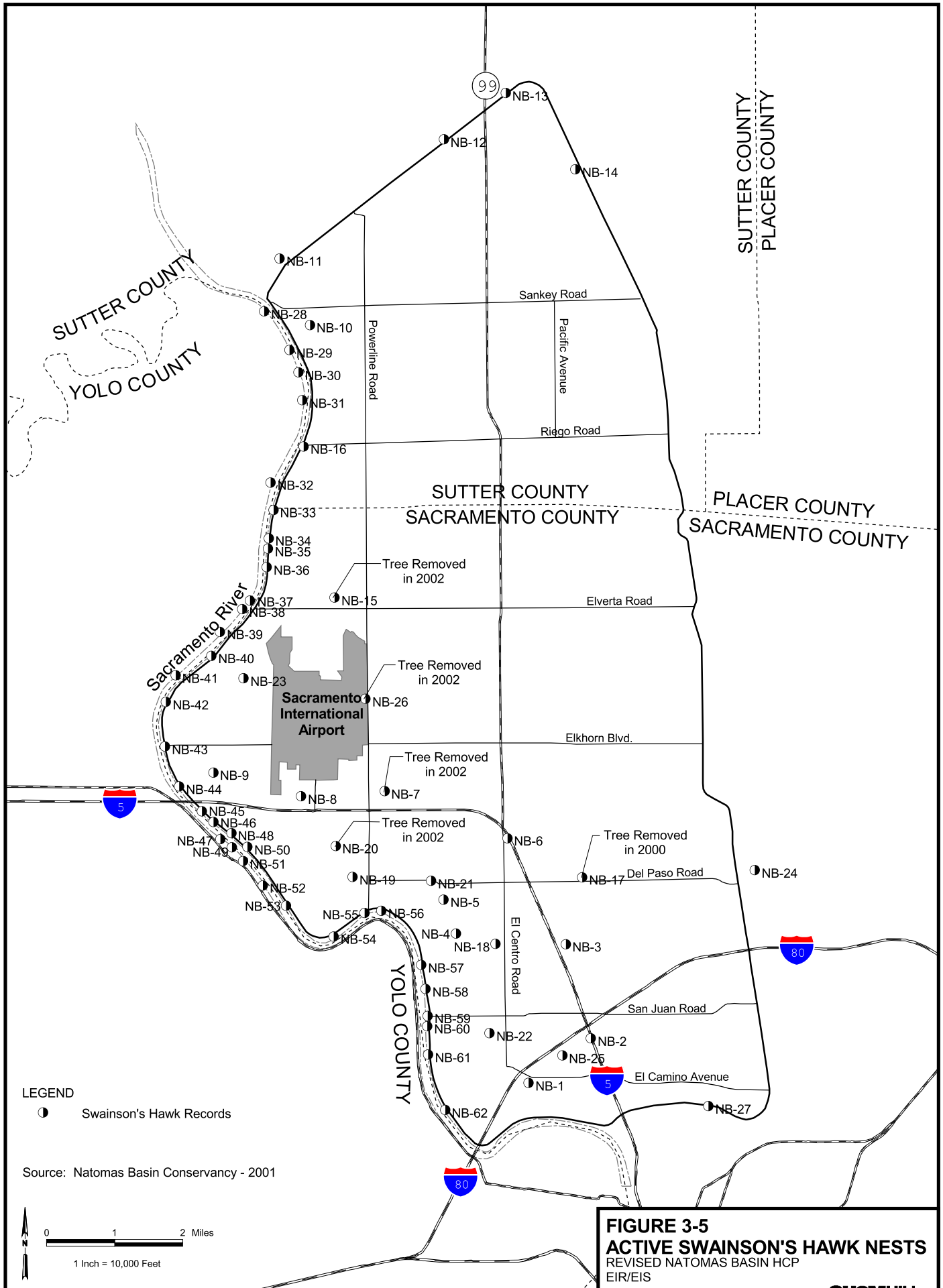
The Swainson's hawk is listed as a Threatened species under the state Endangered Species Act. Historically, it nested throughout lowland California. The current Swainson's hawk California nesting distribution, however, is limited to extreme northeastern California, the Central Valley, and a few isolated locations in the Owens Valley (CDFG, 1992, 1994b). The Swainson's hawk occurs in California only during the breeding season (March through September) and spends winters in South America.

Swainson's hawks begin arriving in the Central Valley in March from wintering grounds in South America to breed and raise their young. The earliest fledging of young occurs in July and the young remain with the parents for about one month following fledging. Swainson's hawk nesting preference is for large valley oaks (*Quercus lobata*), cottonwoods (*Populus fremontii*), or willow (*Salix goodingii*) within one mile of riparian areas. Swainson's hawks are opportunistic feeders, flushing prey (birds, rodents, and some insects) from fields, pastures and grasslands adjacent to their nests. Swainson's hawks require large nesting trees with a panoramic view of their foraging grounds. Foraging habitats and open fields and grasslands need to be within flying distance (maximum observed is 18 miles) and large enough to support the high densities of microtine rodent populations and birds upon which they feed.

Swainson's hawks have been observed foraging behind farm machinery (moving harvester blade or disc) and capturing rodents exposed by ground disturbance (Estep, 1989). Suitable cover types for foraging habitats include, in order of suitability: (1) native grassland; (2) agriculture soon after discing; (3) alfalfa and other hay crops; (4) fallow fields; (5) lightly grazed pasture; (6) combinations of hay, grain, and row crops; (7) rice fields prior to flooding and after draining; and (8) heavily grazed pasture. Flooded rice fields were formerly thought to be unsuited for foraging, but recent observations indicate that their system of levees, checks, and rice fields is used by Swainson's hawks (Dave Zezulak, CDFG, pers. comm., as reported in the HCP). Unsuitable cover types for foraging habitat include vineyards, mature orchards, cotton, thistle in fallow fields, and any crop where prey are unavailable because of high vegetation height and density.

Although nest sites are not found exclusively in riparian habitat, 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).

Swainson's hawk nesting in the Natomas Basin occurs primarily in the western portion of the basin (Figure 3-5). Most nest sites are located along the Sacramento River where large trees are available. The most recent survey of the Natomas Basin vicinity (SHTAC, 2001) shows 35 nest sites along the Sacramento River (22 on the east side and 13 on the west side). Twenty-seven nest sites are located within the basin, for a total of 62 nest sites in or immediately adjacent to the Natomas Basin. Two of these sites are considered abandoned because the nest trees have been removed.



In 2000, the Swainson's Hawk Technical Advisory Committee monitored 24 known nesting sites in the basin, 17 of which were used in 2000. Of these, 10 successfully nested in 2000 (i.e., reared young to fledging), producing a total of 20 fledglings (SHTAC, 2000). During 2001 surveys, two new territories were found in the interior of the Natomas Basin and a third new site was found adjacent to the Natomas East Main Drainage Canal (SHTAC, 2001). Of the 27 territories in the basin, 19 were used in 2001, producing 16 fledglings.

Aleutian Canada Goose (*Branta canadensis leucopareia*)

The Aleutian Canada goose was delisted by the USFWS on March 20, 2001, and is considered a federal Species of Concern due to ongoing monitoring activities pursuant to the delisting. The Aleutian Canada goose is a subspecies of the Canada goose, characterized by its smaller size and a distinctive white ring at the base of its black neck. The primary winter habitat for the goose's largest population segment is the Central Valley, and most of this population can be found by mid-December in the Modesto area (66 FR 15643; March 20, 2001).

Foraging habitat consists of pasture, flooded rice fields, and harvested fields (USFWS, 1991b). In addition, large ponds, flooded fields, and rice checks provide roosting habitat for the wintering geese (USFWS, 1991b). The Aleutian Canada goose occurs occasionally within the Natomas Basin, using this area as a stopover to its primary wintering range.

Additional information about the Aleutian Canada goose can be found in the HCP (Section II.C.4.a.), in the *Federal Register* notice that delists the species (66 FR 15643; March 20, 2001), and in the USFWS's Recovery Plan for the species (USFWS, 1991b).

Burrowing Owl (*Athene cunicularia*)

Burrowing owls are considered a Species of Concern by the USFWS and a Species of Special Concern by CDFG. Burrowing owls are small, long-legged birds of open terrain that use vacated animal burrows (e.g., ground squirrel burrows) or artificial structures (e.g., culverts) for nesting and shelter. Generally, foraging habitat consists primarily of open grasslands and grass/shrub lands where prey species (e.g., insects, small mammals) are readily available. The species is often found in roadsides and other disturbed areas inhabited by ground squirrels and with few visual obstructions. Little scientific information is available for the local burrowing owl population (e.g., home range information, wintering versus resident status), but suitable habitat in the project area consists of areas with small mammal burrows and nearby foraging areas.

Burrowing owls are neotropical migrants that occur throughout the western United States, including portions of northern Mexico and southern Canada. The species is also locally distributed throughout suitable habitat in the Caribbean, and in Central and South America (Haug, et al, 1993). California appears to have a nonmigratory population (primarily in the Imperial Valley), and is also a wintering ground for burrowing owls from other regions. Burrowing owls in northern California are probably migratory, but little information is known about the migration habitats of the northern California population (Haug, et al, 1993). The burrowing owl population is known to be in decline throughout its range because of various factors, including habitat destruction (e.g., agricultural practices, land development), vehicle collisions, and predation. In California, and in the project area specifically, urbanization is likely a key threat to this species.

There are 370 known burrowing owl occurrences in California (CDFG, 2001). Three Natomas Basin occurrences are recorded in the California Natural Diversity Database (Figure 3-4), with another five known burrowing owl sites on the Conservancy's Betts-Kismat-Silva and Ayala reserves and south of Elkhorn Boulevard west of S.R. 99 (Roberts, pers. comm.). Additional information about burrowing owls can be found in the HCP (Section II.C.4.a.) and in CDFG's *Staff Report on Burrowing Owl Mitigation* (CDFG, 1995).

Bank Swallow (*Riparia riparia*)

The bank swallow is state-listed as a Threatened species under the California Endangered Species Act. Historically, bank swallows nested on coastal bluffs in southern California and riverbanks throughout the Central Valley and northern California; however, the state's nesting population of bank swallow is currently concentrated on the banks of Central Valley streams. Approximately 75 percent of the current breeding population occurs along banks of the Sacramento and Feather rivers. Other colonies persist along the central coast from Monterey to San Mateo counties, and northeastern California in Shasta, Siskiyou, Lassen, Plumas, and Modoc Counties (Remson, 1978). There are no known breeding colonies remaining in southern California.

The bank swallow occurs in California during the breeding season (May through July) and winters in South America. Bank swallows begin arriving in the Central Valley from wintering grounds in South America in early March to breed and raise their young. Numbers decline in July and August as nesting colonies are abandoned and migration begins. Colonies are vacant by early August and some migrants could be observed through early- to mid-September. Bank swallows are rarely seen in California during the winter.

The bank swallow breeds from early May through July. Pairs usually nest colonially in groups of 10 to 1,500, although most colonies have 100 to 200 nesting pairs. Bank swallows require vertical banks or cliffs with fine-textured or sandy soils near streams, rivers, ponds, lakes, or the ocean for nesting. Bank swallows forage by hawking insects during long, gliding flights. Foraging occurs primarily over open riparian areas, but also over grassland, shrubland, and savannah habitats during the breeding season. Bank swallows feed on a wide variety of aerial and terrestrial soft-bodied insects including flies, bees, and beetles. The bank swallow uses holes dug in cliffs and river banks for cover; logs, shoreline vegetation, and telephone wires are also used for roosting.

There are 171 known bank swallow occurrences in California (CDFG, 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.

Loggerhead Shrike (*Lanius ludovicianus*)

The loggerhead shrike is a state Species of Special Concern. The loggerhead shrike occurs from the southern Canadian provinces south across most of the United States and into Mexico (American Ornithologists Union, 1957). The shrike is a resident species throughout the lowlands and foothills of California (Grinnell and Miller, 1944). The loggerhead shrike occurs in grasslands, agricultural lands, open shrublands, and woodlands (Bent, 1950). It prefers areas with perch sites (Zeiner et al., 1990). A study conducted in Illinois reported

that shrikes were most abundant near pastures, hedgerows, cornfields, and rural residential areas (Smith and Kruse, 1992). Shrikes nest in low trees, dense shrubs, and vines. They feed on insects, small reptiles, and small mammals (e.g., mice). This species frequently skewers prey on thorns, sharp twigs, barbed wire, or forces it into a tree crotch to feed on or to cache for storage (Zeiner et al., 1990).

The loggerhead shrike is common throughout most of lowland California (CDFG, 1990). This species is observed regularly throughout Natomas Basin. Suitable nesting and foraging habitat is 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 (Metro Air Park Property Owners' Association, 2000), and three shrikes were observed along the eastern portion of the Natomas Basin during habitat-mapping surveys of the basin in 2001 (May & Associates, 2001).

3.4.2.2 Special-status Species Not Covered Under the ITPs

Suisun Marsh Aster (*Aster lentus*)

The Suisun marsh aster is a List 1B species of the CNPS (rare or endangered in California and elsewhere). This species is a perennial herb, inhabiting brackish and freshwater wetland habitats. Although this species has not been recorded in the Natomas Basin, suitable habitat for this species occurs in the Natomas Basin.

Dwarf Downingia (*Downingia pusilla*)

The dwarf downingia is a List 2 species of the CNPS (rare or endangered in California but more common elsewhere). This species is an annual herb found in wet valley-foothill grassland habitats as well as vernal pools. Suitable habitat for this species occurs in the Natomas Basin.

Rose Mallow (*Hibiscus lasiocarpus*)

Rose mallow is a List 2 species of the CNPS (rare or endangered in California but more common elsewhere). This species is a perennial herb found in freshwater marsh habitats and vernal pools. Suitable habitat for this species occurs in the Natomas Basin.

Cooper's Hawk (*Accipiter cooperi*)

The Cooper's hawk frequents stands of live oak, riparian, or other woodland habitats. This bird preys on other birds, small mammals, insects, reptiles, and amphibians in a diverse range of habitats. The Cooper's hawk typically is found in areas without tree stands or patchy woodland habitat, although it is known to hunt in parks and residential areas of Sacramento that support trees. Nesting often occurs in riparian habitat, but nests can also be found in isolated tree groves. The aquatic, wetland, and agricultural areas of the Natomas Basin may provide potential foraging habitat; the riparian habitat along the Sacramento River provides suitable nesting and roosting habitat for this species.

Short-eared Owl (*Asio flammeus*)

The short-eared owl is a widespread winter migrant to the Central Valley, frequenting grassland and wetland habitats. The short-eared owl feeds primarily on small mammals, reptiles, amphibians, and arthropods (Bent, 1938; Earhart and Johnson, 1970). Dense vegetation, tall grasses, brush, ditches, and wetlands are used for resting and roosting cover (Grinnell and Miller, 1944). Undeveloped lands, especially grasslands and croplands with

herbaceous vegetation, may provide suitable foraging habitat for this species in the Natomas Basin.

American Bittern (*Botaurus lentiginosus*)

This species winters in fresh emergent wetlands, primarily west of the Sierra Nevada. In the Central Valley, the American bittern is fairly common from October to April and uncommon to rare the rest of year. This species eats mainly insects, amphibians, fish, crayfish, and small mammals. Foraging habitat consists of tall, fresh or saline emergent wetlands, or adjacent shallow water of lakes, backwaters of rivers, and estuaries. Suitable wintering habitat occurs in the emergent wetland habitat that is supported in some of the large canals and drains in the basin.

Ferruginous Hawk (*Buteo regalis*)

This species is a winter resident of grasslands and agricultural areas in California. The ferruginous hawk frequents open grasslands, sagebrush flats, desert scrub, and low foothills with surrounding valleys. The ferruginous hawk preys on mammals, birds, reptiles, and amphibians. This species typically roosts in open areas. Agricultural areas, pasture, and grasslands provide potential foraging habitat for this species in the Natomas Basin.

Mountain Plover (*Charadrius montanus*)

This species nests in high-elevation grasslands in the central United States, but spends winters in California from September to March. It is typically found in open habitats with sparse vegetation, such as low shortgrass plains, plowed fields, airports, and open sagebrush areas. This species feeds primarily on large insects, especially grasshoppers. In the Natomas Basin, plowed agricultural fields and other open, sparsely vegetated areas provide potential wintering habitat for this species.

Black Tern (*Chlidonias niger*)

The black tern was formerly a very common spring and summer visitor to fresh-emergent wetlands of California, but this species has declined throughout the range, especially in the Central Valley (Grinnell and Miller, 1944; Cogswell, 1977). Breeding is questionable in the Central Valley (Gaines, 1974). This species inhabits fresh emergent wetlands, lakes, ponds, moist grasslands, and agricultural fields. The black tern feeds on small fish, invertebrates, tadpoles, crayfish, and small mollusks. The rice lands throughout the basin provide potential foraging habitat (Grinnell and Miller, 1944).

Lark Sparrow (*Chondestes grammacus*)

The lark sparrow is a yearlong resident in lowlands and foothills throughout much of California. This species inhabits sparse valley-foothill hardwood, valley-foothill hardwood-conifer, open mixed chaparral and similar brushy habitats, and grasslands with scattered trees or shrubs (Zeiner et al., 1990). This species eats seeds, grains, and insects, foraging in agricultural and undeveloped areas around the Natomas Basin.

White-tailed Kite (*Elanus leucurus*)

The white-tailed kite is a yearlong resident in the Central Valley, rarely found away from agricultural areas. This species inhabits herbaceous and open stages of most habitats, mostly in cismontane California. Foraging in undisturbed, open grasslands, meadows, farmlands, and emergent wetlands, the white-tailed kite preys on small mammals, birds, insects, reptiles, and amphibians. Trees or large shrubs with dense canopies are used for cover and

roosting. Agricultural lands throughout the Natomas Basin provide suitable foraging habitat for this species. The white-tailed kite is fully protected under the Fish and Game Code.

Pacific-slope Flycatcher (*Empidonax difficilis*)

This species occurs in cismontane California, and is a widespread and fairly common summer resident in warm moist woodlands, including valley-foothill and montane riparian, coastal and blue oak woodlands, and montane hardwood-conifer habitats (Zeiner et al., 1990). This species is primarily insectivorous, feeding on flying insects, occasionally eating berries and seeds (Bent, 1942). Potential habitat for this species is associated with the riparian habitats along the Sacramento River and of RD 1000's and Natomas Mutual's system of canals and drains throughout the basin.

Little Willow Flycatcher (*Empidonax trailii brewsteri*)

This species is a spring and fall migrant at lower elevations, primarily in riparian habitats throughout California (Grinnell and Miller, 1944, Gaines, 1977a, 1977b; Remsen, 1978; McCaskie, et al. 1979; Garrett and Dunn, 1981). Preferred habitat for this species consists of extensive thickets of low, dense willows along the edges on wet meadows, ponds, or backwaters (Zeiner et al., 1990). The little willow flycatcher is primarily insectivorous, feeding on flying insects and occasionally eating berries and seeds (Bent, 1942). Riparian habitat associated with the Sacramento River, as well as some of the larger drainages in the basin, could provide suitable habitat for this species.

American Peregrine Falcon (*Falco peregrinus anatum*)

The American peregrine falcon has been delisted as a federal Endangered Species, but remains a Species of Concern and retains protected-species status. Peregrine falcons are listed as Endangered under the California Endangered Species Act, and are fully protected under the Fish and Game Code. Peregrine falcons occur throughout California, extending from Mexico to the Oregon border. This species declined substantially during the 1950s, 1960s, and 1970s as a result of pesticide accumulations (especially DDT). In 1981, only 39 breeding pairs were known in California (Monk, 1981). In the 1990s, breeding populations rebounded to an estimated 200 pairs, and additional increases have been noted. By 1998, there were 270 breeding pairs along the Pacific coast.

Active nesting sites are known along the coast north of Santa Barbara, in the Sierra Nevada, and in other mountains of northern California. In winter, the falcon is found inland throughout the Central Valley, and occasionally on the Channel Islands. Migrants occur along the coast, and in the western Sierra Nevada in spring and fall. In summer, this species is found primarily along the California coast, extending the length of the state from Oregon to the Mexican border. It is less-commonly observed in the Central Valley and occasionally wintering in the low-lying foothills of northeastern California.

Peregrine falcons favor cliffs, bluffs, rock outcrops, and similar high points overlooking open ocean, grasslands, or fields for nesting. Peregrine falcons feed on waterfowl, shorebirds, and seabirds, and are associated with high vantage points that are in proximity to areas where prey congregate. Preferred nesting areas are usually located on offshore island cliffs, coastal sea cliffs, and near large shallow interior lakes. For foraging, peregrine falcons favor open grasslands, agricultural fields, desert sagebrush flats, and similar open country in low-lying valleys and foothills. Peregrine falcons are adaptable, and have been

reported to nest and forage on and from tall buildings, bridges, viaducts, and towers where they feed on pigeons and European starlings.

There are 10 known peregrine falcon occurrences (nesting sites) in California (CDFG, 2001). There are no known nesting occurrences in Sacramento or Sutter counties. The peregrine falcon winters in the Sacramento Valley and occurs occasionally in the Natomas Basin. Most of the agricultural fields and seasonal wetlands are suitable foraging habitat. No suitable nesting habitat occurs in the Natomas Basin, although approximately 20,000 acres of low-quality suitable winter habitat (i.e., rice, alfalfa, and other agricultural fields) exists in the Natomas Basin for the falcon (Metro Air Park Property Owners' Association, 2000).

Greater Sandhill Crane (*Grus canadensis tabida*)

The greater sandhill crane is listed by CDFG as a Threatened species, and is considered Fully Protected under the Fish and Game Code. The greater sandhill crane is a common winter visitor to the Central Valley of California, with most flocks migrating into California from Washington and Oregon from October to March. The greater sandhill crane often occurs in mixed flocks of cranes and waterfowl, such as swans and Canada geese. This subspecies is closely related to the lesser sandhill crane (*Grus canadensis canadensis*); both greater and lesser sandhill cranes occur in California.

Historically, the greater sandhill crane was a fairly common breeder on the northeastern plateau (Grinnell and Miller, 1944). Now reduced greatly in numbers, it breeds only in Siskiyou, Modoc, Lassen, Plumas, and Sierra counties (James, 1977; Remsen, 1978; McCaskie et al., 1979). In summer, greater sandhill cranes occur in and near wet meadow, shallow lacustrine, and fresh emergent wetland habitats. It spends winters primarily in the Sacramento and San Joaquin valleys from Tehama County south to Kings County (Grinnell and Miller, 1944), where it frequents annual and perennial grassland habitats, moist croplands with rice or corn stubble, and open, emergent wetlands. It prefers relatively treeless plains. Greater sandhill cranes tend to return to historic wintering grounds.

Greater sandhill cranes do not nest in the Sacramento Valley. Currently, there are 310 nesting and wintering occurrences in California, with no reported occurrences in Sacramento or Sutter counties (CDFG, 2001). Sandhill cranes are not known to inhabit the Natomas Basin, but nearby wintering areas include the Sacramento-San Joaquin Delta to the south and the Butte Sink to the north.

Bald Eagle (*Haliaeetus leucocephalus*)

The bald eagle is an uncommon winter migrant in the Natomas Basin. In the Central Valley, this species predominantly forages on waterfowl in flooded fields, but also will take small mammals. Large, open agricultural areas of rice land, pasture, and short crops provide foraging habitat for this species in the basin.

Long-billed Curlew (*Numenius americanus*)

The long-billed curlew is a winter resident, foraging in open grasslands and croplands in the Central Valley. This species feeds on insects (adults and larvae), worms, spiders, crayfish, snails, and small crustaceans (Bent, 1929). Agricultural lands and undeveloped lands throughout the Natomas Basin provide suitable wintering habitat for this species.

Bewick's Wren (*Thryomanes bewickii*)

Bewick's wren is a common yearlong resident throughout California, inhabiting mixed and montane chaparral habitats and riparian habitats with a brushy understory. Bewick's wrens feed on insects and other small invertebrates, foraging on lower limbs and branches of small trees and shrubs, and stems of large herbaceous plants. Feeding occurs mostly within the cover of dense, shrubby vegetation (Grinnell and Miller, 1944; Bent, 1948; Cody, 1974). Riparian areas associated with the Sacramento River and larger drainages within RD 1000 and Natomas Mutual could provide suitable habitat for this species in the basin.

3.4.3 Waterfowl

The Pacific Flyway is the westernmost of North America's four flyways, or migration routes, which are defined as definite geographic regions with breeding grounds in the north, wintering grounds in the south, and a system of migration routes in between. The Pacific Flyway encompasses territory in three countries: northern and western Canada, Alaska and all states west of the Rocky Mountains in the United States, and western Mexico. The Central Valley lies at the southerly end of the Pacific Flyway migratory route. In pre-settlement times it provided ideal wintering habitat and attracted large numbers of waterfowl. Much of the presettlement habitat has been lost to development within the Central Valley for agriculture and urbanization.

Historically, the Central Valley contained approximately 4 million acres of wetlands. Approximately 1.5 million acres located in the Sacramento/San Joaquin River Delta and the Tulare Basin were permanent marshes, while the remaining 2.5 million acres were seasonal wetlands created by winter rains and spring snow melt from the Sierra Nevada. Today, approximately 300,000 acres remain; 100,000 acres are publicly owned (federal and state refuges) and 200,000 acres are privately owned (including private duck clubs). The remaining 300,000 acres provide wintering habitat for 60 percent of the Pacific Flyway's current waterfowl population, and migration habitat for an additional 20 percent of the population. Altogether, approximately 10 to 12 million ducks and geese, along with millions of other water birds, annually winter in or pass through the Central Valley each year; however, the number of waterfowl using the Central Valley has declined 40 percent to 50 percent over the last 30 years. The USFWS ranks Central Valley wetland habitat as one of the top five habitats in the U.S. for migrating waterfowl. Maintaining the Pacific Flyway for waterfowl depends largely on maintaining critical wetland habitat in the Central Valley.

Lying within the Central Valley, the Natomas Basin provides important migratory stopover and wintering habitat for waterfowl. Although almost all of the native marshes have been converted to agricultural and urban uses, flooded rice fields continue to attract and support migrant waterfowl. Some species may also utilize pasture, harvested rice, and other croplands for foraging.

3.5 Cultural Resources

This section describes the cultural background of the study area and presents known information on archaeological and historical resources in the study area. Other planning documents relevant to the Natomas Basin (see Section 3.1) provide information on known and potential areas where archaeological and historical resources could be encountered in the study area, and the procedures in place for the identification and protection of these

resources. Because of the extent of planning studies, uncertainty associated with the location of habitat reserves, and additional environmental review expected at the time the habitat reserves are developed, new record searches and archaeological surveys were determined to be unnecessary for this EIR/EIS.

3.5.1 Archaeological and Historical Significance of the Natomas Basin

3.5.1.1 Archaeological Resources

A substantial portion of California's prehistoric Native American populations occupied the Sacramento Valley. The Nisenan, or Southern Maidu, subsisted in the lower Sacramento Valley by collecting plant foods, fishing, and hunting. Seasonal flooding of the American and Sacramento rivers provided a variety of plant and animal resources for the Nisenan.

Known prehistoric archaeological sites in the Natomas Basin are limited to two scatters of stone artifacts located north of Elkhorn Boulevard (Site Nos. CA-SAC-244 and -276) and a site located adjacent to the East Drainage Canal north of Del Paso Road (Site AF-34-14). Other archaeological resources may be buried under alluvial deposits. It is expected that archaeological resources would most likely be encountered on low knolls or other elevated areas in the basin.

3.5.1.2 Historical Resources

Subsequent to settlement of the Sacramento Valley region by Europeans, the Sacramento region became recognized as a destination for early nineteenth-century settlers, a trade center during the gold rush era, and the state capitol. Extensive development occurred in Sacramento during the late nineteenth and early twentieth centuries, but use of the Natomas Basin prior to reclamation was generally limited to seasonal grazing and other uses compatible with its "swamp land" designation. Reclamation of the Natomas Basin for agriculture began in earnest by the Natomas Company as part of the Sacramento Flood Control Project, with most of the primary levee construction activity occurring in the 1910s.

Although early settlement was limited, significant historical resources exist within the Natomas Basin. Key historical resources in the Natomas Basin include:

- **Rural Historic Landscape District.** The entire RD 1000 service area (including the entire Natomas Basin) is listed with the *National Register of Historic Places* and the *Historic American Engineering Record*. The RD 1000 Rural Historic Landscape District has been listed with the *National Register* because it provides a significant historical context to reclamation and flood control efforts in the Sacramento River Basin for the Sacramento Flood Control Project. Individual resources, as follows, have been identified as contributing to the features of the district.
 - Levees constructed under the Sacramento Flood Control Project
 - The internal system of primary drainage canals
 - RD 1000 pumping plants 1-A and 3
 - Garden Highway from Orchard Lane to Verona (Natomas Cross Canal), as well as several interior roads, including portions of Del Paso Road, San Juan Road, and El Centro Road

- Large-scale land patterns characteristic of the ownership pattern that developed following reclamation of the Natomas Basin
- **Witter Ranch (or Witter Ranch Historic Farm).** Determined to be a significant historic resource by *National Register* criteria and listed as a California Point of Interest. The *North Natomas Community Plan* incorporates 26 acres of the historic Witter Ranch as a permanent agricultural preserve, and it is now a part of the Sacramento County park system.

The following additional historical resources have been identified in prior studies of the Natomas Basin:

- **Historic road, beginning at Garden Highway and Natomas Main Drainage Canal, extending approximately 3 miles northwest.** This feature does not follow the route of contemporary roadways, and is not considered to be a significant historical resource (City of Sacramento, 1996b).
- **Union Pacific/Western Pacific Railroad (Site No. CA-SAC-464H).** The significance of this resource has not been evaluated.
- **Three bridges (Site Nos. 24C0218, -105, -106).** These bridges were assessed and determined not to be significant historical resources.
- **Eight buildings** of greater than 50 years in age (seven residences and one shed/pump house) were identified in the Draft EIR for Sacramento County's proposed General Plan Amendment (Sacramento County, 2000). The significance of these resources has not been evaluated.

3.5.2 City of Sacramento

Portions of the City's permit area have been determined to be a sensitive cultural resource area because of its proximity to the Sacramento River and the American River. North Natomas has been rated as having a medium to high archaeological sensitivity, and the southwest portion of South Natomas also has been identified as an archaeologically sensitive area.

The City addresses concerns about cultural and historical resources through its environmental review of development entitlement and permit processing. The City reviews proposed development with known, mapped archaeological resources, and an archaeological report and the implementation of the City's standard archaeological mitigation measures may be required as a condition of approval if it is determined that the proposed development would occur in an area for which cultural resources may be disturbed. The City has undertaken specific actions to evaluate and protect cultural resources as part of its development-planning processes in the Natomas Basin. The results of this effort have included the preservation of Witter Ranch and the recordation of the Rural Historic Landscape District in the Historic American Engineering Record. The recordation will include photographic and narrative documentation of RD 1000 as a historic landscape feature (Tim Washburn, pers. comm., January 15, 2002).

3.5.3 Sacramento County

For its proposed *General Plan Amendment* north of Elkhorn Boulevard, Sacramento County conducted research on potential cultural and historic resources. The research included the use of historic maps, a cultural-resource survey record search, review of previously prepared reports on cultural-resource surveys, review of building records, requests for response to inquiry to the Native American Heritage Commission and Sacramento County Historical Society, and meeting with the Office of Historic Preservation. The County's analysis for the *General Plan Amendment* project (Sacramento County, 2000) concluded that:

- Low knolls should be considered areas of high sensitivity for historic and prehistoric cultural resources.
- Verification and further coordination with Native Americans may be necessary for sites CA-SAC-244 and -276.
- Former locations of building sites noted on the Rio Linda (formerly Arcade) and Taylor Monument (Elkhorn Weir) topographic maps dated 1909 and 1951 should be verified and a determination should be made if artifacts of archaeological significance are present.
- Buildings identified as more than 50 years old should be recorded and evaluated (to avoid potential errors that may exist in building records). It should be verified if other old buildings exist within the vicinity.
- Additional cultural-resource analysis and appropriate mitigation is required for potential, future urbanization or other activities involving specific plans, rezoning, and/or development entitlements.

3.5.4 Sutter County

Sutter County has a low to moderate archaeological sensitivity, likely because of the periodic flooding of the region. A natural high spot or area along natural drainages was determined in general to be of a high archaeological sensitivity.

Sutter County's standard practices require that archaeological reconnaissance be performed for development occurring in areas of high archaeological sensitivity. Standard practices established by Sutter County require that if resources are discovered, the developer must implement the mitigation measures identified in the applicable archaeological report. Typically, these measures would include presence during construction of a certified archaeologist to evaluate the onsite findings for their cultural significance under the National Historic Preservation Act. In its General Plan EIR, Sutter County concludes that development projects associated with the implementation of the General Plan that follow the above guideline would have a less-than-significant impact on cultural resources in Sutter County. Sutter County did not identify any historic features within the Industrial-Commercial Reserve, nor elsewhere in the Natomas Basin. Five historic sites are located in Area B, all representative of early settlement in Sutter County in the mid-1800s.

3.6 Land Use

This section describes the general patterns of existing and planned land use within the study area, including the local land use planning goals and policies relevant to the Proposed Action. Agricultural land use within the study area is also discussed. Additional discussions that focus on the habitat categories assigned to biological resources in the Natomas Basin, including the habitat-based land-use GIS database developed to identify and assess project-specific impacts to biological resources in the study area, are presented in Section 3.4, Biological Resources.

3.6.1 Surrounding Land Uses

The Natomas Basin is bounded by the Natomas Cross Canal to the north, Garden Highway to the south, the Natomas East Main Drainage Canal (i.e., Steelhead Creek) to the east, and the Sacramento River to the west. Surrounding land uses to the north of the Natomas Basin are primarily farmlands. The American and Sacramento Rivers are located to the south and west of the Natomas Basin, respectively. To the east, land uses consist of urbanized and semirural development within the City of Sacramento and Sacramento County, and agricultural use in Sutter County. Urbanized centers within the immediate vicinity (less than 10 miles) of the study area include downtown Sacramento, north Sacramento, and the City of West Sacramento.

The City's permit area is bordered by unincorporated Sacramento County lands to the north and west, including the peninsula of unincorporated lands in the North Market Boulevard area (the "panhandle" annexation area). With the exception of the Sacramento International Airport and commercial and light industrial development along North Market Boulevard, these unincorporated lands are generally undeveloped. The City plans to annex portions of this unincorporated panhandle area, which is estimated to be approximately 1,441 acres, within the permit term of the HCP and the City's ITP. (Authorized development in the panhandle portion of the City's permit area would be 640 acres.)

3.6.2 Existing and Planned Land Uses

The Natomas Basin comprises 53,537 acres and is within the local jurisdictions of the City of Sacramento, Sacramento County, and Sutter County. Table 3-9 shows the jurisdictional acreage within the Natomas Basin. Land uses within the City of Sacramento, Sacramento County, and Sutter County are described in the following sections, and are quantified in Section 3.4. RD 1000 and Natomas Mutual have jurisdiction over the canal and drainage system within the Natomas Basin.

TABLE 3-9

Summary of Total Areas by Jurisdiction in the Natomas Basin

Local Government	Acreage Within Natomas Basin	Natomas Basin HCP Acreage
City of Sacramento	12,801	8,050
Sacramento County (unincorporated)	23,854	1,983
Sutter County	16,882	7,467
Total	53,537	17,500

Source: Habitat and Land Use Assessment Database (CH2M HILL, 2002).

3.6.2.1 City of Sacramento

At the time of the *City of Sacramento General Plan Update* in 1988, the predominant land uses in North and South Natomas were agriculture and other vacant land, with a concentration of urban development (primarily residential and commercial) in southern and eastern South Natomas (Gardenland and Northgate neighborhoods).

The future land uses anticipated in the General Plan include a variety of uses within the study area, such as a concentrated core of industrial/employee-intensive land uses north of I-80, surrounded by mixed residential densities and park/open space/recreational uses; a core of heavy commercial or warehouse uses north of I-80 along Northgate Boulevard; and a regional commercial core along the I-5 corridor. Other land uses would consist primarily of mixed residential uses, including recreational and community commercial uses.

Specific land uses within the City's permit area are also identified in the Community Plans prepared for South and North Natomas. The South Natomas Community Plan, adopted in 1988, describes specific land-use patterns for the area generally bordered by I-80 to the north and west, Garden Highway to the south, and the Natomas East Main Drainage Canal to the east. The entire 3,464-acre South Natomas area is almost fully developed, with approximately 900 acres remaining undeveloped. Lands within South Natomas developed prior to 1998 would be exempt from compliance with the provisions of the HCP. Development occurring in the Willow Creek area of South Natomas is included within the 900-acre total for lands subject to the HCP.

North Natomas remains the primary growth area for the City. The North Natomas Community Plan was adopted in 1994, and generally covers lands within the city limits north of I-80 and west of the Natomas East Main Drainage Canal. The community vision described in the *North Natomas Community Plan* included four key features: (1) a town center as a focal point for the community, (2) complete neighborhoods surrounding the town center, (3) mixed-use employment centers, and (4) effective transit/land use interdependency. As described in the HCP, approximately 7,150 acres of developable land within North Natomas would be subject to the HCP. This developable acreage includes a 640-acre portion of the unincorporated panhandle area that is under consideration for annexation to the City. Development within North Natomas that would be exempt from the provisions of the Proposed Action includes Arco Arena and commercial/industrial development in the North Market Boulevard area. The environmental impacts of that anticipated development were evaluated in separate EIRs for the *General Plan Update*, the *South Natomas Community Plan*, and the *North Natomas Community Plan*.

3.6.2.2 Sacramento County

Unincorporated Sacramento County lands within the Natomas Basin total approximately 23,854 acres. The primary land use within this area is agricultural, with a diverse mix of crop types including rice, row crops, and orchards. Nonagricultural land uses include the 1,520-acre Sacramento International Airport complex, light industrial development along North Market Boulevard, and Teal Bend Golf Course northwest of the airport.

Unincorporated county lands include the panhandle that extends into the North Market Boulevard area. This 1,441-acre area is under consideration for annexation into the City and, for planning purposes, 640 acres of this area are included in the 8,050 acres of City lands that would be addressed by the conservation measures of the Proposed Action.

The Metro Air Park special planning area (MAP) project comprises the development of commercial, industrial, manufacturing, and airport-related land uses, open space, and a golf course. MAP is within unincorporated Sacramento County and has been approved for development by the Sacramento County Board of Supervisors, and the USFWS issued an ITP for the MAP HCP on February 21, 2002.

The applicant (MAP Property Owner's Association) prepared and submitted an HCP to the USFWS for the MAP project independent of the HCP evaluated in this EIR/EIS. The MAP HCP also was the subject of separate environmental review by the USFWS under NEPA. Although the MAP is not part of the Proposed Action evaluated in this EIR/EIS, the acreage affected by the MAP project is discussed under the Proposed Action (see Chapter 2) because it is factored into the 17,500 acres in the Natomas Basin that is the study area of the proposed HCP evaluated in this EIR/EIS. The intent of including the MAP acreage is to address impacts to covered species in a way that adequately represents current development plans.

3.6.2.3 Sutter County

The Sutter County portion of the Natomas Basin consists of 16,882 acres of mostly agricultural land. According to the Sutter County General Plan, the majority of the land within the Natomas Basin is designated as Industrial-Commercial Reserve along the S.R. 99 corridor. The remainder of Sutter County lands, within the Natomas Basin and in Area B, are primarily designated for agriculture. Area B, however, includes four small, low-density rural communities. These include Nicolaus, located south of the Bear River near SR 99; East Nicolaus, located at the intersection of SR 70 and Nicolaus Avenue; Trowbridge, located along Pacific Avenue, north of Nicolaus Avenue; and Rio Oso, located south of the Bear River at the intersection of Pacific Avenue and Bear River Drive. Other rural residences and small businesses are found throughout Area B, primarily in the northern and eastern portions of the area.

Implementation of the *Sutter County General Plan 2015* provided for the conversion of a contiguous portion of land in Sutter County, within the Natomas Basin, from an Agriculture land-use designation to an Industrial-Commercial Reserve designation. This change converted 10,500 acres to the Industrial-Commercial Reserve designation, of which 9,588 acres are within the Natomas Basin. The *South Sutter County Specific Plan* was recently approved for development of the first 3,500 acres of the Industrial-Commercial Reserve. For the 3,500-acre Specific Plan area, 85 percent of the land would be for industrial uses and 15 percent would be for commercial uses. Other than specifying the total amount of development allowed and the ratio of allowable uses within the Industrial-Commercial Reserve land-use designation, the *Sutter County General Plan* does not specify or plan the actual pattern of development. According to the *Sutter County General Plan Update EIR*, the County finds that it is likely that development will not occur piecemeal and that an urban core will be surrounded by an agricultural border, as a result of development in the area. Each development project would be considered by the County based upon its merits and whether it is consistent with the General Plan.

Currently, urban development within the Industrial-Commercial Reserve is limited and mostly occurs along Pacific Avenue between Riego Road and Sankey Road. This development is primarily for agricultural and heavy-commercial industries, including rice milling and distribution of heavy equipment and building materials. A 250,000 square-foot food distribution center (Sysco) was recently constructed at the southeast corner of Sankey Road and Pacific Avenue.

3.6.3 Relevant Land-Use Planning Goals and Policies

A local planning agency will set forth goals and policies within its General Plan that provide direction on how growth and development should occur for the different elements of a general plan. The following sections summarize the land-use goals and policies, from the City of Sacramento and Sutter County General Plans, that are most relevant to the HCP.

3.6.3.1 City of Sacramento

Table 3-10 summarizes the relevant land-use goals and policies for the Natomas Basin from the *City of Sacramento General Plan Update*.

TABLE 3-10
Summary of City of Sacramento General Plan Land-Use Goals

Topic	Goal	Policy Statement
Overall Urban Growth Policy Statements	N/A	Policy 1 - Quality of Life: It is the policy of the City to enhance and maintain the quality of life by adhering to high standards for project and plan evaluation as they relate to the characteristics that help define the quality of life in the City.
	N/A	Policy 3 - Economic Development and Employment Opportunities: It is the policy of the City to actively promote the continued vitality and diversification of the local economy, and to expand employment opportunities for City residents.
	N/A	Policy 4 - New Growth Areas: It is the policy of the City to approve development in the City's new growth areas that promotes efficient growth patterns and public service extensions, and is compatible with adjacent developments.
	N/A	Policy 5 - Urban Conservation and Infill Areas: It is the policy of the City to promote the reuse and rehabilitation of existing urban development as a means to meet projected growth.
	N/A	Policy 9 - Local and Regional Government: It is the policy of the City to cooperate with the region's various public jurisdictions on matters of mutual interest including social, economic, and environmental issues; land use policies; and private development project review.
	N/A	Policy 10 - Open Space and Natural Resource Conservation: It is the policy of the City to conserve and protect natural resources and planned open space areas, and to phase the conversion of agricultural lands to planned urban uses.
Preservation of Natural Resources	Goal B: Retain the riparian forest and grassland vegetation along the waterways and floodways in North Natomas and South Sacramento.	Policy 1: Protect the wooded areas along the drainage canals.
	Goal E: Establish development standards for the water-related open-space areas throughout the City to enhance their visual amenities.	Policy 2: Preserve the undeveloped open space areas and wildlife habitats along the East Drainage Canal.
		Policy 3: Design new floodways to be built in North Natomas and South Sacramento, to be aesthetically pleasing and offer limited passive recreation as well as wildlife sanctuaries.

TABLE 3-10
Summary of City of Sacramento General Plan Land-Use Goals

Topic	Goal	Policy Statement
Managed Production of Resources	Goal A: Phase the conversion of agricultural lands to urban uses while implementing the goals and policies in the North Natomas Community Plan.	Policy 1: Work with Sacramento County to explore the feasibility of an agricultural preservation plan.

Source: City of Sacramento (1988a).

3.6.3.2 Sutter County

Table 3-11 summarizes the relevant land-use goals and policies for the study area, from the *Sutter County General Plan 2015* policy document.

TABLE 3-11
Summary of Sutter County General Plan Land-Use Goals

Topic	Goal	Policy Statement
Commercial and Industrial Land	1.D To designate adequate commercial and industrial land to provide convenient and valuable business areas and employment opportunities within Sutter County.	1.D-1 The County shall designate specific areas suitable for commercial and industrial development and reserve such lands in a range of parcel sizes to accommodate a variety of commercial and industrial uses.
Industrial Buffers	1.E To reduce the potential for conflicts between the industrial land uses and surrounding uses which are sensitive to the impacts of industrial development.	<p>1.E-1 New development that may be incompatible with adjacent uses shall be required to provide buffer zones consistent with County standards to reduce anticipated conflicts with existing and future land uses.</p> <p>1.E-2 The County shall maintain, where feasible, areas for expansion around existing industrial development and shall generally discourage the redesignation of industrial lands to uses not compatible with industrial development unless it is demonstrated that such changes will not impact existing or planned future development.</p> <p>1.E-3 The County encourages industrial development to be developed in contiguous or generally consolidated areas to reduce the potential for conflicts with surrounding uses.</p>
Agricultural Land	1.F To minimize conflicts between agricultural and non-agricultural uses.	<p>1.F-2 The County shall require that all land set aside or utilized for mitigation of development in Sutter County or the Natomas Basin demonstrates that its creation and existence will not adversely impact existing and/or future planned agricultural or urban development.</p> <p>1.F-3 The County shall continue to implement its Right to Farm Ordinance.</p> <p>1.F-4 The County shall protect agricultural operations from conflicts with non-agricultural uses by requiring buffers between proposed non-agricultural uses and adjacent agricultural operations.</p>

TABLE 3-11
Summary of Sutter County General Plan Land-Use Goals

Topic	Goal	Policy Statement
Open Space, Habitat, and Natural Resources	1.G To preserve and protect open space and natural resources and reduce pollution.	1.G-1 The County shall encourage development projects to minimize their impacts to open space areas and wildlife habitats.

Source: Sutter County (1996a).

3.6.4 Agriculture in the Natomas Basin

Agriculture is the primary land use within the Natomas Basin, with approximately 42,000 acres in agricultural production under the baseline condition. Primary crops grown in the Natomas Basin include rice, sugar beets, safflower, wheat, barley, alfalfa, corn, pasture land, tomatoes, and fruit trees. The pattern of agricultural use within the Natomas Basin has been stable in recent years. According to the *Sacramento County General Plan* (County of Sacramento, 1993), approximately 9,195 acres of farmlands are under Williamson Act contracts in the Sacramento County portion of the Natomas Basin. Sutter County only recently began participating in the Williamson Act program.

Farmland resources in California are monitored by the Department of Conservation. The Farmland Mapping and Monitoring Program (FMMP) produces maps of important farmlands, and tracks land use changes that affect important farmlands. As shown in Table 3-12, most of the undeveloped Natomas Basin is considered important farmland.

TABLE 3-12
Farmland Mapping and Monitoring Program Acreage in Study Area

FMMP Category	City of Sacramento	Metro Air Park	Other Sacramento County	Sutter County	Total
Prime Farmland ^a	5,010	1,543	14,311	8,494	29,358
Farmland of Statewide Importance ^b	856	309	3,918	7,996	12,079
Farmland of Local Importance ^c	1,938	0	418	0	2,356
Unique Farmland ^d	13	47	667	2	729
Grazing Land	48	38	199	148	433
Urban and Built-Up Land	4,478	0	1,059	118	5,655
Other Land ^e	494	13	1,284	124	1,915
Water	0	0	12	1	13
Total	12,836	1,950	21,869	16,882	53,538

- ^a Prime Farmland is farmland with the best combination of physical and chemical features able to sustain long-term production of agricultural crops. This land has the soil quality, growing season, and moisture supply needed to produce sustained high yields. Land must have been used for production of irrigated crops at some time during the four years prior to the mapping date.
- ^b Farmland of Statewide Importance is similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture. Land must have been used for production or irrigated crops at some time during the four years prior to the mapping date.
- ^c Farmland of Local Importance is land of importance to the local agricultural economy as determined by each county's board of supervisors and a local advisory committee. In Sacramento County, locally important farmlands are lands which do not qualify for Prime, Statewide, or Unique designation but are currently irrigated crops or pasture or nonirrigated crops; and lands which currently support confined livestock, poultry operations, and aquaculture. For Sutter County, the Board of Supervisors determined that there will be no Farmland of Local Importance for Sutter County.
- ^d Unique Farmland is farmland of lesser-quality soils used for the production of the state's leading agricultural crops. This land is usually irrigated, but may include nonirrigated orchards or vineyards as found in some climatic zones in California. Land must have been cropped at some time during the four years prior to mapping date.
- ^e Other Land includes lands not included in any other mapping category. Common examples include low-density rural developments; brush, timber, wetland, and riparian areas not suitable for livestock grazing; vacant and nonagricultural land surrounded on all sides by urban development; confined livestock, poultry or aquaculture facilities; strip mines, borrow pits; and water bodies smaller than forty acres.

FMMP= Farmland Mapping and Monitoring Program
Source: Farmland Mapping and Monitoring Program, 2001.

Additional discussion on agricultural land use is included in Sections 3.4 and 4.4, Biological Resources, because land use classes are discussed in this EIR/EIS largely in the context of habitat for biological resources.

3.7 Socioeconomics

This section summarizes the social and economic conditions, within the study area and surrounding areas, relevant to determining significant impacts. The information presented in this section is based on the planning documents described in Section 3.1 and information obtained from the Sacramento Area Council of Governments (SACOG).

3.7.1 City of Sacramento and Sacramento County

3.7.1.1 Population

The population for the area of the City of Sacramento within the Natomas Basin is estimated to be 37,513 persons, as summarized in Table 3-13 (SACOG, 2001). A small population (849 persons) exists within the unincorporated area of Sacramento County. In total, the population residing within the greater Sacramento area of the Natomas Basin is approximately 3.25 percent of the population for Sacramento County. The population residing within the jurisdiction of the City of Sacramento accounts for approximately 9.25 percent of the City's population. Projections for the year 2025 show that the total estimated population of Sacramento County is anticipated to increase to approximately 1.7 million persons, of which the Natomas area will account for approximately 6.24 percent.

TABLE 3-13
Estimated Population Within the Natomas Basin and Vicinity, Sacramento County

Jurisdiction	Estimated Current Total Population (1999)	Estimated Current Natomas Basin Population (1999)	Projected Total Population (2025)
City of Sacramento	406,000	37,513	528,880
Sacramento County, Unincorporated	642,700	849 ^a	–
Sacramento County, Total	1,189,100	38,362	1,695,506 ^b

Source: SACOG Website, 2001.

^a Study area population based on data for North and South Natomas minor zones for each jurisdiction, as defined by SACOG.

^b 2025 projection data for minor zones not available. Natomas area projected to be 105,879 for both City and County jurisdictions.

3.7.1.2 Employment

The employment base for the Sacramento region consists of government, trade, and services sectors. Within the City, employment is balanced among heavy-commercial/warehouse, office, and retail-commercial sectors, based on estimates from land-use designations. According to the *City of Sacramento General Plan EIR*, the Natomas area supports approximately 3.5 percent of the City's workforce, approximately equally categorized as industrial jobs and community/neighborhood commercial jobs. These jobs are currently concentrated primarily in South Natomas because the North Natomas workforce is largely agricultural. The majority of the City's employment increase is expected to occur in the Natomas area, primarily North Natomas. Based on land-use designations, the majority of employment growth is projected to be in the regional office sector; but industrial and community/neighborhood commercial sectors are projected to grow as well.

3.7.2 Sutter County

3.7.2.1 Population

Sutter County's current total population is approximately 77,900 (SACOG, 2001), and is projected to be 134,708 in 2025. Both Sutter County portions of the Study area are contained in SACOG's South Sutter Regional Analysis District (RAD). The population of the South Sutter RAD is currently 3,036 and is projected to grow to 4,246 in 2025 (Table 3-14; SACOG, 2001). Minor zones within the South Sutter RAD do not correspond to the Natomas Basin boundary; therefore, it is difficult to state the current population of the Natomas Basin in Sutter County. Residences in the Sutter County portion of the Natomas Basin are limited and include scattered farmhouses along the east side of Garden Highway and the west side of Natomas Road, and several residences along Howsley Road in the far north of the Natomas Basin. Therefore, the estimated population would be quite small, relative to the overall residential population of the South Sutter RAD. The future population in the Sutter County portion of the Natomas Basin is not expected to grow substantially, because planned development consists entirely of commercial and industrial land uses.

TABLE 3-14
Estimated Population Within the Natomas Basin and Vicinity, Sutter County

Area	Estimated Current Population (1999)	Projected Population (2025)
Natomas Basin, Sutter County	N/A	N/A
South Sutter County RAD	3,036	4,246
Sutter County, Total	77,900	134,708

Source: SACOG, 2001.

3.7.2.2 Employment

Agriculture and related industries provide the key employment base for Sutter County, and some minor growth is expected in this industry group over the General Plan's planning horizon. Consistent with other areas dependent on an agricultural employment base, Sutter County experiences high rates of seasonal unemployment. Most job growth over the past decade is associated with increases in population, and job growth is expected to continue as population increases. Growth is primarily expected to occur in service, retail, local government, and education employment. Moderate growth is expected for manufacturing, wholesale, and agriculture industry groups. Professional-specialty and executive/administrative/management occupational groups have experienced the greatest growth in recent years and are expected to continue to grow.

3.8 Traffic and Circulation

This section provides a discussion on the existing transportation network within the vicinity of the Natomas Basin, which is shown in Figure 1-1.

3.8.1 City of Sacramento

Transportation within the City of Sacramento is highly dependent on automobile use, although mass transit (light rail and bus) services, bikeways, and pedestrian paths are available and planned. The I-5/S.R. 99 and I-80 systems are the primary transportation corridors within the city limits in the Natomas Basin. Other existing major north/south roadways within the vicinity of the study area include Power Line Road, El Centro Road, and Truxel Road. Major east/west roadways include Elverta Road, Elkhorn Boulevard, Del Paso Road, and San Juan Road.

Other modes of transportation within the City of Sacramento and the study area include planned light rail service to the Natomas area, and the existing and future-planned expansion of the fixed-route bus system. Light rail, regional bus service, and a neighborhood bus shuttle service are identified by the City as planned services for North Natomas. Existing and proposed on-street and off-street bikeways are on most of the major and minor roadways in the Natomas area, as part of the Sacramento City/County Bikeway Master Plan and the North Natomas Community Plan. Off-street bikeways and pedestrian paths are planned along the north and west boundaries of North Natomas, including along Fisherman's Lake.

3.8.2 Sacramento County

Sacramento County is dependent on automobile-based transportation. Freight and commuter rail, light rail, and bus transit do not currently service the Natomas area of Sacramento County outside of the panhandle annexation area. The Union Pacific Railroad operates a line adjacent to the Natomas East Main Drainage Canal (Steelhead Creek), but does not stop in the area. Major freeway access to Sacramento County includes I-5, I-80, and S.R. 99. Elkhorn Boulevard and Elverta Road are the major roadways in the area. Elverta Road is classified as a two-lane rural highway. Small public and private rural roadways are located throughout undeveloped Sacramento County, and RD 1000 and Natomas Mutual maintain a network of access roads along area canals. A description of expected future congestion on roadways of regional significance is presented above in Section 4.8.

3.8.3 Sutter County

Sutter County is dependent on its roadway system for transportation, with automobile use comprising the majority of trips taken in the county. S.R. 99/70 is the primary regional transportation corridor in southern Sutter County, serving north/south travel. Garden Highway and Natomas Road (abutting the Natomas East Main Drainage Canal) are major county roads also accommodating north/south traffic in the Natomas Basin, with Pacific Avenue and Pleasant Grove Road serving north/south travel in Area B. East/west travel is accommodated by major and minor county roads, including Sankey and Riego roads in the Natomas Basin, and Howsley Road, West Catlett Road, Nicolaus Avenue, and Bear Creek Drive in Area B. Small public and private rural roadways are located throughout Sutter County in the Study area, and RD 1000 and Natomas Mutual maintain a network of access roads along canals and drains in the Natomas Basin.

Other modes of transportation within Sutter County include a fixed-route bus system that offers commuter and express services from Marysville and Yuba City to Sacramento and major Sacramento medical facilities, as well as demand-responsive bus service for elderly and disabled transportation needs.

Within Sutter County, a limited amount of roadway bikepaths exist, and no off-street facilities exist. The *Yuba-Sutter Bikeway Master Plan* has been adopted. The Plan will connect all cities in Sutter County via a bikeway system, in addition to connections to other counties, including Sacramento.

3.9 Noise

This section describes the existing ambient-noise environment in the study area. Projected noise levels were also identified and evaluated for future conditions in previously prepared CEQA documents for the covered activities related to the Proposed Action of this EIR/EIS. The findings are summarized in Section 4.9 of this EIR/EIS as they pertain to the Proposed Action's covered activities.

3.9.1 City of Sacramento

Major noise generators in the City of Sacramento include traffic generated from freeways and major roadways, and aircraft from the Sacramento International Airport. Industrial

noise was determined to not be a major contributor to noise impacts within the City. In the city limits within the Natomas Basin, I-5, I-80, and other major roadways (see Section 3.8, Traffic and Circulation) are major noise sources. This area is subject to noise from major freeways, roadways, the Union Pacific railroad (which operates a line roughly parallel to Steelhead Creek), aircraft from the Sacramento International Airport, and the Arco Arena sports complex in North Natomas.

3.9.2 Sacramento County

Existing noise sources in the Natomas area of Sacramento County include traffic from the major freeways and roadways in the vicinity, the Sacramento International Airport, and the Union Pacific Railroad, which operates a line roughly parallel to the Natomas East Main Drainage Canal (Steelhead Creek).

3.9.3 Sutter County

The major noise generators within Sutter County are related to transportation, primarily resulting from freeway and roadway traffic. Other noise generators include natural gas extraction facilities, mining, farming, and industrial facilities. Within the study area, S.R. 99/70 and the major roadways (see Section 3.8, Traffic and Circulation) are major noise generators. Other major noise sources within the study area are likely to include freight train service, natural gas extraction facilities near the Sacramento International Airport, airplanes from the airport, and ongoing farming activities.

3.10 Air Quality

This section describes the existing air quality conditions in the region, focusing on compliance with the state and federal Clean Air Acts.

3.10.1 Sacramento Valley Air Basin

The study area is within the Sacramento Valley Air Basin. The air basin is bounded by the Coast Range to the west and the Sierra Nevada to the east. The Carquinez Strait, a sea-level gap in the Coast Range, is located 50 miles southwest, and the intervening terrain is very flat. The prevailing wind direction in Sacramento is southwesterly, resulting from marine breezes through the Carquinez Strait. During winter, when the sea breeze diminishes, northerly winds occur more frequently, but southerly winds still predominate.

A relatively stable high-pressure zone positioned off the coast diverts storms to the north, away from California, during the spring, summer, and early fall. The dry, warm, subsiding air of this system produces an atmospheric condition known as a subsidence inversion, where warm air overlies cooler air. Subsidence inversions may be several thousand feet deep and, together with strong sunlight, can produce worst-case smog conditions, of which ozone is the largest single component. In conjunction with this high-pressure zone, a thermal trough (a low-pressure zone caused by intense surface heating) is normally positioned over the Central Valley. The relative positions of these pressure zones cause air to blow through the Carquinez Strait to the Sacramento Valley. This helps cool the region, but it also carries pollutants from upwind, urban sources.

During the late fall, winter, and early spring, the high-pressure zone shifts to the south, allowing numerous storm fronts to sweep through the region. Typically, over 30 of these winter storms can be expected per year, accounting for virtually all of the precipitation Sacramento receives in a typical year (about 18 inches in an average year). Periods of stagnation between storms are characterized by very light winds. Surface inversions, which can form under these conditions, are most often observed in the morning from October to February.

3.10.2 Regulatory Background

Air quality in the air basin is regulated at the federal, state, and regional levels. At the federal level, the EPA is responsible for overseeing implementation of the Federal Clean Air Act. The Air Resources Board is the state agency that regulates mobile sources and oversees implementation of state air quality laws, including the California Clean Air Act.

The primary agencies that regulate air quality on a regional level in the study area are the Sacramento Metropolitan Air Quality Management District (SMAQMD) and the Feather River Air Quality Management District (FRAQMD). Regional planning and attainment of air quality goals also involves the neighboring local air quality agencies of El Dorado County Air Pollution Control District, Placer County Air Pollution Control District, and Yolo-Solano Air Quality Management District. SMAQMD, FRAQMD and these local agencies have permit authority over stationary sources, act as the primary reviewing agencies for environmental documents, and develop regulations that must be consistent with, or more stringent than, federal and state air quality policies.

Pursuant to the federal Clean Air Act, the EPA has established national ambient air-quality standards for criteria pollutants, including ozone, carbon monoxide (CO), and particulate matter of respirable size (PM₁₀ and PM_{2.5}). Descriptions of the criteria pollutants are as follows:

- **Ozone** - a pungent, colorless, acutely toxic gas, primarily produced by photochemical processes in the atmosphere. Reactive organic gases (ROG), including hydrocarbons and oxides of nitrogen (NO_x), react in the atmosphere to form ozone. The common effects of ozone are eye irritation, respiratory difficulties, and damage to vegetation.
- **Carbon Monoxide** - a colorless, odorless, toxic gas produced through the incomplete combustion of fossil fuels. Concentrations of CO are generally higher in winter when more fuel is burned and weather conditions in the area favor the buildup of directly-emitted contaminants. Emissions from gasoline-powered engines are the major source of this contaminant, with automobiles as the primary contributor. CO passes through the lungs directly into the bloodstream, where it may interfere with the transfer of oxygen and deprive sensitive tissues of oxygen.
- **Respirable Particulate Matter (PM₁₀ and PM_{2.5})** - Fine particulate matter (PM₁₀) includes particulates of 10 microns or less in aerodynamic diameter, and PM_{2.5} includes particulate matter of 2.5 microns or less. PM₁₀ and PM_{2.5} are small enough to pass through the respiratory system when inhaled and become lodged in the lungs, potentially resulting in adverse health effects. PM₁₀ and PM_{2.5} may consist of dust, sand, salt spray, metallic and mineral particles, pollen, smoke, mist, and acid fumes. Primary man-made sources of fugitive particulate matter are agricultural operations, demolition

and construction activities, road dust entrained by motor vehicles, and wood burning. Natural sources and wind erosion of agricultural land also represent significant sources of airborne dust.

California's ambient air-quality standards are generally more stringent than the national standards. The national and state standards for ozone, CO, and PM₁₀ are presented in Table 3-15.

The Sacramento Valley Air Basin does not consistently meet several applicable state air quality standards. Depending on the pollutant, the boundaries of the attainment areas vary. The air basin, including Sacramento and Sutter counties, is designated as a severe nonattainment area for the federal and state ozone standards. For CO, the Sacramento urbanized area was recently reclassified from nonattainment to attainment of the federal and state standards. Therefore, both Sacramento and Sutter counties meet federal and state carbon monoxide standards. For the federal PM₁₀ standards, only Sacramento County has been designated a nonattainment area; however, redesignation to attainment has been requested by SMAQMD. For the state PM₁₀ standards, the entire air basin is considered a nonattainment area. Air quality attainment designations for the study area are summarized in Table 3-16.

TABLE 3-15
Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards ^a	National Standards ^b	
			Primary ^c	Secondary ^d
Ozone	8 hours	–	0.08 ppm	0.08 ppm
	1 hour	0.09 ppm	0.12 ppm	0.12 ppm
Carbon Monoxide	8 hours	9 ppm	9 ppm	–
	1 hour	20 ppm	35 ppm	–
PM ₁₀	Annual Geometric Mean	30 µg/m ³	–	–
	Annual Arithmetic Mean	–	50 µg/m ³	50 µg/m ³
	24 hours	50 µg/m ³	150 µg/m ³	150 µg/m ³
PM _{2.5}	Annual Arithmetic Mean	–	15 µg/m ³	15 µg/m ³
	24 hours	–	65 µg/m ³	65 µg/m ³

^a California standards for ozone, carbon monoxide, and suspended particulate matter (PM₁₀) are values that are not to be exceeded.

^b National standards, other than ozone and those based on annual averages or annual arithmetic means, are not to be exceeded more than once a year. The ozone standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one.

^c National Primary Standards: The levels of air quality necessary, with an adequate margin of safety, to protect the public health.

^d National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

ppm parts per million (by volume)

Source: California Air Resources Board, 2001a.

TABLE 3-16
Air Quality Attainment Designations

Pollutant	Standards			
	Sacramento County		Sutter County	
	National	State	National	State
Ozone	Nonattainment	Nonattainment	Nonattainment	Nonattainment
Carbon Monoxide	Attainment	Attainment	Attainment	Attainment
PM ₁₀	Nonattainment	Nonattainment*	Nonattainment	Nonattainment

* Area meets air quality standard, and ARB has been requested to reclassify area for attainment status.
Source: California Air Resources Board, 2001b.

3.11 Public Health and Safety

In general, the potential public health and safety issues discussed in this EIR/EIS focus on potential for increased wildlife strikes at the Sacramento International Airport and related potential increase in safety risk for aircraft passengers at the airport, as a result of the implementation of the Proposed Action.

The purpose of this section is to provide the environmental and regulatory baseline for assessing the potential for increased bird strikes as a result of the implementation of the Proposed Action. The Sacramento International Airport is located in the southwestern portion of the Natomas Basin (see Figure 1-1). Encounters with wildlife by aircraft have occurred at the airport during various times of operation during a flight. Of particular concern is the possibility of encounters with birds by aircraft during approach, within 5 miles north of the airport. Based on information provided by Sacramento International Airport, the impact evaluation (see Chapter 4: Environmental Consequences) is limited to the northerly approach pattern within five miles of the airport landing area. The increased number of bird strikes at Sacramento International Airport since approximately 1993 coincides with a change in rice field management (the removal of rice-field stubble through flooding) and subsequent observation of increased waterfowl use of the Sacramento Valley and the lower American Basin (including the Natomas Basin) (SCAS, 2001).

3.11.1 Background on Wildlife Hazards at Airports

Wildlife can be attracted to airports and their vicinities because of the presence of cover, food, and water sources. The Federal Aviation Administration (FAA) considers wildlife hazards a serious threat to the safety of aircraft passengers and crews, as well as an economic concern. Presented below is a brief summary of information available on the magnitude and effects of wildlife hazards at airports.

Quantitative analysis on wildlife hazards has been compiled for the years 1990 through 1998, and is continuing to be compiled for subsequent years. A detailed report covering the years 1990 through 1998 summarizes results from the 22,935 strikes that were reported for this period (Cleary et al., 1999). Reports included strikes encountered with commercial, business, private, and miscellaneous aircraft. The analysis generally found that:

- Between 1990 and 1998, there was a 107 percent increase in the number of strikes reported nationwide and for areas outside of the United States covered by the study.
- Most bird strikes occurred between July and October during the day, when the aircraft was approaching or performing the landing roll, and at an altitude of less than 2,000 feet.
- The majority of birds that were able to be identified for reported strikes were gulls, followed by waterfowl, doves, and raptors. Other bird groups made up a much smaller portion of reported, identifiable strikes. In general, larger birds and bird species that exhibit flocking behavior, such as waterfowl, are most frequently associated with the potential for bird strike hazards.
- The majority of strikes did not damage the aircraft (approximately 16,000); substantially fewer caused the aircraft to suffer minor or substantial damage (approximately 2,000 and 1,300, respectively); and the fewest destroyed 19 aircraft (determined to be beyond repair).
- Seventy-eight percent of wildlife strikes (of which 15 percent were bird strikes) had an adverse effect on flight. An effect on flight was defined as an aborted takeoff, precautionary landing, engine shutdown, or other. Of those operations that were affected, the majority resulted in a precautionary landing.

3.11.1.1 Regulatory, Policy, and Guidance Setting

Regulatory requirements, FAA policies, and guidance on wildlife hazards is provided.

- **Federal Aviation Act of 1958, as amended.** Among other things, this act empowers the FAA to issue airport operating certificates and to establish minimum safety standards for those airports, some of which involve the management of wildlife and wildlife hazards at or near airports. During regular FAA inspections, control of wildlife hazards is an issue that is addressed and reported.
- **Title 14, Code of Federal Regulations, (CFR) Part 139.337.** The FAA is responsible for enforcing various aspects of aviation. Part 139.337 requires that an ecological study and wildlife-hazard management plan be implemented at an airport when certain wildlife-hazard events occur at an airport. Additionally, a staff wildlife biologist will be assigned to the airport to work with airport operators to identify causes and mitigate wildlife hazards.
- **Office of Airport Safety and Standards Guidance and Policies.** *Advisory Circular Number 150/5200-33, Hazardous Wildlife Attractants on or Near Airports* provides guidance on identifying and mitigating hazardous wildlife attractants at or in the vicinity of airports. Although implementation of the guidance is not mandatory, as indicated above, control of wildlife hazards is an issue addressed in FAA safety inspections. This

guidance indicates that the FAA has determined that 1 strike per 10,000 operations (departure or approach) at an airport is an acceptable wildlife strike rate.

- ***Sacramento International Airport Wildlife Hazard Management Plan.*** The Sacramento International Airport has been required to implement a wildlife hazard management plan (Plan) in accordance with 14 *CFR* 139.337, and is described below.

3.11.2 Sacramento International Airport and Vicinity

As discussed above, the Sacramento International Airport experiences bird strikes likely as a result of the favorable habitat that exists within the vicinity of the airport. Provided below is a summary of wildlife-strike information available for the airport, specific measures being taken or considered for implementation for wildlife hazard control, and the relationship of current land-use practices and wildlife for lands within the northerly approach pattern of the airport.

3.11.2.1 Wildlife Strikes Occurring at Sacramento International Airport

Data on wildlife strikes and strike rates for the Sacramento International Airport indicate an increase in wildlife strikes from 1990 through 1998 of greater than 300 percent (SCAS, 2001). As of 1999, the Sacramento International Airport reported a strike rate of 4.5 strikes per 10,000 operations, approximately five times the acceptable level of 1 strike per 10,000 operations set by the FAA. The increase in strikes is generally not attributable to an increase in aircraft operations. For example, during 1996, the strike rate was 2.9 (172,203 operations occurred with 50 reported strikes), whereas for 1998, the strike rate was 5.3 (151,205 operations occurred with 80 reported strikes). Increases in strike rates have been anecdotally attributed to the increased flooding of rice fields in the vicinity of the airport as a result of air quality rules prohibiting rice-field burning and a general improvement in the use of the Pacific Flyway by migratory waterfowl (SCAS, 2001).

Most bird strikes at Sacramento International Airport occur from November through February (SCAS, 2001), which is unlike national trends but coincident with winter migration and flooding of rice fields. Similar to national trends discussed above, the majority of reported bird strikes at Sacramento International Airport occur with waterfowl upon approach and less than 3,000 feet above ground level. The majority of wildlife strikes have not had an effect on flight, and precautionary landing was the most common effect on flight. Financial losses as a result of wildlife strikes are not available for Sacramento International Airport (Personal Communication, John Febbo).

3.11.2.2 Sacramento International Airport Wildlife Hazard Management Plan

As described above, the Sacramento International Airport has been required to adopt a wildlife hazard management plan in accordance with 14 *CFR* 139.337. The plan describes areas around the airport for which wildlife hazards are of greatest concern; optimal management of habitats, water sources, vegetation, and structures; and the food-prey base for airport property. The plan also describes potential wildlife control procedures, which include aurally and visually frightening techniques and population-reduction methods in accordance with federal and state wildlife protection laws. A major long-range goal of the plan is to reduce wildlife habitat on airport property in accordance with state and federal wildlife protection laws, and to discourage land use practices on other properties that increase wildlife hazards.

The two major areas of greatest concern within the airport vicinity are within a 5-mile radius of the runway centerline (general zone) and within a 2-mile radius of the centerline (critical zone). Control efforts documented in the Plan are focused on the critical zone. However, removal of wildlife habitat on airport property in the general zone and discouragement of land-use practices near airport property are also long-range goals of the Plan.

Other land management efforts at and near the airport include:

- Management of water features on airport property includes the removal/modification of permanent and temporary water features on airport property, including irrigation canals/ditches, temporary pools created by sprinklers or airport structures, sewage treatment ponds on the south side of the airport, and jurisdictional wetlands; and obstruction of water features through installment of wire grids.
- Management of vegetation features on airport property includes modifications to landscaping to be less attractive to wildlife, such as the use of turf grass as the major ground cover and removal of trees, and removal of vegetation suitable for wildlife habitat.
- Vegetation management also includes the discontinuance of agriculture on airport properties within the security fence and up to a mile away from the runway landing if these areas are determined to be attractive to wildlife. Conduct field preparation activities at night.
- Structure management includes consideration during design of reducing structural attractions to wildlife, removal of unnecessary buildings, and retrofit of problematic structures.
- Food-prey base management includes elimination of habitats such as streamside vegetation and abandoned structures, direct population control methods, removal of debris, and discouragement of handouts.

Existing Land Management Practices in the Vicinity of Airport

Areas north of the airport are currently in rice production, whereas areas to the south are managed as row crops. The area to the immediate west of the airport is also managed as row crops and abuts the Sacramento River and the Vic Fazio/Yolo Basin National Wildlife Refuge. The area to the east of the airport is managed as rice and field crops. Lands owned by the airport are managed to reduce the likelihood of wildlife being attracted to the area, particularly waterfowl, in accordance with its Wildlife Hazard Management Plan, by eliminating or reducing pooled water.

The Sacramento International Airport and the Natomas Basin Conservancy are engaged in ongoing discussions in association with the implementation of the proposed HCP on optimal use of the lands outside of the airport property in the general zone. The purpose of this effort is to determine potential use of the lands in the general zone for future habitat reserves without increasing the potential for bird-strike hazards.