4 ENVIRONMENTAL ANALYSIS

This chapter includes the Draft EIR text, which has been revised in concert with the responses to comments on the Draft EIR. The locations of text revisions shown with strikethrough (~~strikethrough~~) text for deletions and underline (underline) text for additions. This chapter is divided into six sections. Section 4.1 discusses the environmental topics that have been eliminated from further analysis because the project is consistent with the determination that there is no potential for significant environmental effects resulting from implementation of the project, as discussed in Park Plan's Section 4.5, "Environmental Topics Eliminated from Further Analysis." Section 4.1 also discusses the environmental topics that were adequately addressed in the Park Plan's EIR analysis. As a tiered EIR, this document does not repeat the analyses in the Park Plan. However, it provides sufficient project-level detail to document why the proposed project would not result in new environmental impacts or greater environmental impacts than those disclosed (and mitigated as necessary) in the Park Plan.

Sections 4.2 through 4.6 address the five resource topics evaluated in detail in this DEIR: Agricultural Resources; Hydrology, Water Quality, and River Geomorphology; Biological Resources; Cultural Resources, and Air Quality. Each of these sections includes a subsection that discusses the *environmental setting* (i.e., existing conditions) in accordance with State CEQA Guidelines Section 15125. This information constitutes the baseline conditions with which the proposed project is compared. The *regulatory setting* subsection describes pertinent federal, state, and local laws and regulations that may apply to the proposed project. The *environmental impacts* subsection discusses potential effects of the proposed project in accordance with State CEQA Guidelines Sections 15126.2(a) and 15143. Project impacts are numbered sequentially in each subsection. The discussion that follows each impact statement includes the substantial evidence upon which the significance conclusion is based. A discussion of cumulative impacts is provided in Chapter 5. The *mitigation measures* subsection identifies mitigation measures recommended to reduce any potentially significant effects associated with the proposed project to less-than-significant levels, in accordance with State CEQA Guidelines Sections 15002(a)(3), 15021(a)(2), and 15091(a)(1). The number of each mitigation measure corresponds to the number of the impact to which it applies.

4.1 EFFECTS FOUND NOT TO BE SIGNIFICANT

4.1.1 ENVIRONMENTAL TOPICS ELIMINATED FROM FURTHER ANALYSIS

Consistent with the BSRSP General Plan and EIR (Park Plan), Section 4.5, "Environmental Topics Eliminated from Further Analysis," the following resource topics do not warrant comprehensive analysis in this EIR because there is no potential for significant environmental effects resulting from implementation of the project. These topics include land use and planning; mineral resources; population and housing; and recreation. A brief description of these topics and why they have been eliminated from further analysis is provided below.

LAND USE AND PLANNING

The Nicolaus property and the Singh Unit are located in a rural area of Butte County outside of any established community; the City of Chico is located approximately 6 miles to the west of the project site. The Singh Unit is owned by State Parks and part of BSRSP, and the Nicolaus property would be transferred from TNC to State Parks and made part of BSRSP prior to project implementation. Because BSRSP is owned and managed by the State, it is not subject to local land use planning (i.e., county general plans and zoning). In addition, there are no federal or state land use plans applicable to the project site or the Park. As a result, no further analysis of this topic is necessary.

MINERAL RESOURCES

Neither the proposed project site nor the other BSRSP subunits are located within an area with known mineral resources, and as such they are not designated as important resource areas by the California Department of Conservation under the Mineral Resource Zone classification system. Further, the project site and BSRSP do not contain any energy production or mineral extraction land uses. Therefore, no significant effects to energy and mineral resources would occur and no further analysis is necessary.

POPULATION AND HOUSING

The proposed project would restore native riparian habitat and develop recreation facilities on lands currently planted to walnut and almond orchards. There is one home located on the project site, the Nicolaus farmhouse, which is leased to the current resident by the Nicolaus farm lessee. Although the farmhouse would remain in place, the resident would relocate as a result of the proposed project because the farmhouse would be used as the new Park headquarters building. No housing would be demolished as a result of the proposed project. Because only one resident would need to relocate as a result of the project, and there is adequate housing available in the surrounding area, the project would not result in a significant loss of housing or displacement of people.

The proposed project would not provide any new infrastructure (i.e., roads, utility connections) that could lead to additional development. State Parks may hire one new staff person in association with the proposed project. In addition, the project could increase tourism in the area, which could result in a limited indirect increase in the employment base of the local area, primarily in Chico. As of August 2007, Butte County had a total labor force of 104,800 and an unemployment rate of 6.4% (State of California 2007). Based on this data, one new State Parks staff person and any potential increase in the demand for labor due to increased tourism would be anticipated to be met by the existing local population, and therefore, no increase in population or need for additional housing is expected. As a result, no significant effects to population and housing would occur and no further analysis is necessary.

RECREATION

The proposed project would result in habitat restoration and the development of recreational facilities on the Nicolaus property and the Singh Unit, which would expand the recreation opportunities of BSRSP as proposed in

the Park Plan. Because the project would provide additional recreation facilities, it would not necessitate the construction of new recreational facilities. In addition, the project would not result in a population increase that would increase use of other existing recreation facilities or result in physical degradation of those facilities. Therefore, no significant adverse effects to recreation would occur and no further analysis is necessary.

4.1.2 ENVIRONMENTAL TOPICS REQUIRING NO FURTHER ANALYSIS

The following environmental topics do not warrant comprehensive analysis in this EIR because the proposed project is consistent with the Park Plan Goals and Guidelines and would result in less than significant effects to these resources: aesthetics; geology and soils; hazards and hazardous materials; noise; transportation and traffic; and utilities and public services. Therefore, these topics are appropriately addressed by the General Plan EIR analysis. A brief description is provided below regarding why these topics are consistent with the Park Plan conclusions and do not require further analysis.

AESTHETICS

Restoration of native riparian habitat on the project site would result in a change in the landscape from walnut and almond orchards to a mix of riparian communities (forest and grassland), a change that would generally be considered as an improvement in the existing viewshed, or that possibly would be considered by some viewers to be a neutral change. Implementation of the proposed project would involve removal of existing vegetation, which would temporarily degrade the existing visual character in the project site. Removal of the orchards and other crops would be replaced with a mixture of cottonwood mixed riparian forest, valley oak forest, mixed riparian forest, valley oak riparian forest, and native grasslands that would mature over a 3-year period to appear natural and undisturbed.

As discussed in Impact AES in Chapter 4 of the Park Plan, the General Plan anticipated the development of recreational facilities that would be visible to Park visitors and that could degrade the natural landscape and interfere with views of and from the Park. The proposed project would result in the relocation of the Park headquarters from the current location, across River Road, to the existing farm complex on the Nicolaus property and the construction of new recreational facilities on the project site. The headquarters relocation would allow for the removal of the structures, fencing, and equipment at the current Park headquarters site. Although this site would remain a day use area for the Park, the project would result in improved views of riparian habitat in BSRSP west of River Road. The new Park headquarters would be the existing farm buildings, which would remain in their current state, with minor modifications. Therefore, there would be little to no change in views of the existing Nicolaus farm buildings. The entry road on the Nicolaus property would be realigned from a straight road that runs perpendicular between River Road and the farm complex (Exhibit 3-2) to a curved road that connects to River Road at an angle and bends around the farm complex (Exhibit 3-9). This road realignment would provide additional visual buffer between the farm complex and River Road. The proposed overnight camping facilities would be developed near the center of the Nicolaus property (Exhibit 3-9) and would be surrounded by restored riparian vegetation (Exhibit 3.8), which would provide a vegetative screen between the facilities and River Road/adjacent private properties. The trails, day-use areas, and overnight camping facilities would be consistent in appearance to similar facilities in other BSRSP subunits and proposed trails would be no closer than 100 feet from private property boundaries. New nighttime lighting may be required for some of the proposed Park headquarters or campsites on the Nicolaus property (no lighting would be necessary for the trails on the Singh Unit), which may introduce a new source of light/glare to the area and adversely affect nighttime views within the Park.

Park Plan Goal ER-4.1 calls for the preservation of the natural appearance of the Sacramento River corridor and is supported by a range of guidelines. These guidelines call for the retention of riparian woodland for aesthetic values (Guideline ER-4.1-1), establishment of appropriate vegetative screening for new facilities (Guideline ER-4.1-2), and consideration of the natural aesthetics of the river when siting and designing Park signage (Guideline ER-4.1-3). Consistent with these guidelines, the proposed project would restore riparian habitat on the Singh Unit

and Nicolaus property, provide vegetative screening between the new recreational facilities and neighboring properties (including River Road), and consider aesthetics when siting Park signage. Pursuant to Park Plan Guideline ER-4.1-4, any new light/glare sources would be shielded wherever possible. It is also the intent of State Parks to support regular debris cleanup along the creeks and river, which would help maintain the aesthetic values (Guideline ER-4.1-5).

Consistent with Park Plan Impact AES, the project would implement Park Plan goals and guidelines, which minimize aesthetic effects of the project, and would result in less-than-significant impacts on aesthetics. The potential project effects on aesthetics are adequately covered in the Park Plan. No further analysis is required.

GEOLOGY AND SOILS

The project site is not designated as an Alquist-Priolo Fault study zone and no known surface faults are present under the project site; however, the project is located in a potentially active seismic region (Butte County 1977). As a result, although the potential for seismic activity in the region exists, the project site is not expected to be subject to fault rupture. In the event of a large earthquake, the project site could be subject to moderately-strong seismic ground shaking, which could result in potential structural damage to the proposed recreational facilities and the Park headquarters (in the Nicolaus farm complex). The risk of liquefaction (transformation of soils from a solid state to a liquid state during ground shaking) is high due to the presence of saturated sandy soils. Liquefaction could cause structures to sink and render them susceptible to major damage. Subsidence due to groundwater extraction could also pose a risk to developed recreational structures. However, by law, all structures developed would have to comply with the standards contained in the California Code of Regulations, Title 24 (CBC). Therefore, the proposed facilities would include structural reinforcements and other features, as required by the CBC, as necessary to avoid or minimize seismically induced structural damage.

Slopes on the project site are generally less than 2%; therefore, landslides are determined not to be a hazard. Soils on the project site consist primarily of silt loams or sandy loams that are composed of river deposits.

Although the project site is relatively flat, project-related ground-disturbing activities could result in erosion. However, consistent with Park Plan Goal ER-1.1 and Guidelines ER-1.1-1 and ER-1.1-2, the project would restore riparian vegetation, which would generally aid in minimizing erosion, and would maintain the existing vegetative buffers along the banks of Mud Creek. Additionally, the proposed recreation facilities would be designed and constructed with the use of best management practices, including measures specified in erosion-control plans (Goal ER-3.2 and Guideline ER-3.2-1, ER-3.2-2, and ER-3.2-3). Soil erosion is discussed further in Section 4.3, “Hydrology and Water Quality.”

The project would include construction of a new septic system/leachfield, located in an area where annual flooding is not anticipated and designed to prevent accidental release during flood events. The characteristics of the soils at the project site are conducive to supporting specialized septic systems, such as those currently operating at the Irvine Finch and Pine Creek BSRSP subunits. The use of septic systems would not be limited by the soils at the project site.

Consistent with the Park Plan analysis of Impact GEO, because potential seismic-related impacts would be avoided or minimized through provisions of CBC, the potential erosion would be addressed through Park Plan goals and guidelines, and the project site soils are conducive to septic systems, implementation of the proposed project would result in less-than-significant impacts to geology and soils. No further analysis is required.

HAZARDS AND HAZARDOUS MATERIALS

No hazardous materials are stored on the Singh Unit. However, there are four above-ground storage tanks on the Nicolaus property: one 500-gallon diesel above-ground storage tank, one 500-gallon gas above-ground storage tank, one 1,000-gallon waste oil above-ground storage tank, and one 1,000-gallon diesel above-ground storage

tank. All four of these storage tanks would be removed and disposed in accordance with all state and federal rules and regulations as part of the proposed project. There is also a chemical storage shed on the Nicolaus property, in the farm complex, that is on a concrete slab and contains hazardous materials (Round Up, fertilizers, Abound, Goal, malathion, Dipel, rodenticide, Kocide, and Manex).

Construction of the proposed project may require the use of small amounts of hazardous materials (e.g., gasoline, diesel fuel, engine oil). Accidental spills of construction-related materials could occur during construction, resulting in contamination. However, as described in Section 4.3, "Hydrology, Water Quality, and River Geomorphology," a SWPPP would be developed and implemented for the project. The proposed project would not involve activities that could generate hazardous emissions, but small quantities of hazardous materials such as propane, pesticides, fertilizers, and herbicides would be stored in the storage shed in the farm complex (to be the relocated Park headquarters) and occasionally used on the project site. However, replacing the existing agriculture land use with restored riparian habitat would result in a decrease in pesticide and herbicide applications. All transport, storage, and use of hazardous materials would be conducted in accordance with all state and federal rules and regulations.

Based on EPA's Envirofacts website, the project site is not listed as a hazardous materials site and is not known to contain listed hazardous materials or waste (EPA 2006). Additionally, based on Phase I Environmental Site Assessments conducted on the Nicolaus property and Singh Unit, no sites located within the American Society for Testing and Materials (ASTM) search radius of the project site were identified within the federal or state environmental databases.

Based on Phase I Environmental Site Assessments conducted on the Nicolaus property and Singh Unit, there is no evidence of recognized environmental conditions that would cause an impact based on the proposed habitat restoration and recreational facilities development project. It is expected that pesticides have previously been used on the project site; however, the persistence of chemicals commonly used in orchards range from a few days to several months. Therefore, it is unlikely that these chemicals would still be present at the time the project site is open to the public (TNC 2001 and TNC 2005).

The project is not located within 2 miles of any schools or airports, and the project would not involve development that would be in conflict with the operation of the nearest school or airport.

Introducing new recreational facilities on the project site would increase the risk of wildland fires. In addition, riparian habitat restoration could increase the fuel load on the project site. Increased fuel load and increased recreational facilities that increase human activity, including campfires, would result in an increased risk for wildfires. Campfires would be allowed in designated areas within the proposed campgrounds on the Nicolaus property, consistent with Park Plan Guideline AO-2.3-2. Additionally, Park Plan Goal AO-2.3 and Guidelines AO-2.3-1 and 2.3-2 facilitate monitoring and patrolling of BSRSP, which would provide the opportunity to control and respond to potential illegal fires. Park Plan Guideline VU-3.7-4 would also be implemented to ensure Park visitors are provided information regarding fire safety. BSRSP also has an existing Wildfire Management Plan that addresses wildfire threats within the Park and the project would operate in compliance with this Plan.

The proposed project would not cause any road closures on public roads. Therefore, it would not conflict with an adopted emergency response plan or other emergency plan. Adequate emergency vehicle access would be maintained consistent with Park Plan Guidelines AO-2.3-1, AO-2.3-2, and AO-2.3-3.

Consistent with the Park Plan analysis of Impact HAZ, the proposed project would result in a less-than-significant impact related to risk of exposure to hazardous materials, risk of wildland fires, and emergency access. Because the project effects on hazards and hazardous materials have been adequately covered in Park Plan Impact HAZ and a SWPPP would be developed and implemented, no further analysis is required.

NOISE

The existing noise environment at the Singh Unit and Nicolaus property is defined primarily by onsite and neighboring agricultural operations, local roadway traffic on River Road, and recreational activities associated with BSRSP. Existing noise-sensitive receptors in the vicinity of the project site include a farm house located approximately 400 feet north of the Nicolaus property, and a farm house located approximately 1,200 feet southeast of the Singh Unit. The proposed project would result in temporary construction noise related to implementing the habitat restoration and constructing the recreation facilities; operational noise associated with the new recreational facilities and park visitors; and vehicular traffic. These sources are discussed separately below.

SHORT-TERM RESTORATION AND CONSTRUCTION-RELATED NOISE

Restoration and construction activities on the Singh Unit and Nicolaus property would include clearing and tree removal, site grading, paving (on the Nicolaus property only), installation of out-buildings (on the Nicolaus property only), planting of native species, and irrigation. The onsite equipment required for restoration and construction operations is anticipated to include an excavator, front-end loader, rubber-tired backhoe, grader, compactor, generator, and haul trucks. Depending on the activities conducted, individual noise equipment would generate noise levels ranging from 76 to 88 dBA at a distance of 50 feet, as shown in Table 4.1-1.

Table 4.1-1
Noise Levels of Typical Construction Equipment

Equipment Type	Typical Noise Level (dBA) at 50 feet
Air Compressor	81
Backhoe	85
Concrete Pump	82
Compactor	82
Concrete Pump	82
Concrete Breaker	82
Truck Crane	88
Dozer	87
Generator	78
Front-end Loader	84
Asphalt Paver	88
Pneumatic Tools	85
Water Pump	76
Power Hand Saw	78
Power Shovel (Excavator)	82
Trucks	88

*All equipment fitted with properly maintained and operational noise control device, per manufacturer specifications.
Source: FTA 2006.

The simultaneous operation of the onsite construction equipment associated with the proposed project, as identified above, would result in combined average equivalent noise level (L_{eq}) of approximately 89 dBA at a distance of 50 feet. However, it is unlikely that all the equipment would be operated on a constant basis. Construction noise levels would fluctuate depending the number and types of equipment used and their respective usage rates (i.e., percent of time operated during a typical hour). Assuming default usage rates (FTA 2006, RCNM 2006), construction activity would result in hourly average noise level of 85 dBA L_{eq} at a distance of 50 feet.

Hourly performance criteria, such as L_{eq} standards or maximum standards (L_{max}), are not contained in the Noise Element of the Butte County General Plan; however, it has established a "normally acceptable" 24-hour day-night standard (L_{dn}) of 60 dBA for low-density residential land uses. The County does not have a noise ordinance and the Butte County Code contains no noise standards.

In accordance with Guideline AO-3.3-3 of the Park Plan, State Parks would ~~ensure that~~advise its contractors ~~would comply with~~ to meet Butte County's noise control requirements for construction activity. As provided by Butte County Planning Department staff, the following noise control measures are required for construction activity (Troaster, pers. comm., 2007):

- Construction activity shall be limited to the hours between 6:00 AM and 7:00 PM, Monday thru Friday. No construction activities shall be performed on Saturdays, Sundays, and holidays.

- All construction equipment shall be properly maintained per manufacturers' specifications and fitted with the best available noise suppression devices (i.e. mufflers, silencers, wraps). Shroud or shield all impact tools, and muffle or shield all intake and exhaust ports on power equipment.

- Construction equipment should not be left idling for more than 5 minutes.

- Stationary equipment (e.g., generators, compressors, rock crushers, cement mixers) shall be located as far as possible from noise-sensitive receptors.

- The applicant shall designate a noise disturbance coordinator, and this person's contact telephone number shall be conspicuously posted around the project site and in adjacent public spaces. The noise disturbance coordinator shall receive all public complaints about construction-related noise, shall be responsible for determining the cause of the complaint, and shall implement any feasible measures to be taken to alleviate the problem. Additionally, in advance of noise-generating construction operations, the disturbance coordinator shall advise nearby noise-sensitive receptors of the construction schedule.

In adherence to these requirements State Parks would ensure that restoration and construction activity would not occur outside the hours between 6:00 AM and 7:00 PM. Assuming that project-related restoration and construction activity would occur during these daytime hours, the average daily noise level generated by these activities would be 85 dBA L_{dn} at a distance of 50 feet. The nearest noise-sensitive receptor is a farm house located approximately 400 feet north of the Nicolaus property's northern boundary line and approximately1,800 feet from the property's center. Assuming an attenuation rate of 6 dBA per doubling of distance, restoration- and construction-related noise levels at the closest residence would attenuate to approximately 54 dBA L_{dn} at this receptor. Thus, the resultant noise level would be less than the "normally acceptable" standard of 60 L_{dn} dBA established by the Butte County General Plan for low-density residential land uses.

Construction activities occurring at the existing park headquarters and day use facility would consist of the removal of existing park headquarters office trailer, the dismantling of existing storage sheds, and the development of the site for day use activities. As with the other project construction activities, State Parks would ensure that construction at the day use area does not occur outside the hours between 6:00 AM and 7:00 PM and that Butte County noise control measures are implemented. Additionally, modifications to the existing day use facilities are not expected to require the use of heavy equipment (graders, excavators, dozers). As a result,

construction generated noise levels at the existing headquarters are not expected to exceed the Butte County Noise Element 60 dB L_{dn} standard.

Because project construction would be limited to daytime hours, and would implement all other noise control measures required by Butte County, and not generate construction noise levels that exceed any of the County's land use compatibility standards, the project would not result in a temporary substantial increase in noise levels without the project. As a result, short-term construction-related noise would be less than significant and no further analysis is required.

LONG-TERM STATIONARY-SOURCE NOISE

The proposed project would develop new overnight campgrounds and recreational day-use areas. In addition, the project would renovate existing farm structures on the Nicolaus property into the new BSRP headquarters. Noise associated with the operation of the facilities is discussed separately below.

CAMPGROUND ACTIVITY NOISE

Overnight campgrounds would provide ~~recreational vehicle (RV) camping,~~ vehicle camping, walk-in tent camping, and group camping. Noise associated with campground activities includes people conversing, children playing, and doors opening and closing. Most of these activities are mundane in nature and do not contribute to the ambient noise environment. State Parks has its own law enforcement in the form of State Park Peace Officers who are California Penal Code 830.2(f) and have full law enforcement authority in the State of California. These Peace Officers patrol State Park recreation areas and enforce California Code of Regulations Section 4320 (a), (b), and (c) Peace and Quiet. These sections prohibit noise that disturbs others in sleeping quarters between 10 p.m. and 6 a.m., use of outside machinery or electronic equipment at any time which is likely to disturb others, and state that electric generators are prohibited between the hours of 8 p.m. and 10 a.m. Adherence to the State Parks quiet hours and enforcement of the CCR Peace and Quiet section by State Park Peace Officer ~~Ranger~~s would limit the potential for noise disturbances during more sensitive nighttime hours. ~~Because the proposed project would provide electrical and water services at all RV camping stalls, the use of generators and the idling of engines is not expected to occur.~~ As a result, campground noise would be less than significant and no further analysis is required.

PARKING ACTIVITY NOISE

(In response to comments on the Draft EIR, the recreational vehicle [RV] campgrounds were removed from the recreation facilities plans [Appendix D]. The Draft EIR analysis of parking noise included RV parking spaces and concluded that the parking activity noise would be less than significant. This analysis is, therefore, very conservative. With removal of the RV campground, the parking noise would be further reduced, would not exceed the "normally acceptable" standard of 60 dBA L_{dn} and the impact would remain less than significant.)

Project-related parking would be located adjacent to the relocated park headquarters (at the existing farm complex) and at the new campgrounds on the Nicolaus property, and at designated day-use areas. ~~throughout the park.~~ The largest parking area would be at the new campgrounds, which ~~collectively~~ would include parking for approximately 80 passenger vehicles. ~~and 37 RVs.~~ Based on the total number of parking spaces at the campgrounds, and a trip rate of 4.0 daily trips per campground, the campgrounds are expected to generate up to 468 daily parking events (i.e., a vehicle arriving or departing) when operating at full capacity. Assuming higher turnover rates for the new headquarters and recreational day-use facilities, according to the assumptions outlined for the air quality analysis in Appendix E, a maximum of 210 daily parking events would occur at the new headquarters/day use lot.

Based on reference noise level data, the typical Sound Exposure Level (SEL) associated with a single vehicle arriving and departing, including noise generated by the vehicle occupants and mechanical noise of the vehicle, is

approximately 72 dBA at a distance of 50 feet. Typically, maximum noise levels are 8-9 dBA less than the SEL associated with an event, or 64 dBA L_{max} at 50 feet. In order to estimate the L_{dn} for parking lot activity, the input volume must be adjusted to account for the day/night trip distribution and a 10 dBA penalty applied to noise generated during the nighttime hours (10:00 p.m. to 7:00 a.m.). Thus, the following formula is used to determine the L_{dn} generated by parking lot activity:

$$L_{dn} = SEL + 10*Log\ (N_{eq}) - (10*Log(T_{sec})), \text{ where}$$

SEL as described previously, is the average sound exposure level for a vehicle arrival and departure, N_{eq} is the number of daytime events (7 a.m.–10 p.m.) per day plus 10 times the number of nighttime events (10 p.m.–7 a.m.) per day, and

T_{sec} is the number of seconds in the desired period.

Applying this methodology, parking-generated noise levels at the campgrounds and the headquarters/day use parking lot would be 56 dBA L_{dn} and 52 dBA L_{dn}, respectively, from a distance of 50 feet. These noise levels would attenuate to less than 35 dBA L_{dn} at the nearest noise-sensitive receptor located more than 1,500 feet away. Thus, the resultant noise level would likely be less than the existing ambient noise level at this receptor and not exceed the "normally acceptable" standard of 60 dBA L_{dn} established by Butte County General Plan Noise Element for low-density residential land uses. As a result, parking activity noise would be less than significant and no further analysis is required.

GARBAGE COLLECTION NOISE

The proposed project would include four garbage dumpsters in the overnight, day-use, and headquarter areas. Smaller animal-proof waste collection and recycling containers would be placed throughout the park. Specific locations of trash collection areas are unknown; however, trash collection areas are anticipated to be located near the relocated Park headquarters, which is approximately 1,800 feet from the nearest off-site noise-sensitive receptor. Trash removal generally occurs for a period of 10 to 15 minutes, one day per week. The primary noise source associated with refuse collection is the idling refuse truck. This process results in noise levels of approximately 60–65 dBA L_{eq} over a 15 minute period, at a distance of 50 feet. Through distance alone, garbage collection noise would attenuate to 32–37 dBA L_{eq} at the nearest off-site residence. As a result, garbage collection noise would be less than significant and no further analysis is required.

OPERATIONAL TRAFFIC NOISE

(In response to comments on the Draft EIR, the RV campgrounds were removed from the recreation facilities plans [Appendix D]. The Draft EIR analysis of operational traffic noise included RV trips and concluded that the traffic noise would be less than significant. ~~This analysis is, therefore, very conservative~~However, the Draft EIR analyzed traffic noise based on a 35 mph speed limit on River Road. The correct speed limit is 55 mph. With the correction for the 55 mph speed limit and the removal of the RV campground, the traffic noise ~~would be further reduced,~~ would not exceed the "normally acceptable" standard of 60 dBA L_{dn} and the impact would remain less than significant.)

The existing average daily traffic volume on River Road, which provides access to the project site, is approximately 1,241 vehicles (Butte County Public Works Engineering Division 2002). ~~Based on trip generate rates used to prepare the air quality analysis (above), t~~The new campgrounds, park headquarters and day use facilities would generate a maximum of ~~678~~ 553 additional vehicle trips per day during peak season. The daily traffic volume on River Road would increase to approximately 1,~~919~~ 794 vehicles. Traffic noise levels with and without project-generated traffic were modeled using the FHWA Traffic Noise Prediction Model (FHWA-RD-77-108). Additional input data included day/night percentages of autos, medium and heavy trucks, vehicle speeds, ground attenuation factors, and roadway widths. Table 4.1-2 presents the predicted L_{dn} noise levels at ~~50~~ 100 feet from the centerline of River Road with and without the proposed project under existing conditions.

As shown in Table 4.1-2, project-generated traffic would result in a traffic noise level of approximately ~~55~~ 58 dBA L_{dn} along River Road. Because the resultant noise level would not exceed Butte County's 60 dBA L_{dn} standard at any noise-sensitive receptors, operational traffic noise would be less than significant and no further analysis is required.

Table 4.1-2
Modeled Traffic Noise Levels along River Road

Scenario	Daily Traffic Volume	Day/ Night%	Medium Truck %[2]	Heavy Truck %	Speed (mph)	Predicted Traffic Noise Level, L_{dn} (dBA) 100 feet from the Roadway Centerline[1]
Existing	1,241	83/17	2.5	1.5	~~35~~55	56.4~~1.9~~ dB
Existing Plus Project	1,~~919~~794	83/17	~~8.0~~1.8	1.~~5~~0	~~35~~55	57.7~~4.8~~ dB

Traffic noise levels were predicted using the FHWA Traffic Noise Model (FHWA RD-77-108). Modeled estimates assume no natural or human-made shielding (e.g., vegetation, berms, walls, buildings).
~~The vehicle fleet mix would change under existing plus project conditions because approximately 18% of project generated traffic is estimated to be RVs, according to the assumptions outlined for the air quality analysis in Appendix E.~~
Source: Modeling performed by EDAW in ~~2007~~2008

TRANSPORTATION AND TRAFFIC

(In response to comments on the Draft EIR, the RV campgrounds were removed from the recreation facilities plans [Appendix D]. The Draft EIR analysis of transportation and traffic included RV trips and concluded that the traffic impacts would be less than significant. This analysis is, therefore, very conservative. With removal of the RV campground, the number of vehicle trips on River Road would be reduced, the number of parking spaces would be reduced, and the impact to traffic and circulation would remain less than significant.)

Access to the project site is provided by public roadways, including River Road serving the east side of the Sacramento River and SR 32 serving the west side of the river. In addition, West Sacramento Avenue, a two-lane arterial road maintained by Butte County, runs into River Road, thereby linking the downtown Chico area to the project site and BSRSP. The project would not physically interfere with or modify any of the public access roads in the vicinity of the project site. Temporary construction and habitat restoration activities would involve a limited number of truck trips that would not pose a significant change to traffic and circulation. All construction and habitat restoration staging would occur on the project site, off of existing roadways.

The existing average daily traffic volume on River Road, which provides access to the project site, is approximately 1,241 vehicles (Butte County Public Works Engineering Division 2002). The proposed project would increase recreational facilities in BSRSP and may attract additional visitation, which would increase vehicular trips along local roadways serving the Park. Based on trip generate rates (used to prepare the air quality analysis, see Appendix E), the new campgrounds, park headquarters and day use facilities would generate a maximum of 678 additional vehicle trips per day during peak season. The daily traffic volume on River Road would increase to approximately 1,919 vehicles. Most of the vehicle trips along local roadways would occur during weekends, particularly holiday weekends, and very few of the trips are expected during the peak commuter hours when LOS levels are of most concern. Park Plan Goal VU-3.2 and Guidelines VU-3.2-1 and 3.2-2 also facilitate the provision of public transportation to the Park. Furthermore, Goal AO-2.3 would facilitate coordination with Caltrans.

The access road on the Nicolaus property, connecting to River Road would be realigned as shown in Exhibit 3-9. The realignment of the access road would not result in any hazards; rather, the road would be designed to provide safer access off River Road and proper signage would provided (consistent with Park Plan Guidelines VU-3.1-2). Use of standard farm equipment during project implementation phases would be consistent with historical

farming practices in the region that have included the presence of slow-moving farm equipment on local roadways. Implementation of the proposed project would not result in an incremental increase in this type of hazard. No emergency access routes would be impaired as a result of the proposed project.

The project site is not located within an airport land use plan or within 2 miles of a public or private airport. Therefore, the project would not have the potential to affect air traffic patterns or result in substantial safety risks associated with airports.

Parking areas would be constructed for day use facilities, overnight camping facilities, and Park headquarters. The largest parking area would be at the new campgrounds, which collectively would include parking for approximately 80 passenger vehicles ~~and 37 RVs~~. Based on the total number of parking spaces at the campgrounds, and a trip rate of 4.0 daily trips per campground, the campgrounds are expected to generate up to 468 daily parking events (i.e., a vehicle arriving or departing) when operating at full capacity. Assuming higher turnover rates for the new headquarters and recreational day-use facilities (according to the assumptions outlined for the air quality analysis in Appendix E) a maximum of 210 daily parking events would occur at the new headquarters/day use lot. The proposed parking is expected to be adequate to serve the increase in visitation to the project site and would be consistent with Park Plan Goal VU-3.3.

Consistent with the Park Plan analysis of Impact TRANS, the proposed project would result in a less-than-significant impact related traffic and circulation. The project effects on traffic and circulation have been adequately covered in the Park Plan. No further analysis is required.

UTILITIES AND PUBLIC SERVICES

The Singh Unit has one groundwater well with a current capacity of approximately 500 gallons per minute (Luster 2007). There are five groundwater wells on the Nicolaus property. Four of the wells are intended for agricultural use; however, only one of the agricultural wells (located in the north-central part of the property) is used to water the entire orchard. This well has a current capacity of approximately 1,800–2,000 gallons per minute (Luster 2007). The other three agricultural wells are drilled and cased and could be functional, although they do not currently have pumps or motors. The fifth well is the existing domestic water source, with a capacity of approximately 25 gallons per minute, which is located adjacent to the existing farm house. This domestic water well would continue to be used to provide potable water to the BSRSP headquarters (relocated to be in the farm buildings) and the recreational facilities on the Nicolaus property. An onsite water treatment facility would be installed to maintain acceptable water quality levels from this domestic groundwater well as regulated by the State Division of Drinking Water.

~~There is one existing on-site groundwater well on the Nicolaus property, with an estimated capacity of 2,000 gallons per minute. There is also one existing groundwater well on the Singh Unit with an estimated capacity of 500 gallons per minute.~~ The groundwater well on the Singh Unit and the functional agricultural well on the Nicolaus property ~~se groundwater wells~~ currently provide irrigation for the orchards. Under the proposed project, these wells would provide irrigation during the 3-year establishment period for the habitat restoration~~, and potable water for campgrounds, day-use facilities, and Park headquarters~~. Based on experience at other habitat restoration sites, it is anticipated that the ground-water wells would have more than sufficient capacity to serve the proposed project. Based on a conservative estimate of water usage, during the first year of the habitat restoration, the irrigation water would be roughly equivalent to that used for the orchards; during the second year the water use would be half of that used on the orchards; during the third year it would be roughly a quarter of that used on the orchards; and thereafter no water would be used for irrigating the restored habitat. ~~For the potable water, an on-site water treatment facility would be installed to maintain acceptable water quality levels.~~ If, in the future, the groundwater wells are no longer productive and/or no longer necessary to support the restoration area, they would be properly decommissioned according to Department of Water Resources' specifications (filled and capped). The decommissioning would prevent infiltration of floodwater into an uncapped well that could otherwise contaminate the local groundwater aquifer surrounding the well with surface contaminants carried in flood flows.

A total of seven restroom facilities would be constructed as part of the project. Restrooms would be pre-manufactured vault toilets placed on a raised pad that is suitable for occasional flooding. Vault toilets are impervious to water, which is why they are safe to use in floodplains and why they require pumping for maintenance. In preparation of flood events, the vault toilets would be pumped, hosed out, and sealed. By cleaning and sealing the vault toilets, these facilities do not leak wastewater during flood events. In addition, one combination restroom/shower building would be constructed. The combination restroom/shower building would be a pre-manufactured or site- built building placed on a raised pad and would include a dishwashing station. ~~An~~ The existing septic system/leachfield would be used to service the Park headquarters. A new septic system/leachfield would be installed to service the combination restrooms/shower building (in an area where annual flooding is not anticipated). These septic systems would be outside of the normal flood levels and in preparation for more extreme flood events, the check-valves at the facilities could be turned off. The project site is not served by a wastewater treatment facility; wastewater would be treated on-site using septic systems.

BSRSP monitors real-time flow conditions at upstream locations to monitor for potential flood conditions at the Park. When there is indication of potentially approaching flood levels, standard BSRSP maintenance measures are enacted, including: removing equipment and vehicles from potentially effected park and service yards to higher ground; turning off utilities (electricity, water, and gas); pumping and sealing vault toilets; and cleaning and sealing restroom/shower buildings (sand bags in toilets, urinals, floor drains and door thresholds; sink drains and door jams are duct taped; water heater removed if not installed above flood threat). Additionally, after flood events, the septic tanks are pumped (Akers 2007). As part of BSRSP, the facilities on the Singh Unit and the Nicolaus property would be subject to these maintenance measures.

~~BSRSP monitors real-time flow conditions at upstream locations to monitor for potential flood conditions at the Park. When there is indication of potentially approaching flood levels, utilities (i.e., electricity, water, and gas) are turned off; restrooms are sealed (sand bags in toilet, urinal, floor drains and door thresholds; sink drains and door jambs are duct taped); and water heaters are removed if they are not installed above the flood threat. Additionally, after flood events, the septic tanks are pumped (Akers 2007).~~

A total of four garbage dumpsters would be located within the overnight, day-use, and Park headquarter areas, and garbage would be collected by a local contractor.

Recreational facilities would be designed to allow natural drainage on the project site, similar to existing conditions. Stormwater drainage would be transported in grass-lined swales and overland flow. The recreational facilities would be designed to minimize the use of impervious surfaces.

The Butte County Fire Department contracts with the California Department of Forestry and Fire Protection (CDF) to administer fire prevention and suppression in Butte County. The program includes full-time firefighters as well as a capably-trained contingent of volunteers who respond to every type of emergency. The closest fire station to the project site, and the first due engine, through an automatic aid agreement between Butte County and the City of Chico, would be Chico Station 6 located at 2544 State Route 32. For multiple engine responses, County Stations 41 (13871 Hwy 99, Chico), 42 (10 Frontier Circle, Chico), and 44 (2334 Fair Street, Chico) would respond. Response times from these stations are as follows:

- Chico Station 6: approximately 6 minutes 15 seconds
- County Station 41: approximately 9 minutes 11 seconds
- County Station 42: approximately 12 minutes 6 seconds
- County Station 44: approximately 14 minutes 41 seconds

Butte County is statutorily responsible for fire, life and safety incidents at the project site due to its location in the Local Responsibility Area. Historic data for the past three (3) years indicates there have been approximately 45 calls over the three-year period in the Scotty's Boat Landing and Hwy 32/River Road area. The County anticipates that number to rise if the project is approved as proposed.

Implementation of Park Plan Goal AO-2.3 and Guidelines AO-2.3.1 and AO-2.3.2 would facilitate monitoring and patrolling of the Park, which would provide the opportunity to respond to potential causes of wildfire (e.g., illegal fires). In addition, Park Plan Guideline AO-3.3-2 would restrict the use of campfires, further minimizing potential wildfire ignition, and Park Plan Guideline VU-3.7-4 would ensure the provision of information to visitors on Park rules regarding fire safety. Given these goals and guidelines, the increase in the risk of wildland fire is not expected to be substantial. Further, all facilities would be designed in compliance with the California Building Code, which requires fire safety features.

Law enforcement services are provided concurrently by State Parks, California Highway Patrol and local law enforcement agencies, namely Butte County Sheriff Department for the portion of BSRSP in Butte County. However, public safety is the primary responsibility of the ~~Park Ranger serving the Park. State Parks has its own law enforcement in the form of~~ State Park Peace Officer~~ Ranger~~s who are California Penal Code 830.2(f) and have full law enforcement authority in the State of California. These ~~Ranger~~Peace Officers patrol State Park recreation areas and enforce California Code of Regulations Section 4320 (a), (b), and (c) Peace and Quiet. Additionally, consistent with the Park Plan Goal AO-4.4, State Parks will work with private land owners in proximity to BSRSP to minimize conflicts associated with the mixed public and private land ownership in the area.

~~Services such as fire protection, law enforcement, and emergency medical services are provided to the Park by outside sources (see Chapter 3 of this EIR, "Description of Proposed Project," and Park Plan Chapter 2, "Park Support and Emergency Services").~~ It is expected that ~~these outside sources~~the Butte County Fire Department and Sheriff Department would have sufficient capacity to serve the proposed project because the additional visitation is not expected to be substantial, and the project would not change the population of the area. The project would not include the construction of housing and therefore would not generate additional students or increased demands on schools.

Consistent with the Park Plan analysis of Impact UTIL, the proposed project would result in a less-than-significant impact related to utilities and public services. Because the project would be consistent with Park Plan Guidelines AO-3.2-1, AO-3.2-2, and AO-3.2-3, the project would not create any new significant effects on utilities and service systems not previously addressed Therefore, project effects on utilities and service systems have been adequately covered in the Park Plan. No further analysis is required.

4.2 AGRICULTURAL RESOURCES

This section analyzes the potential effects of the proposed project on agricultural resources. The analysis is based on a review of agricultural characteristics of lands in the study area (Exhibit 4.2-1); it is further based on consideration of proposed project actions that could result in adverse physical changes to the environment or in the degradation of physical attributes that historically supported native riparian habitat and that have supported agricultural production in more recent times. This analysis is consistent with the findings in the Recirculated EIR for the Preliminary General Plan (Agricultural Resources) (October 2005) for the Bidwell-Sacramento River State Park General Plan (Park Plan), which presented a thorough analysis of the potential impacts to agricultural resources resulting from the implementation of the Park Plan.

The proposed project actions are consistent with the Park Plan, as described in Chapter 1, "Introduction," of this ~~D~~EIR. However, while the Singh Unit was discussed in the Park Plan (Section 2.3.3), the Nicolaus property was not identified as a potential acquisition site at the time the Park Plan was prepared. Although the characteristics of the Nicolaus property are similar to other potential acquisitions (e.g., Singh Unit, Beard property, Sunset Ranch) that were discussed and analyzed in the Park Plan, and the recreation facilities proposed for the Nicolaus property are consistent with the recreation facilities proposed and analyzed in the Park Plan, this analysis is necessary to addresses project-specific impacts and to ensure complete analysis of the project's potential effects on agricultural resources.

The information presented in this section is based on review of existing environmental documents and other relevant information, including aerial photography, habitat maps, and proposed restoration plans. The following documents were reviewed during preparation of this analysis:

- Butte County. 1995 (May 9). Agricultural Element of the Butte County General Plan. Oroville, CA.
- Butte County. 2007b (January). *Resolution 07-021 of the Board of Supervisors of the County of Butte: Butte County Administrative Procedures and Uniform Rules for Implementing the California Land Conservation (Williamson) Act.* Oroville, CA.
- Butte County. 1979 (October 30). Land Use Element of the Butte County General Plan: Chico Area Greenline Policy. Oroville, CA.
- Butte County. 1981. Butte County Right to Farm Ordinance (Ord. No. 3965). Oroville, CA.
- State Parks (California Department of Parks and Recreation). 2003 (December). *Bidwell-Sacramento River State Park Preliminary General Plan and DEIR.* Prepared by EDAW. Sacramento, CA.
- State Parks (California Department of Parks and Recreation). 2005 (October). *Bidwell-Sacramento River State Park Recirculated DEIR (Agricultural Resources)*. Prepared by EDAW. Sacramento, CA.
- State Parks (California Department of Parks and Recreation). 2006 (January). *Bidwell-Sacramento River State Park Comments and Responses to Comments on the Recirculated DEIR*. Prepared by EDAW. Sacramento, CA.
- California Bay-Delta Authority. 2005 (June). *Sacramento River–Chico Landing Subreach Habitat Restoration Project Draft Environmental Impact Report.* Prepared by EDAW, Sacramento, CA.
- U.S. Fish and Wildlife Service. 2005. *Comprehensive Conservation Plan for the Sacramento River National Wildlife Refuge*. Sacramento, CA.
- DFG (California Department of Fish and Game). 2004. *Comprehensive Management Plan for the Sacramento River Wildlife Area.* Sacramento, CA.

- TNC (The Nature Conservancy). ~~December 2007~~April 2008. *Riparian Habitat Restoration Plan for Singh Unit Sacramento River (RM 194)*. Prepared for California Department of Parks and Recreation Bidwell-Sacramento River State Park.

- TNC (The Nature Conservancy). ~~August 2007~~April 2008. *Riparian Habitat Restoration Plan for Nicolaus Property Sacramento River (RM 195)*. Prepared for California Department of Parks and Recreation Bidwell-Sacramento River State Park.

Documents that provided information relevant to this analysis are cited throughout this section, and corresponding references are included in Chapter 10~~9~~, "References."

4.2.1 ENVIRONMENTAL SETTING

Much of the soil in the study area is considered prime agricultural soil, which is why substantial amounts of native riparian vegetation have been cleared for agriculture. Prime soils are reflected in the mapping of "Important Farmland." Important Farmland is defined as "Prime Farmland," "Farmland of Statewide Importance," "Unique Farmland," or "Farmland of Local Importance" under the Farmland Mapping and Monitoring Program (FMMP) administered by the California Department of Conservation (DOC). The FMMP also includes "Irrigated Farmland" and "Non-irrigated Farmland" for areas where modern soil survey information does not exist, as is the case in Butte County, and for which there is an expressed local concern on the status of farmland. As illustrated in Exhibit 4.2-1, the Singh Unit and the Nicolaus property are designated as "Irrigated Farmland."

Both the Singh Unit (approximately 43 acres) and Nicolaus property (approximately 146 acres) are currently in agricultural production. Approximately 34 acres of the Singh Unit are planted in walnuts, ranging in age from one-year replants to ten-year old trees. Approximately 104 acres of the Nicolaus property are planted in walnuts, ranging in age from six-year old trees to eleven-year old trees, and approximately 32 acres are planted in almonds, planted approximately ten years ago. The Nicolaus property includes an agricultural building complex consisting of a residence, two sheds, and a barn.

According to the 2006 Agricultural Crop Report (Butte County 2007a), 464,308 acres are in agricultural production in Butte County, of which almonds and walnuts accounted for 74,942 acres. The Singh Unit and Nicolaus property orchards (totaling approximately 170 acres of agricultural production) account for approximately 0.2% of Butte County's almond and walnut orchards and approximately 0.04% of land in agricultural production.

4.2.2 REGULATORY SETTING

The project site is located within and adjacent to BSRSP, and is subject to the Goals and Guidelines of the Park Plan. State Parks relies on multi-agency coordination in overall operations and resource management efforts at the Park. This coordination is formalized in a Memorandum of Understanding (MOU) between State Parks, U.S. Fish and Wildlife Service, and the California Department of Fish and Game established in 2001. It applies to lands within the Sacramento River National Wildlife Refuge (SRNWR) (owned by USFWS), Sacramento River Wildlife Area (SRWA) (owned by DFG) and State Parks, and includes future property acquisitions.

The MOU formally documents the agreement between these public land management agencies to manage, monitor, restore and enhance lands managed for fish, wildlife and plants along the Sacramento River in Tehama, Butte, Glenn, and Colusa counties. It also prevents duplicative land management and property acquisition efforts.

Section 3.3.1, "Local and Regional Conservation Planning," of this ~~D~~EIR describes the regional conservation plans that these agencies have prepared, which are applicable to the project sites and surrounding lands. The plans include the Park Plan (State Parks 2003, 2005, 2006), the DFG Sacramento River Wildlife Area Comprehensive Management Plan (DFG 2004), the USFWS Sacramento River National Wildlife Refuge Comprehensive

Conservation Plan (USFWS 2005), and the Sacramento River Conservation Area (State of California Resources Agency 1989).

FEDERAL AND STATE FARMLAND PROTECTION POLICIES

Loss of farmland is an important concern that is captured by the development of federal, state and local policies calling for protection of Prime, Unique or Statewide Important Farmland. Under the Federal Farmland Protection Policy Act (FPPA)(Subtitle I of Title XI, Section 1539–1549), projects are subject to FPPA requirements if they may irreversibly convert farmland (directly or indirectly) to nonagricultural use and are completed by, or with the assistance of, a federal agency. However, as the U.S. Department of Agriculture's Farmland and Conversion Impact Rating form advises, "The purpose of the rating process is to insure that the most valuable and viable farmlands are protected from development projects sponsored by the Federal Government... Accordingly, a site with a large quantity of non-urban land surrounding it will receive a greater number of points for protection from development." The form advises that the "LESA system (Land Evaluation-Site Assessment) is used as a tool to help assess the options for land use on an evaluation of productivity weighed against *commitment to urban development*." (USDA Farmland Conversion Impact Rating Form AD-1006 (10-83) at pages 4 and 7. Emphasis added.)

Under the California LESA model the proposed project would not qualify as "Land Committed to Nonagricultural Use" as such land is designated as having received discretionary *development* approvals, such as a tentative subdivision map, tentative or final parcel map, or recorded development agreement. (DOC California Agricultural LESA Model 1997 Instruction Manual (Manual) at page 26). In contrast, the proposed project falls within the California LESA model definition of "protected resource lands." The model defines protected resource lands as "those lands with long term use restrictions that are compatible with, or supportive of, agricultural uses of land. Included among them are the following: publicly owned lands maintained as park, forest, or watershed resources; and lands with agricultural, wildlife habitat, open space, or other natural resource easements that restrict the conversion of such land to urban or industrial uses" (Manual at page 28). Because this project concerns protected resource lands and not "Land Committed to Nonagricultural Use" by virtue of urban development, evaluation under the LESA Model was not deemed appropriate. Such a determination by a lead agency is consistent with CEQA Statutes Section 21095, which makes use of LESA an "optional methodology."

AMERICAN FARMLAND TRUST MAPPING PROGRAM

In 1997, American Farmland Trust released a study that showed the geographic relationship between high quality farmland and land development pressure in the United States, using the U.S. Department of Agriculture's National Resources Inventory. That study used the unit of Major Land Resource Areas to determine where the most threatened farmland lay throughout the United States. The map defined high-quality farmland by combining the USDA's "prime farmland" designation (land most suitable for producing food, feed, forage, fiber and oilseed crops) with American Farmland Trust's unique farmland definition (land used to grow vegetables, grapes and horticultural crops, including fruits, nuts and berries, that have unique soil and climatic requirements.) Then American Farmland Trust determined acreage amounts of prime and unique farmland within each of the 33,000 mapping units included in the map database.

Development is defined by American Farmland Trust as the change in urban built-up land occurring within each of the 33,000 mapping units between 1992 and 1997. Because farmland conversion is taking place in every state, the map identifies high-quality farmland that is important relative to statistical benchmarks established for each state. In addition to identifying the most intense areas of high quality farmland conversion in the nation, the map also identifies where conversion was most intense within each given state (American Farmland Trust 2007).

CALIFORNIA LAND CONSERVATION ACT OF 1965 (WILLIAMSON ACT)

Since 1965 the State has encouraged landowners to protect agriculture and open space lands via the California Land Conservation Act of 1965, commonly referred to as the Williamson Act. The State of California Department of Conservation (DOC) is responsible for interpretation and enforcement of Williamson Act restrictions and provisions. Under this law, agricultural, recreational, and other related open space uses are protected ~~with property tax incentives~~ when the landowner enters into a restrictive use contract with the ~~State~~local administering government. As an incentive for enrolling their land in the program, landowners receive a reduction in property tax liability. Counties benefit when they formally adopt the program because they are then able to claim "Open Space Subvention Act Payments" that partially replace property tax losses associated with Williamson Act enrollees. The Williamson Act program is intended to preserve farmland, although a landowner could have other activities on the same land, including a permitted mining operation, a hunting club (without permanent facilities), or processing operations for agricultural products. Williamson Act contracts have a 10 year renewable contract term. ~~The County of~~ Butte County administers the Williamson Act Program in Butte County. *Resolution 07- 021 of the Board of Supervisors of the County of Butte: Butte County Administrative Procedures and Uniform Rules for Implementing the California Land Conservation (Williamson) Act* (Butte County Williamson Act Procedures) (~~County of~~ Butte County 2007b) identifies the Butte County Department of Development Services, Planning Division as the lead County department for all Williamson Act program management, including~~sion~~ applications, Williamson Act contract non-renewals, and contract cancellations.

There is a Williamson Act contract on the Nicolaus property; however, there is no Williamson Act contract for the Singh Unit. Prior to habitat restoration or recreation facilities development on the Nicolaus property, the contract will either be phased out, amended or a new contract will be executed, which allows for such uses. ~~Butte County administers the Williamson Act Program, which is intended to preserve farmland although a landowner could have other activities on the same land, including a permitted mining operation, a hunting club (without permanent facilities), or processing operations for agricultural products. Williamson Act contracts have a 10 year renewable contract term.~~Since 2000, Williamson Act Program enrollment in Butte County has increased 3,661 acres, to a total of 215,248 acres (based on 2005 figures) (DOC 2006).

BUTTE COUNTY GENERAL PLAN

Butte County addresses the protection of agriculture in its General Plan as follows:

Agricultural Element

Recognizing the importance of protecting and maintaining agriculture as a continuing major part of the local economy and way of life in Butte County, the Board of Supervisors directed the preparation of an Agricultural Element to the General Plan (Butte County 1995). The Agricultural Element was adopted on May 9, 1995, establishing policies designed to achieve four main purposes:

- to preserve agricultural lands for continued agricultural uses;
- to strengthen and support the agricultural sector of the economy;
- to protect the natural resources that sustain agriculture in Butte County; and,
- to consolidate agricultural policies required in mandated general plan elements into one document.

The Agricultural Element describes several issues and challenges affecting the viability of agriculture in Butte County, such as leapfrog development, subdividing agricultural parcels into smaller units, conversion of agricultural land to urban development or rural residential "ranchettes," trespass and vandalism, environmental regulations, and water availability. The Agricultural Element addresses these issues through specific goals, policies, and programs to ensure continued agricultural productivity unhindered by development pressures. The established goals are ~~goals set the ideal for the element, and include the following~~:

Goal 1. Maintain parcel sizes that ensure the long-term preservation, conservation and continuity of those general plan areas identified as Orchard and Field Crops and Grazing and Open Lands.

Goal 2. Conserve and stabilize agricultural land uses at city and community boundaries in order to protect agricultural lands from encroachment and conversion to urban uses.

Goal 3. Support the management of agricultural lands in an efficient, economical manner, with minimal conflict from non-agricultural uses.

Goal 4. Encourage environmental resource protection measures to ensure the continued agricultural use of the land.

Goal 5. Seek and support preservation policies and programs to protect long-term agricultural production.

Goal 6. Seek measures to preserve and maintain agriculture and encourage new agricultural industries and operations.

Goal 7. Support appropriate amounts of farm worker and farm family housing in agriculturally zoned areas.

Land Use Element – Chico Area Greenline Policy

The Land Use Element of the Butte County General Plan, as adopted by Resolution 79-222, on October 30, 1979, contains the Chico Area Greenline Policy (Butte County 1979). The policy establishes and defines the "Chico Area Greenline" as the established boundary line which separates urban/suburban land uses from agricultural land uses in the Chico area. The stated purposes of theis policy are as follows:

- To define the limits of future urban development which may occur on agricultural lands in the Chico Area of Butte County.
- To provide for the long-term protection of agricultural resources of the Chico Area of Butte County.
- To mitigate the threat to agricultural resources posed by urban encroachment into and conversion of agricultural lands in the Chico Area of Butte County.
- To reduce agricultural/urban conflicts in the Chico Area of Butte County.
- To establish County cooperation with the City of Chico in land use planning of urban and agricultural lands located in the Chico Area of Butte County.
- To identify urban development limits in or near agricultural lands within the County's Chico Area Land Use Plan by use of a certain bold dashed boundary line.
- To establish a certain and clear policy text for Butte County's Chico Area Land Use Element, which will enhance and uphold the aforementioned boundary line and policy text.
- To establish certain land use designations for the Chico Area of Butte County in conformity with the aforementioned boundary line and policy text.

In order to implement the Chico Area Greenline Policy, properties on the agricultural side of the boundary line were zoned or rezoned by the County to support the policy. The policy stipulates that all land uses on the agricultural side of the Chico Area Greenline consist solely of ~~A~~agricultural land uses as provided by the Orchard and Field Crop designation, except for Agricultural Residential land uses.

Butte County Right to Farm Ordinance

In 1981, the Butte County Board of Supervisors adopted the Butte County Right to Farm Ordinance (Right to Farm Ordinance). The purpose and intent of the Right to Farm Ordinance is to limit the circumstances under which properly conducted agricultural operations on agricultural land in Butte County may be considered a nuisance, as well as:

> "… to promote a good-neighbor policy by requiring notification of owners, purchasers, residents, and users of property adjacent to or near agricultural operations on agricultural land of the inherent potential problems associated with being located near such operations, including, without limitation, noise, odors, fumes, dust, smoke, insects, operation of machinery during any time of day or night, storage and disposal of manure, and ground or aerial application of fertilizers, soil amendments, seeds and pesticides. It is intended that, through mandatory disclosures, owners, purchasers, residents and users will better understand the impact of living or working near agricultural operations and be prepared to accept attendant conditions from properly conducted agricultural operations as a normal and necessary aspect of living in a county with a strong rural character and an active agricultural sector."(35-2[c])

The Right to Farm Ordinance further states that:

> "No agricultural operation conducted or maintained on agricultural land in a manner consistent with proper and accepted customs and standards, as established and followed by similar agricultural operations in the county, shall be or become a nuisance for purposes of this code or county regulations if it was not a nuisance when it began, provided that such operation complies with the requirements of all applicable federal, state, and county statutes, ordinances, rules, regulations, approvals and permits. The provisions of this section shall not apply where a nuisance results from the negligent or improper management or operation of an agricultural operation. (Ord. No. 3965, § 6, 6-12-07)" (35-6)

~~**Agriculture and Crop Land**~~

- ~~**Policy B:** Retain in an agricultural designation on the land use map areas where location, natural conditions and water availability make lands well suited to orchard and field crop use, while considering for non-agricultural use areas where urban encroachment has made inroads into agricultural areas and where past official actions have planned areas for development.~~

4.2.3 ENVIRONMENTAL IMPACTS

THRESHOLDS OF SIGNIFICANCE

Information useful for developing thresholds of significance for determining whether an agricultural land conversion creates a significant environmental effect was reviewed, including the State CEQA Guidelines and other CEQA documents addressing the topic.

Appendix G of the State CEQA Guidelines is a "checklist" of sample questions to aid lead agencies in determining whether a project could cause potentially significant environmental impacts. The "Agriculture Resources" section of the Appendix G checklist provides examples of land use changes as a way of aiding lead agencies in determining whether impacts to agricultural resources result in significant environmental effects. The checklist asks whether the project would:

- Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Important Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use;

- Conflict with existing zoning for agricultural use, or a Williamson Act contract; or

- Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Important Farmland, to non-agricultural use.

Although land use changes are not, in and of themselves, significant effects on the environment, changes from less-intensive to more-intensive uses can be indicators that physical effects may be reasonably foreseeable, including indirect and secondary effects. As stated in the CEQA Guidelines definitions, "effects" includes:

> Indirect or secondary effects which are caused by the project and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect or secondary effects may include *growth-inducing effects and other effects related to induced changes in the pattern of land use*, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems. (CEQA Guidelines Section 15358(a)(2). Emphasis added.)

Therefore, the threshold question is not whether there will be a land use change, but whether the land use change will result in a potentially significant adverse impact on the physical environment. The "environment" is defined as land, air, water, minerals, flora, fauna, ambient noise, and objects of historical or aesthetic significance. (CEQA Guidelines Section 15360.) Although the "environment" includes "both natural and man made conditions," the Guidelines acknowledge that current "natural conditions, including ecosystems" can in fact be man-made.[1]

For this analysis, the project would be considered to have a significant effect on agricultural resources if it would:

- Result in a permanent conversion of a substantial acreage of Prime, Unique, or Statewide Important Farmland. A permanent conversion is considered to be one that involves the irreversible change to land uses that would cause serious degradation or elimination of the physical conditions or natural processes that provide the land's resource qualities for agriculture and/or require expenditures of substantial development costs that would likely preclude future conversion back to agricultural uses if the opportunity for such conversion were to arise (CBDA 2005).

4.2.4 IMPACT ANALYSIS

IMPACT 4.2-a **Change of Land Use from Agricultural Land to Restored Native Riparian Habitat and Developed Recreational Facilities.** *The proposed project would restore agricultural acreage to native riparian habitat and develop outdoor recreation facilities, effectively removing the land from agricultural production. However, the proposed project would neither be irreversible nor cause serious degradation or elimination of the physical or natural conditions that provide the site's values for farming. The proposed project would not stop or hinder the agricultural practices that occur on neighboring properties. This impact is considered* ***less than significant****.*

Implementation of the proposed project would result in a change in land use in areas designated as "Irrigated Farmland," which are currently in agricultural production (almond and walnut orchards). The Singh Unit would be restored to natural vegetation conditions with a trail connecting to other BSRSP facilities. The Nicolaus property would support a combination of restored natural vegetation and low-intensity, outdoor recreation uses. This change in land use could have a minor economic effect related to a reduction of local crop production.[2] As described above, 464,308 acres are in agricultural production in Butte County, of which almonds and walnuts

[1] For example, man-made agricultural drainage and irrigation canals can constitute critical riparian habitat for the giant garter snake (GGS) (*Thamnophis gigas*), a threatened species under both the Federal and State Endangered Species Acts. As stated in the *Natomas Basin Habitat Conservation Plan, Sacramento and Sutter Counties* (City of Sacramento 2003): "After emergence from winter retreats, which occurs by late March or early April, GGS utilize canals with water that persists through the summer months. Many of the canals contain adequate emergent aquatic vegetation and steep, vegetated banks that provide cover and an abundant food supply of small fish, tadpoles and frogs." (*Natomas Basin HCP – Biological Data*, at p. II-9.)

[2] An economic or social change by itself is not considered a significant effect on the environment (CEQA Guidelines Section15382).

accounted for 74,942 acres (Butte County 2007a). The Singh Unit and Nicolaus property orchards (totaling approximately 170 acres of agricultural production) account for approximately 0.2% of Butte County's almond and walnut orchards and approximately 0.04% of land in agricultural production. However, the change from commercial uses to non-commercial uses (i.e., the change from walnuts to native vegetation) would not substantially diminish the land, soils or open space values of the physical resource, nor would they preclude future agricultural use of the land or preclude nearby agricultural uses, as described below.

Conversion of Agricultural Land and Relationship to CEQA

The proposed riparian habitat restoration and outdoor recreation facilities on the Singh Unit and the Nicolaus property do not constitute a conversion of farmland resulting in potentially significant adverse environmental impacts as defined in CEQA and the State CEQA Guidelines. In the American Farmland Trust's mapping program, the assessment of loss of farmland (i.e., conversion) evaluates the acres of farmland converted to developed uses (American Farmland Trust 2007). The definition of "development" uses the term, "urban and built-up areas" from the National Resource Inventory, which is described as follows:

- **urban and built-up areas:** A land cover/use category from the National Resources Inventory that includes residential, industrial, commercial, and institutional land; construction sites; public administrative sites; railroad yards; cemeteries; airports; golf courses; sanitary landfills; sewage treatment plants; water control structures and spillways; other land used for such purposes; small parks (less than 10 acres) within urban built up areas; and highways, railroads and other transportation facilities if they are surrounded by urban areas.

Similarly, the term "urban and built up land" is also used in the California DOC's FMMP. The proposed habitat restoration and outdoor recreation facilities do not fit this definition of urban and built-up land. Therefore, the planned uses do not qualify as "conversion" to development.

At the federal level, the Federal Farmland Policy Protection Act (FPPA) requires consideration of whether federal actions would lead to the conversion of agricultural lands to non-agricultural uses. While the statute does not include a definition of "non-agricultural uses," the procedures established by the Natural Resources Conservation Service (NRCS) for assessing farmland conversion impacts provide some insight. NRCS created Form AD 1006 to provide a "Farmland Conversion Impact Rating" to Federal actions. In assessing conversions, the form defines uses as "urban," which detract from agricultural land values in the rating system, and "non-urban uses," which create or protect agricultural land values in the rating system. The definition of "non-urban uses" includes: agricultural land; range land; forest land; non-paved parks and recreational areas; rural roads; lakes, ponds and other water bodies; open space; and wetlands, among other similar uses. Urban uses include houses, apartments, commercial and industrial buildings, paved recreation areas (e.g., tennis courts), and other urban development (NRCS 1983). The proposed project would not result in "urban" uses, but would fall within the "non-urban" use category (i.e., non-paved parks and recreational areas, rural roads, other water bodies, open space, and wetlands) that creates or protects agricultural land values. Therefore, the ultimate physical conditions of the Singh Unit and the Nicolaus property resulting from the proposed project would be protective of agricultural land values, as considered by the procedures implementing the FPPA.

In addition, the LESA Model (referenced in Appendix G of the CEQA Guidelines) defines "Land Committed to Nonagricultural Use," as "land that is permanently committed by local elected officials to nonagricultural development by virtue of decisions which cannot be reversed simply by a majority vote of a city council or county board of supervisors." (*LESA Instruction Manual* p. 26.) The commitment to non-agricultural uses is further described as requiring a tentative subdivision map, tentative or final parcel map, or recorded development agreement. Each of these descriptors involves an urban development action; however, no urban development would occur under the proposed project.

In contrast, the proposed riparian habitat restoration and outdoor recreation facilities qualify as "Protected Resources Lands" (*LESA Instruction Manual* p. 28.) as follows:

Protected resource lands are those lands with long term use restrictions that are compatible with or supportive of agricultural uses of land. Included among them are the following:

- Williamson Act contracted lands
- Publicly owned lands maintained as park, forest, or watershed resources
- Lands with agricultural, wildlife habitat, open space, or other natural resource easements that restrict the conversion of such land to urban or industrial uses.

Habitat Restoration

The vast majority of the Singh Unit and Nicolaus property would be restored to native riparian habitat under the proposed project. Unlike urban development, natural vegetation restoration would represent a return to the land's original (natural) physical condition, as part of a riparian corridor, which offers long-term natural process and function benefits, including the natural formation of soils that provide these sites with their current resource values. Because the resource value of the soil is tied directly to the natural conditions and processes that existed prior to commercial agricultural cultivation, native vegetation restoration efforts would in effect be preserving (and possibly improving over time) the soil integrity (Cannon 2004).

TNC (in partnership with USFWS) evaluated the effects of agriculture and habitat restoration in the inner river zone. The findings show that in a dynamic riverine environment, the management of prime and unique farmland soils for agricultural purposes can expose them to some degree of degradation. Protection from flooding and associated sediment deposition, tilling, and the application of agricultural chemicals can adversely affect nutrient cycling, increase exposure to erosion, and inhibit natural soil microorganisms. In contrast, in restored riparian woodland, soils are improved in the values that make them valuable for farming. Brown and Wood (2002) evaluated soil development at riparian forest sites at different stages of restoration (new to mature), finding that soil bulk densities decreased as restored riparian forests matured. Higher bulk densities are evidence of soil compaction that happened over time. The lower bulk densities exhibited in mature forests is considered to result from increased biological activity in the soil, such as earthworms, beetles and small mammals aerating the soils (Brown and Wood 2002).

The proposed project would re-establish long-term processes and functions present in riparian habitat communities, including the natural formation of soils that gave the Singh Unit and Nicolaus property their original agricultural value. Fully functioning riparian ecosystems are also known to improve groundwater and surface water quality by removing undesirable constituents such as nutrients and pesticides (Brown and Wood 2002). Ceasing agricultural practices and restoring the project area could benefit adjacent and downstream agricultural lands by diminishing the volume and frequency of pesticides applied to the properties, slowing the loss of soils from the sites onto adjacent or downstream locations, and by increasing groundwater levels. Because the agricultural value of the soil is tied directly to the natural conditions and processes that existed before commercial agricultural development of the land, habitat restoration efforts would in effect be preserving (and possibly improving over time) the agricultural value of the soil (Cannon 2004, Tilman et al. 1996 and 2002).

Recreational Facilities Development

Consistent with Park Plan Guideline AO-3.2-1, the proposed recreational facilities have been designed such that they would minimize alteration of the natural landform and they would be compatible with the open space values of the area, including the resource values that support agricultural productivity. The proposed outdoor recreational facilities, which include standard trails/campground/day-use features and ancillary facilities (e.g., parking, restrooms, etc.), would include minimal paving and limited small structures (see Section 3.4.2 of the EIR). The proposed recreational facilities would be sufficiently limited in nature (i.e., small areas used for trails, parking, and camping that could be readily demolished and removed), such that it would be feasible to return the lands to another resource-based use, such as agricultural production, at some future time. Consequently, the

development of the proposed outdoor recreation facilities would not constitute agricultural land conversion in the sense of the environmental impact concerns of CEQA.

Indirect Conversion of Agricultural Land

As described above, the proposed habitat restoration and recreational facilities are non-urban uses that would be protective of and compatible with adjacent agricultural land. Additionally, the project would not include the extension of utility lines or new utility connections, which would potentially open new development pressures.

However, during the scoping and Draft EIR review processes for this project, neighboring private agricultural land owners expressed concerns regarding indirect effects of the project on their land. The project has considered and incorporated measures to avoid indirect impacts to neighboring agricultural lands as follows.

Hydrology

As described in Chapter 3, the habitat restoration plans (Appendix C) are based on hydraulic modeling (Appendix B), which takes into consideration the hydrologic regime in the project area as well as soil and ground water conditions. Please refer to Section 4.3 of this DEIR, "Hydrology, Water Quality, and River Geomorphology," for the analysis of the project's potential impacts related to flooding, hydrology, and water quality.

Pests

The habitat restoration plans include grassland buffers where the project site borders active agricultural land, to prevent encroachment of the riparian vegetation on neighboring agricultural land and to minimize pest concerns. The proposed grassland buffer would be approximately 100-feet wide and would be maintained by State Parks (~~mowed at least biannually~~managed to prevent woody species establishment). A wider grassland buffer is not proposed for this project because the habitat restoration plans do not include planting any threatened or endangered plant species; therefore, a large grassland buffer is unnecessary to prevent encroachment of such species onto private property. ~~Additionally, a large grassland buffer is unnecessary to protect the restoration area from spray-drift from adjacent agricultural activities.~~ Furthermore, grassland buffer zones may not be effective against all possible pests. In general, a maintained ~~vegetated~~ grassland buffer ~~of mowed grass~~ may be effective in preventing the exchange of codling moth between orchards and riparian forests by providing a barrier to movement, but would not be expected to deter the spread of vertebrate pests such as California voles, Botta's pocket gopher, or California ground squirrel, or the invertebrate pest, western tarnish bug (aka Lygus bug). In contrast, it is possible that to reduce California ground squirrel, California vole, and Lygus bug population sizes, a more appropriate buffer would likely be a dense closed canopy shrub or tree type with low density of herbaceous plants (Colusa Pest and Regulatory Effects Study; EDAW 2007).

Additionally, the proposed campgrounds and BSRSP headquarters facilities would be located over 300 feet away from the property boundary with neighboring private agricultural lands. The area between the campgrounds and the property boundary is proposed to include restored riparian forest, grassland buffer, as well as Mud Creek along the eastern boundary of the project site. The proposed recreational trails would be at least 100 feet away from the property boundary. Therefore, the project meets the intent of Butte County's agricultural buffer setback and a larger grassland buffer is unnecessary to protect the restoration area from spray-drift from adjacent agricultural activities.

Trespass

The northern boundary of the Singh Unit and the four corners (NW, NE, SW, SE) of Nicolaus property have been surveyed and marked (April 2008). The survey plat has been recorded with Butte County. The boundaries between the project site, which would be part of State Park's BSRSP, and private property would be clearly posted, consistent with Guideline AO-1.1-2 and AO-4.4-1 of the Park Plan. State Parks would post "Park

Boundary" signs as well as "No Trespass" signs along the project site boundaries with private lands. State Parks plans on locking the gate at the day use area (located at the current site of the Park headquarters) from sunset to sunrise. Additionally, State Parks will consider other measures to prevent trespass such as appropriate fencing or natural barriers, subject to regulatory approval.

~~Additionally, the~~The proposed trails and recreational facilities on the Nicolaus property and Singh Unit would be no closer than 100 feet from private property boundaries. The proposed campsites would be located in the center of the Nicolaus property, surrounded by restored riparian habitat to provide a buffer between campsites and the neighboring private property. Furthermore, as part of BSRSP, the project site would be managed and maintained consistent with the Park Plan goals and guidelines, including coordinating with public and private landowners in the project vicinity to minimize land use conflicts (Park Plan Overall Goal AO-4).

Law enforcement services are provided concurrently by State Parks and local law enforcement agencies, namely Butte County Sheriff Department for the portion of BSRSP in Butte County. ~~Park security is~~Public safety and emergency services are the primary responsibility of the ~~Park Ranger serving the Park. State Parks has its own law enforcement in the form of~~ State Park Peace Officers ~~Rangers~~ who are California Penal Code 830.2(f) and have full law enforcement authority in the State of California. These ~~Ranger~~Peace Officers patrol State Parks and enforce California Code of Regulations Section 4320 (a), (b), and (c) Peace and Quiet. Additionally, consistent with the Park Plan Goal AO-4.4, State Parks will work with private landowners in proximity to BSRSP to minimize conflicts associated with the mixed public and private land ownership in the area.

Conclusion

The proposed project would not result in conversion of agricultural land to urban uses and would, therefore, not result in a loss of farmland as a resource, significant damage to soil values of the resource, or detraction from the agricultural values of the resource. Additionally, the habitat restoration and outdoor recreation facilities are designed and would be managed to avoid indirect adverse primary or secondary effects on adjacent agricultural land. Based on the information presented above, State Parks concludes that the proposed project would result in a ***less-than-significant impact on agricultural resources*** within the intended meaning of CEQA and the CEQA Guidelines.

IMPACT 4.2-b **Williamson Act Contract Nonrenewal ~~Cancellation~~ and Land Use Compatibility.** *The Singh Unit is not in a Williamson Act contract. However, the Nicolaus property (approximately 146 acres) is currently in a Williamson Act contract. Transfer of ownership of the Nicolaus property from TNC to the State of California (i.e., State Parks) would not require a new Williamson Act contract (pursuant to California Government Code Section 51295). However, prior to the land transfer, State Parks is required to advise the Director of Conservation and Butte County of its intention to locate a public improvement on land under a Williamson Act contract (pursuant to Section 51291). Following the transfer, State Parks is required to make findings pursuant to California Government Code Section 51292 to locate a public improvement on ~~support the cancellation~~ the property under a Williamson Act contract ~~for the property~~. Either TNC (prior to the transfer) or State Parks (following the transfer) would serve written notice of nonrenewal to Butte County, which would stop the automatic annual renewal of the contract and start the 10-year phase-out of the contract. The ~~cancellation~~ nonrenewal would represent a 0.07% decrease in the total acreage under ~~Willamson~~Williamson Act contracts in Butte County (using data from 2005, which is the most recent data available). However, ~~per California Government Code Section 51238.1,~~ the proposed habitat restoration and outdoor recreational facilities would not significantly compromise the long-term agricultural capability of the Singh Unit and Nicolaus property. In addition, the habitat restoration and recreational facilities proposed are considered compatible with agriculture and therefore would have no significant adverse effects on neighboring farmland production. Therefore, this impact is considered* ***less than significant****.*

Williamson Act Contract ~~Cancellation~~ Process

The Singh Unit is not in a Williamson Act contract. However, the Nicolaus property (approximately 146 acres) is currently in a Williamson Act contract ~~and an application for notice of~~no nonrenewal request has been filed ~~with Butte County.~~ TNC and State Parks will adhere to the local and state regulations for lands under a Williamson Act contract.

State Acquisition of Land under Williamson Act Contract – Value to the Public

Rule 6(F) of the Butte County Williamson Act Procedures (~~County of~~ Butte County 2007b) ~~states~~ provides guidance for the County in situations when land under Williamson Act contract is acquired by the State. Rule 6(F) reads as follows:

> **Public Acquisition.** Williamson Act contracts become void for land that is acquired by a federal, state or local government agency for necessary public uses and facilities. The California Land Conservation Act of 1965 contains policies and restrictions to avoid public acquisition of lands in agricultural preserves, with special emphasis on restricting acquisition of land subject to Williamson Act contracts or containing prime agricultural land. State and local government agencies are required to refer proposals to acquire land in agricultural preserves to the State Department of Conservation for their review and response prior to acquisition.

A stated in Government Code Section 51290(a)(b), "it is the policy of the state to avoid, whenever practicable, the location of any federal, state, or local public improvements…and the acquisition of land therefore, in agricultural preserves," and "that whenever it is necessary to locate such an improvement within an agricultural preserve, the improvement shall, whenever practicable, be located upon land other than land under a [Williamson Act] contract." Furthermore, a public agency proposing to acquire and/or locate improvements on land under Williamson Act contract, shall "give consideration to the value to the public…of land…within an agricultural preserve." (Section 51290[c]).

In determining the value to the public, the Legislature finds (Section 51220):

(a) That the preservation of a maximum amount of the limited supply of agricultural land is necessary to the conservation of the state's economic resources, and is necessary not only to the maintenance of the agricultural economy of the state, but also for the assurance of adequate, healthful and nutritious food for future residents of this state and nation.

(b) That the agricultural work force is vital to sustaining agricultural productivity; that this work force has the lowest average income of any occupational group in this state; that there exists a need to house this work force of crisis proportions which requires including among agricultural uses the housing of agricultural laborers; and that such use of agricultural land is in the public interest and in conformity with the state's Farmworker Housing Assistance Plan.

(c) That the discouragement of premature and unnecessary conversion of agricultural land to urban uses is a matter of public interest and will be of benefit to urban dwellers themselves in that it will discourage discontiguous urban development patterns which unnecessarily increase the costs of community services to community residents.

(d) That in a rapidly urbanizing society agricultural lands have a definite public value as open space, and the preservation in agricultural production of such lands, the use of which may be limited under the provisions of this chapter, constitutes an important physical, social, esthetic and economic asset to existing or pending urban or metropolitan developments.

(e) That land within a scenic highway corridor or wildlife habitat area as defined in this chapter has a value to the state because of its scenic beauty and its location adjacent to or within view of a state scenic highway or because it is of great importance as habitat for wildlife and contributes to the preservation or enhancement thereof.

(f) For these reasons, this chapter is necessary for the promotion of the general welfare and the protection of the public interest in agricultural land.

In consideration of the value to the public of the proposed project pursuant to Section 51220, State Parks could make the following findings. The proposed project is consistent with State Parks' Central Valley Vision process, which provides recommendations for park acquisition, development, and program activities over a 20-year planning horizon (DPR 2007). During the Central Valley Vision planning process, which began in 2003, State Parks found that there are significant resource protection and recreational opportunities and programs in the Central Valley through which State Parks can better serve the needs of Valley residents and visitors (DPR 2007). Recognizing and responding to the rapid population growth anticipated in the Central Valley over the next 20–30 years, the dearth of State Park facilities in the Central Valley, and the increasing diversity of visitor needs and interests, State Parks is working to expand and improve park facilities and recreation programs at Central Valley State Park System units, including BSRSP. Public input during the Central Valley Vision planning process found a strong interest in river access with adjacent day-use and camping facilities, as well as preservation of riparian habitat (DPR 2007). Acquisition of the Nicolaus property, and subsequent habitat restoration and development of outdoor recreation facilities would address public interests expressed during State Parks' Central Valley Vision planning process. Additionally, as discussed in Sections 3.1.3, 3.1.4, and 3.3.1 of this EIR, the proposed project is a product of a number of policies, programs and activities focused along the Sacramento River over the last 20 years at multiple levels of government. The implementation of these programs represents a significant public investment in the protection and restoration of riparian habitat. The efforts began in 1986, when the State of California legislature passed into law SB 1086, calling for development of a management plan for the Sacramento River and its tributaries. This set into motion an effort to protect, enhance and restore fisheries and riparian habitat that has become a model for the State. SB 1086 resulted in publication of the *Sacramento River Conservation Area Forum Handbook* (SRCA Forum 2003) that contains a set of principles and guidelines for habitat management along the river. SB 1086 also led to the formation of a nonprofit organization, the SRCA Forum, to coordinate the habitat restoration efforts along the river in accordance with guidance in the SRCA Forum Handbook.

Notification of Intent to Locate Public Improvement on Property under Williamson Act Contract

State Parks would acquire the Nicolaus property as a gift from TNC. Prior to the transfer of the Nicolaus property ~~land~~ from TNC to State Parks, State Parks would advise the Director of Conservation and Butte County of its intention to consider the location of a public improvement within property under Williamson Act contract (pursuant to Section 51291[b]). "In accordance with Section 51290, the notice shall include an explanation of the preliminary consideration of Section 51292, and give a general description, in text or by diagram, of the agricultural preserve land proposed for acquisition, and a copy of any applicable [Williamson Act] contract" (Section 51291[b]). The Director of Conservation would then forward a copy of the notice to the Secretary of Food and Agriculture for comment. Within 30 days, the Director of Conservation and Butte County would forward their comments with respect to the effect of the location of the public improvement on the land within an agricultural preserve to State Parks for their consideration (Section 51291[b]). Following acquisition of the Nicolaus property by State Parks, State Parks "shall notify the Director of Conservation within 10 working days. The notice shall include a general explanation of the decision and the findings made pursuant to Section 51292" (Section 51291[c]).~~is required to make findings pursuant to California Government Code Section 51292 to support the cancellation of the Williamson Act contract for the property.~~ As stated in Government Code Section 51292, it is the policy of the state that public agencies cannot locate public improvements in agricultural preserves unless specific findings can be made:

1. The location is not based primarily on a consideration of the lower cost of acquiring land in an agricultural preserve. (Section 51292[a])

2. If the land is agricultural land covered under a [Williamson Act] contract ~~pursuant to this chapter~~ for any public improvement, that there is no other land within or outside the preserve on which it is reasonably feasible to locate the public improvement (Section 51292[b])

~~It is anticipated that State Parks could~~ The project facts support the first finding (pursuant to Section 51292[a]) because the selection of the Nicolaus property was based on the location near~~at~~ the confluence of the Sacramento River, Big Chico Creek, and Mud Creek; the location relative to BSRSP; the potential the site offers to rehabilitate natural river processes, aid recovery of special-status species, restore riparian habitat, and improve water quality; and a willing seller. The property represents the potential expansion of BSRSP, including expansion of native riparian habitat in the Park (and within the greater area of protected and restored habitat along the Sacramento River between river mile [RM] 199 and RM 193) and the expansion and improvement of recreational facilities.

~~It is also anticipated that State Parks could~~ Project facts also support the second (pursuant to Section 51292[b]) ~~required~~ findings. As the purpose of the ~~land transfer~~project, including the land transfer from TNC to State Parks, is both restoration of native riparian habitat and expansion of the BSRSP, the property needs to be adjacent to existing BSRSP property and offer an opportunity to restore riparian habitat. The Nicolaus property is located directly across River Road from the Indian Fishery Subunit and north of the ~~Singh Unit~~Big Chico Creek Riparian Area Subunit (which includes the Singh Unit), separated by a privately owned orchard and field crops. These two subunits, totaling 240.6 acres, represent 89% of the total land that composes the BSRSP. New recreation facilities, such as trails and campground, would connect to and support the use of other existing facilities in BSRSP. Additionally, the existing farm complex would provide the ability to relocate the BSRSP headquarters to higher, less frequently flooded ground. The location of the project near ~~at~~ the confluence of the Sacramento River, Big Chico Creek, and Mud Creek provides a unique habitat restoration opportunity. Additionally, the property is located adjacent to lands that are part of DFG's ~~the~~ Sacramento River Wildlife Area, ~~managed by DFG,~~ and ~~is located~~ proximate to USFWS lands that are~~managed by the USFWS as~~ part of the Sacramento River National Wildlife Refuge. ~~This~~ The Nicolaus property, similar to these neighboring public lands, is ~~also~~ located within the Sacramento River Conservation Area (SRCA). ~~, and could~~ The proposed project would support the SRCA goal to "preserve remaining riparian habitat and reestablish a continuous riparian ecosystem along the Sacramento River between Redding and Chico and reestablish riparian vegetation along the river from Chico to Verona." Furthermore, the Nicolaus property, which is owned by TNC, has an owner willing to transfer the land to State Parks as a gift (i.e., State Parks would not purchase the Nicolaus property from TNC). Due to the large amount of land in public ownership in the vicinity of BSRSP, and the lack of private land owners willing to sell land adjacent to BSRSP, another location was not identified that could meet these criteria.

Notice of Nonrenewal of the Williamson Act Contract

Pursuant to Rule 6(A) of the Butte County Williamson Act Procedures (Butte County 2007b), either TNC (prior to the land transfer) or State Parks (following the land transfer) would serve written notice of nonrenewal of the Williamson Act contract for the Nicolaus property to DOC and Butte County, which would release State Parks from the contract after the ninth year following the year the notice of nonrenewal is submitted. During the nonrenewal period, State Parks would conduct activities consistent with the Williamson Act contract. ~~the dearth of State Park facilities in the Central Valley.~~

~~Once State Parks makes the findings pursuant to Section 51292, the Williamson Act contract would be cancelled and a new Williamson Act contract would not be required (pursuant to California Government Code Section 51295). Countyb~~

As of 2005 (the most recent data available), a total of 215,248 acres were enrolled in the Williamson Act Program in Butte County (DOC 2006). The ~~cancellation~~ nonrenewal of the Williamson Act contract for the Nicolaus property (approximately 146 acres) would represent a 0.07% decrease in the total acreage under Williamson Act contract in Butte County. Based on the information presented above, State Parks concludes that the proposed project would result in a ***less-than-significant impact on agricultural resources*** within the intended meaning of CEQA and the CEQA Guidelines.

Land Use Compatibility with Agriculture and Williamson Act Contracts

The proposed habitat restoration and outdoor recreational uses at the project site would be compatible with surrounding agriculture land uses, based on existing federal and state laws and programs for farmland protection. As described in Impact 4.2-a, the Federal FPPA indicates that non-agricultural uses are urban uses, which detract from agricultural land values in the rating system, while "non-urban uses," which create or protect agricultural land values, include non-paved parks and recreational areas. Based on the characteristics of the proposed habitat restoration and outdoor recreation facilities, the project would qualify as non-urban uses, which the FPPA considers to be protective of and compatible with agricultural values. The Williamson Act also contains numerous provisions that recognize the compatibility between agricultural and recreation/open space uses. The definitions included in the statute are the first indication of such compatibility. It defines an "agricultural preserve" as an area devoted to either agricultural use, recreational use, open space use, or any combination thereof (California Government Code Section 51201(d)). Also, "recreational use" is defined as the use of the land in its agricultural or natural state by the public, with or without charge, for a range of listed uses, including, but not limited to walking, hiking, picnicking, camping, swimming, boating, fishing, and other outdoor sports (California Government Code Section 51201(n)). Finally, "compatible use" is defined as any use determined to be compatible with the agricultural, recreational, or open space use of the land within the preserve (California Government Code Section 51201(e)) The habitat restoration and recreational facilities proposed are considered compatible with agriculture and therefore should have no significant adverse effects on neighboring farmland production. Furthermore, per the goals and guidelines under Park Plan Overall Goal AO-4, State Parks has incorporated design features (e.g., grassland buffers) into the habitat restoration and recreation facility plans to minimize land use incompatibilities and has/will coordinate with public and private landowners in the project vicinity to minimize land use conflicts. Park Plan guidelines also address fire protection and law enforcement at the Park (see Chapter 3, "Description of the Proposed Project") to minimize incompatibilities with active agricultural operations on adjacent properties.

The definitions described above are reinforced in Section 52105 of the Williamson Act, which states that land devoted to recreational use…may be included within an agricultural preserve (California Government Code Section 51205). In outlining the purpose of the Williamson Act, the statute states that the discouragement of premature and unnecessary conversion of agricultural land to urban uses is a matter of public interest (California Government Code Section 51220(c)); there is no reference to other non-urban uses, such as low-intensity rural outdoor recreation, such as those that result from the proposed project. The clearest evidence for compatibility between agriculture and the habitat restoration and recreational facilities proposed at the project site are found in the principles of compatibility presented in Section 51238.1 of the statute. It states that uses approved on contracted lands, such as those proposed for the project site, will not significantly compromise the long-term agricultural capability of the subject contracted parcel in agricultural preserves (California Government Code Section 51238.1(a)(1)). The proposed project, and goals and guidelines of the Park Plan, strive to maintain physical conditions of the land that create resource values, including future agricultural and open space capabilities. Therefore, the habitat restoration and recreational facilities proposed are considered compatible with surrounding agriculture land use this impact is considered ***less than significant***.

SOCIOECONOMIC CONSIDERATIONS

The CEQA Guidelines provide that "economic or social information *may* be included in an EIR or *may* be presented in whatever form the agency desires" but that "economic or social effects of a project *shall not* be treated as significant effects on the environment." (CEQA Guidelines Section 15131. Emphasis added).

Therefore, while social and economic consequences are not in of themselves environmental impacts under CEQA, this section discusses socioeconomic considerations related to agricultural production resulting from implementation of the proposed project.

Agricultural production supports considerable economic activity in Butte County. The value of all agricultural production in Butte County was approximately $454 million in 2006 (Butte County 2007a). Almonds and walnuts accounted for approximately $104.5 million and $76.7 million of total production, respectively. In 2006, the amount of land in agricultural production in Butte County was 464,308 acres, of which almonds and walnuts accounted for 74,942 acres.

Combined, the Singh Unit and Nicolaus property represent a total of 189 acres of designated Irrigated Farmland (see Section 4.2.1). Of this amount, a total of 170 acres are currently planted in walnuts and almonds. If this total acreage was removed from production for native vegetation restoration or rural outdoor recreation uses, it would constitute a very small portion of total agricultural lands in walnut and almond production in Butte County (approximately 0.2% of Butte County's almond and walnut orchards and approximately 0.04% of land in agricultural production), and a correspondingly small amount of production value (approximately $209,000 annually). Reducing agricultural production value by this proportion would have a minor, if not unnoticeable, economic effect in the county. The cessation of agricultural production can also cause an indirect economic ripple effect on secondary service and supply businesses supporting agriculture. However, because of the small relative contribution of the project site to agricultural production in the county, the combined direct and indirect economic effect of removing agricultural production from these lands would be minor.

4.2.4 MITIGATION MEASURES

No mitigation is required for impacts to agricultural resources.

4.3 HYDROLOGY, WATER QUALITY, AND RIVER GEOMORPHOLOGY

This section addresses hydrology, water quality, and river geomorphology in the project area and the potential effects of the proposed project. As described in Chapter 3, "Description of the Proposed Project," the project area occurs along the Sacramento River in and adjacent to Bidwell-Sacramento River Park (BSRSP). Potential effects on aquatic species are addressed in Section 4.4, "Biological Resources."

This analysis tiers off of the BSRSP General Plan and Draft Environmental Impact Report (Park Plan) which considered the potential impacts to hydrology and water quality resulting from implementation of the Park Plan (Park Plan Section 4.6.8). As described in Chapter 1 of this EIR, the proposed project actions are consistent with those identified in the Park Plan.

4.3.1 ENVIRONMENTAL SETTING

SOURCES OF INFORMATION

The evaluation of hydrology, water quality, and river geomorphology for this ~~D~~EIR is based largely on review of the following documents:

- *Hydraulic Analysis for Flood Neutrality on the Nicolaus and Singh Properties, Sacramento River, Mud Creek, and Big Chico Creek.*~~*Flood Neutral Hydraulic Analysis for the Nicolaus and Singh Properties; Sacramento River, RM 194–195.*~~ Prepared by Ayres Associates, ~~in December~~ May 30, 2008~~7~~.
- *Sacramento and San Joaquin River Basins California Comprehensive Study*. Interim report. Prepared by U.S. Army Corps of Engineers (USACE) and The Reclamation Board in 2002.
- *Sacramento River Conservation Area (SRCA) Forum Handbook*, prepared in 2003. (http://www.sacramentoriver.ca.gov/publications/handbook/ handbook.html)
- California Department of Parks and Recreation. 2003 (December). *Bidwell-Sacramento River Park General Plan and Draft Environmental Impact Report*. Prepared by EDAW, Sacramento, CA.

These resources are cited throughout this section and corresponding references are included in Chapter 9, "References." Relevant sections of the CALFED Final PEIS/EIR were reviewed, including Section 5.1, "Water Supply and Water Management;" Section 5.2, "Bay-Delta Hydrodynamics and Riverine Hydraulics;" and Section 5.3, "Water Quality."

REGIONAL CONTEXT

The Sacramento River Valley encompasses an area of more than 26,300 square miles in the northern portion of the Central Valley. The Sacramento River basin encompasses large and smaller sub-basins. Major sub-basins include the McCloud River, Pit River, Goose Lake and the Cascade Range in the north. Major sub-basins of the Sierra Nevada include the Feather River and the American River in the east. Smaller sub-basins include the Coast Range and Klamath Mountains in the west, and the Bay-Delta in the south. The Sacramento River joins the San Joaquin River in the Bay-Delta near Pittsburg in Contra Costa County. The combined waters from these two river systems flow into Suisun Bay, through the Carquinez Strait, into San Pablo Bay and San Francisco Bay, and to the Pacific Ocean.

The Sacramento River is the largest river in the state. It has an average annual runoff of 22.4 million acre-feet (MAF) and yields 35% of the state's developed water supply. Upper Sacramento River flows are largely controlled by the Central Valley Project (CVP) storage and diversion facilities operated by the U.S. Bureau of Reclamation and local irrigation districts. Shasta Dam, located upstream of Redding, is the dominant reservoir on

the mainstem Sacramento River, and its operations exert considerable influence over stream flow patterns in the river (described below).

In its historic condition, the Sacramento Valley was composed of extensive perennial grasslands, riparian woodlands, and marshes. The Sacramento River and other primary waterways often would flood in winter and early spring, recharging wetlands and depositing fertile sediments on the floodplain that is now valued for agriculture. The Sacramento River within the project area is characterized by a meandering channel with a broad alluvial floodplain. Upstream reaches are characterized by confined canyons, and lower reaches are characterized by natural levees separating the river from extensive flood basins.

The natural physical and biological processes of erosion, deposition, and riparian succession along the Sacramento River have generally been modified by humans throughout the period of recent development since about 1850. Construction of Shasta Dam (completed in 1944) 9 miles north of Redding resulted in a substantial reduction in winter flood flows and an increase in summer stream flows. Past efforts to reclaim floodplain areas for agricultural production and flood protection involved clearing of riparian areas, stabilization of stream banks, and construction of levees and other flood protection structures.

PROJECT AREA SETTING

Hydrology

Stream flow patterns in the Sacramento River reflect a combination of natural runoff events and operational controls (DWR 1994). Annual average precipitation in the entire basin is 36 inches and varies considerably from approximately 20 inches in the valley floor falling nearly exclusively as rain, and ranging from 40 to 60 inches annually as rain and snow at higher elevations in the mountains (CALFED 2000). In general, natural Sacramento River stream flow patterns are distinctly seasonal; however, managed reservoir releases have altered the natural flows as depicted in Table 4.3-1. The typical water year (starting October 1) begins with low natural runoff flows, reduced reservoir releases as the agricultural irrigation season ends, and minimum reservoir storage levels (CALFED 2000). With the return of winter rains, the highest flows and increased probability of overbank flooding events occurs during the winter rainfall months of January and February. Flows decrease slightly in late winter before peak periods of mountain snowmelt that occur in spring. Flows are muted in spring compared to historical unimpaired flows as the natural runoff is retained to fill the reservoirs to their normal summer operating pool levels. Flows then increase through the summer as reservoirs are lowered (primarily Shasta Lake) for hydropower production and to meet the agricultural demands of the Sacramento Valley and CVP operational demands and requirements.

Table 4.3-1
Average Mean, Maximum, and Minimum Monthly Flows (cfs) on the Sacramento River

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Sacramento River at Hamilton City												
Mean	5,624	5,683	15,695	18,395	19,590	14,263	8,325	11,303	10,961	11,777	8,299	6,909
Maximum	6,736	6,450	20,661	29,779	41,324	23,698	13,320	22,575	12,857	12,182	8,984	7,790
Minimum	4,550	4,888	6,462	7,881	8,697	8,885	5,437	7,099	9,087	10,838	7,701	5,831
Sacramento River at Ord Ferry												
Mean	5,832	5,797	18,382	21,252	20,659	16,589	9,728	12,357	11,243	11,819	8,961	7,559
Maximum	6,889	7,023	22,345	34,487	42,752	27,485	14,336	24,200	13,411	12,632	9,563	8,349
Minimum	5,221	4,777	11,996	8,608	10,471	10,361	5,816	7,855	9,349	10,737	8,200	6,269

Source: DWR 2005

Table 4.3-1 shows descriptive statistical flow parameters (i.e., minimum, average, and maximum) for two gauging stations that are located in the project area (Hamilton City and Ord Ferry). These measured stream flows are considered representative of the range of flow conditions in the project area.

Sacramento River Flows and Flood Control Operations

This subsection provides an overview of the flow patterns on the Sacramento River and flood control structures and operations to protect communities, agriculture, and other commercial operations.

The Sacramento River has a design flow capacity of 160,000 cubic feet per second (cfs) just downstream of the project area (USACE and The Reclamation Board 2002). Table 4.3-1 depicts average monthly flows on the Sacramento River at the Hamilton City and Ord Ferry gauging stations from 2001 through 2004.

Shasta Dam provides flood protection to the communities of Redding, Anderson, Red Bluff, and Tehama, as well as the agricultural lands, industrial developments, and communities downstream along the Sacramento River. Private levees or low berms, and USACE project levees limit the area of flooding in both urban and agricultural areas. Nevertheless, small communities and portions of larger communities continue to be at risk of flooding along portions of the river and tributaries. Shasta Dam is operated for an objective release of 79,000 cfs at Redding and 100,000 cfs at Bend Bridge in Red Bluff. Flows greater than 36,000 cfs begin to cause flooding in Redding (USACE and The Reclamation Board 2002).

Tributaries entering the Sacramento River from the west, including Clear, Cottonwood, Elder, Thomes, and Stony creeks, drain runoff from the Coastal Mountain range. Cottonwood Creek provides the most significant amount of inflow to the Sacramento River in this region. Tributaries from the east that drain runoff from the Cascade and Sierra Nevada mountain ranges include the Cow, Bear, Battle, Paynes, Antelope, Mill, Deer, Rock, Big Chico, Mud, and Butte creeks. Most of the tributaries are unregulated and can contribute high flood flows to the Sacramento River (USACE and The Reclamation Board 2002).

The maximum historical flows from Keswick Dam to Red Bluff are predominantly a result of uncontrolled local drainage. The 2,500-square mile uncontrolled drainage area between Keswick Dam and Bend Bridge can produce flows well in excess of the design channel capacity of 100,000 cfs. These high-magnitude flows can occur very rapidly, requiring release changes from Keswick Dam based on official flow forecasts and complicated by the 8- to 12-hour travel time between Keswick Dam and Bend Bridge (USACE and The Reclamation Board 2002). As described above, the measured flows at Red Bluff and Colusa reflect the range of conditions in the project area.

The Sacramento River Flood Control Project

The Sacramento River Flood Control Project (SRFCP) was conceived in 1911 and constructed by USACE downstream of the project area. At that time, 80% of the proposed 500 miles of river and bypass levees had already been completed under private and municipal levee systems begun in the 1850s (Kelley 1989). Along the Sacramento River, the SRFCP consists of setback levees beginning near the town of Ord on the west side and just north of the Butte/Glenn County line on the east. The west bank project levee runs upstream to approximately river mile (RM) 184. The east bank project levee extends only as far upstream as RM 176. (The proposed project site is located at RM 194–195.) The Reclamation Board, which as of January 1, 2008 is called the Central Valley Flood Protection Board (CVFPB), is responsible for maintenance of the SRFCP. The responsibility is passed on to the local reclamation and levee districts or to the Department of Water Resources (DWR) where no such district exists. The bank protection project consists of the rock revetment of about 160 miles of banks and levees, installed to ensure the security of the flood control system (SRCA Forum 2003). Additional levees maintained by the CVFPB in conjunction with local reclamation districts extend upstream of the USACE project levees.

The Chico Landing to Red Bluff Project, authorized in 1958, extends and modifies the SRFCP. This project, sponsored by CVFPB, provides for bank protection (erosion protection) and incidental channel modifications

along 50 miles of the Sacramento River between Chico Landing and Red Bluff. In this reach, which includes the project area, 21.5 miles of bank protection have been installed to hold the river in place and limit meandering of the channel (USACE and The Reclamation Board 2002). Specifically at the Singh Unit and Nicolaus property, bank protection has been applied to eroding banks or repaired in a number of locations in the project area under USACE PL 84-99 emergency authority (Luster, pers. comm., 2005).

Behind the present day SRFCP levees, access to the Sacramento River floodplains and flood basins is limited by the overflow weirs (Moulton, Colusa, Tisdale, Fremont, and Sacramento) and bypasses (Sutter, Yolo, and Butte Basin), described below.

Butte Basin Overflow Area

The Butte Basin lies to the east of the Sacramento River and extends from the Butte Slough outfall gates near Meridian (RM 138) to the near the mouth of Big Chico Creek at the Singh property (RM 194) (see Exhibits 3-2 through 3-4). The Butte Basin Overflow Area is an essential element of the flood management system for the Sacramento River. Flood flows are diverted out of the Sacramento River into the Butte Basin and Sutter Bypass via several designated overflow areas (i.e., low points along the east side of the river) that allow high flood flows to exit from the Sacramento River channel. Overflow into the Butte Basin reduces the peak discharge and stage between the main levees of the SRFCP. The reduction of discharge and stage in the river is necessary to prevent the overtopping and subsequent failure of the flood control project levees downstream. The Sutter Bypass, in turn, conveys flows to the lower Sacramento River region at the Fremont Weir near the confluence with the Feather River and into the Sacramento River and the Yolo Bypass (USACE and The Reclamation Board 2002). The Yolo Bypass (59,000 acres), Sutter Bypass (15,000 acres) and Butte Basin provide access to broad, inundated floodplain habitat during wet years.

At high stages, water flows from the Sacramento River into the Butte Basin near the mouth of Big Chico Creek. Farther downstream of the project area, additional flood flows are diverted out of the Sacramento River into the Butte Basin and Sutter Bypass via the M&T Bend Flood Relief Structure, 3B's Flood Relief Structure, Goose Lake Flood Relief Structure, and the Moulton, Colusa, and Tisdale Weirs.

Sacramento River Bank Protection Project

The Sacramento River Bank Protection Project (SRBPP) was originally authorized under the Flood Control Act of 1960 (PL 86-645). Its purpose is to protect the levees and flood control facilities on the Sacramento River from the Bay-Delta at Collinsville at RM 0 to Chico Landing at RM 194 and includes the lower reaches of the American River (RM 0 to RM 23), Feather River (RM 0 to RM 61), Yuba River (RM 0 to RM 11), and Bear River (RM 0 to RM 17), as well as portions of Three Mile, Steamboat, Sutter, Miner, Georgianna, Elk, and Cache Sloughs. The SRBPP was created in 1959 and initiated by USACE in 1963 as a means of protecting the SRFCP levees. The SRBPP is an ongoing project subject to Congressional reauthorization. Construction activities authorized to date by the SRBPP account for approximately 152 miles of river bank revetment.

1961 USACE Mud, Big Chico and Sandy Gulch Channel Improvement and Levee Construction Plan

The 1961 U.S. Army Corps of Engineers (USACE) Mud, Big Chico and Sandy Gulch Channel Improvement and Levee Construction Plan called for the following: (a) diversion structures near the head of Sandy Gulch (Lindo Channel) and on Chico Creek to divert excess Chico Creek flood flows to Mud Creek; (b) a diversion channel to Mud Creek via Sycamore Creek and related left bank levee; (c) levees along both banks of Mud Creek and tributaries and channel enlargement as required; (d) bank protection on both banks of Mud and Sycamore Creeks where needed to prevent erosion due to high stream velocities; and (e) drainage structures as required through the new levees. The USACE plan addressed levee construction and channel widening for the Sacramento River tributaries, but did not contain any guidelines for land use on the dry sides of the levee (such as requiring that fields must be in agriculture). According to the Plan, landowner opposition to the plan resulted in USACE not building a levee on the west side of Mud Creek between Sacramento Avenue and the Sacramento River. Opposed landowners were primarily those owning land on the west side of Mud Creek between Sacramento Avenue and

the Sacramento River. Therefore, there is no "design project" on the Nicolaus property or Singh Unit. The 1961 USACE report (Page 5, Section 11a) states:

> "....Therefore, in view of the opposition of the local interests and in accordance with the request of the Reclamation Board, channel improvement and right bank levee construction in the above reach has been excluded from the plan of improvement."

The constructed flood control system pursuant to this Plan does not include a levee on the west side of Mud Creek in the vicinity of the project site. Additionally, the historic east-west slough on the Singh Unit was filled with spoil material from the channel widening portion of the USACE project as illustrated in Exhibit 8-1 of this EIR.

Water Quality

Surface Water Quality

Designated beneficial uses for the Sacramento River and all tributaries from Shasta Dam, upstream of the project area, to the Colusa Basin Drain, downstream of the project area, include:

- municipal, industrial, and agricultural supply;
- power generation;
- contact and non-contact recreation;
- cold-water fish habitat, migration, and spawning;
- warm-water fish habitat, migration, and spawning;
- wildlife habitat; and
- navigation.

The U.S. Geological Survey (USGS) completed an evaluation of water quality conditions of the Sacramento River upstream of the project area at Red Bluff as a component of an overall analysis of conditions in the Sacramento River watershed (USGS 2000). The evaluation indicated that the Sacramento River at Red Bluff generally has excellent water quality that is very low in contaminants.

Table 4.3-2 shows a summary of average concentrations from monthly water samples for conventional physical and inorganic chemical constituents measured in the Sacramento River at Red Bluff from February 1996 through April 1998 (USGS 2000). Red Bluff is approximately 55 miles north (upstream) of the project area and while changes in water quality are likely to occur as water flows downstream, this is the best available information to characterize water quality at the project area. In general, the data indicate that the river is low in total dissolved solids (TDS) as indicated by measurements of electrical conductivity (EC), total hardness, and specific cations and anions. The water has neutral pH, moderate alkalinity, and adequate dissolved oxygen (DO) levels for aquatic organisms. The water from the river is also generally low in nutrients (e.g., nitrogen and phosphorus) that can cause nuisance algae and aquatic vascular plant growth. Trace metal content is low in the river. Although mercury is routinely detected, the concentration has not exceeded ambient California Toxics Rule criteria (see below for description). Pesticides have been detected in the Sacramento River; however, with the exception of the drinking water standard for carbofuran, there are no applicable regulatory criteria established for the pesticides that have been detected. DFG has established guidance values for aquatic life chronic criteria (i.e., four-day-average) applicable to the organophosphate pesticides diazinon and chlorpyrifos. The DFG guidance values and other reference dose values for aquatic life or human health hazards that have been established for many pesticides are generally indicative of the lowest concentrations at which toxic effects have been detected. The average concentration of diazinon in the Sacramento River does not exceed the DFG guidance level of 50 nanograms per liter (ng/L) (DFG 2000).

Table 4.3-2
Summary of Conventional Water Quality Constituents in the Sacramento River at Red Bluff, 1996–1998

Constituent (Units)	Water Quality Objective	Average Measurement
Conventional Physical and Chemical Constituents		
Temperature	<2.5°F [a]	11.5°C
EC (µS/cm)	—	116
DO (mg/L)	7.0 [b]	10.7
DO Saturation (%)	85 [b]	99
pH (standard units)	6.5 to 8.5 [c]	7.8
Alkalinity (mg/L $CaCO_3$)	—	48.3
Total Hardness (mg/L $CaCO_3$)	—	46.6
Suspended Sediment (mg/L)	—	38.8
Calcium (mg/L)	narrative [d]	10.3
Magnesium (mg/L)	—	5.0
Sodium (mg/L)	—	5.8
Potassium (mg/L)	—	1.1
Chloride (mg/L)	500 [e]	2.4
Sulfate (mg/L)	500 [e]	4.5
Silica (mg/L)	—	20.5
NO_2+NO_3 (mg/L N)	NO_3<10 [f]	0.12
Total Phosphorus (mg/L P)	—	0.0477
Trace Metals		
Arsenic (µg/L)	50 [g]	1.0
Chromium (µg/L)	180 [g]	1.0
Copper (µg/L)	5.1 [g]	1.6
Mercury (µg/L)	0.050 [h]	0.0045
Nickel (µg/L)	52 [g]	1.2
Zinc (µg/L)	120 [g]	2.3
Organic Pesticides		
Molinate (ng/L)	13,000 [i]	<60
Simazine (ng/L)	3,400 [j]	<22
Carbofuran (ng/L)	40,000 [e], 500 [i]	<31
Diazinon (ng/L)	51 [k]	<28
Carbaryl (ng/L)	700 [j]	<41
Thiobencarb (ng/L)	1,000 [a]	<38
Chlorpyrifos (ng/L)	14 [k]	<25
Methidathion (ng/L)		<38

Notes: $CaCO_3$ = calcium carbonate; µS/cm = microsiemens per centimeter; mg/L = milligrams per liter; ng/L = nanograms per liter; µg/L = micrograms per liter; NO_2 = nitrogen dioxide (nitrate); MRL = method reporting limit; NO_3 = nitrogen trioxide (nitrite)

[a] Regional Water Board (formerly called the Regional Water Quality Control Board) Basin Plan (Basin Plan) water quality objective for allowable change from controllable factors

[b] Basin Plan water quality objective

[c] Basin Plan water quality objective; <0.5 allowable change from controllable factors

[d] Basin Plan narrative objective: water shall not contain constituent in concentrations that would cause nuisance or adversely affect beneficial uses

[e] Secondary drinking water maximum contaminant level (MCL)

[f] Primary drinking water maximum contaminant level (MCL)

[g] California Toxics Rule aquatic life criteria for four-day average dissolved concentration

[h] California Toxics Rule human health maximum criteria total recoverable concentration

[i] DFG hazard assessment value

[j] U.S. Environmental Protection Agency Integrated Risk Information System reference dose for drinking water quality

[k] DFG aquatic life guidance value for four-day average concentration

Source: Constituent measurements from USGS 2000.

The Sacramento River was also evaluated from 1997 through 2003 as part of DWR's Sacramento River Watershed Program (SRWP) and during varying periods for programs coordinating with the SRWP (Larry Walker Associates 2004). Results indicated that some samples collected from throughout the Sacramento River watershed in 2002–2003 caused toxicity to test organisms; the causes of observed toxicity at these locations has not yet been determined. As a result of these data, the Sacramento River is included on the federal Clean Water Act (CWA) Section 303(d) list of impaired waters for unknown toxicity. The Central Valley Regional Board (formerly called Central Valley Regional Water Quality Control Board) is required to develop a total maximum daily load (TMDL) for the specific pollutants in waterways on the 303(d) list. The Central Valley Regional Board has listed the TMDL for "unknown toxicity" as a low priority (Central Valley Regional Board 2002).

Geomorphology

The geomorphology of the Sacramento River varies throughout the region. From the base of Mount Shasta for about 75 miles downstream to near elevation 300 near the town of Red Bluff, the river is generally constrained from moving laterally by erosion-resistant volcanic and sedimentary formations. The river in this area, the Sacramento Canyon, is generally narrow and deep, and the floodplain is similarly narrow. From here, the river emerges onto the broad alluvial floodplain of the Sacramento Valley. For the next 100 river miles or so, the Sacramento River historically meandered freely across a wide (1.5 to 4 miles) floodplain (SRCA Forum 2003). By eroding and depositing sediment, the river migrated across deep alluvial soils from the Red Bluff area to the area near Colusa (USACE and The Reclamation Board 2002).

The reach of the Sacramento River that includes the project area is predominately a meandering single-thread channel bordered by setback levees. This reach of the river has become less sinuous since 1896. This has been attributed to chute cutoffs promoted by the clearing of riparian forests and to natural variation over time (USGS 1977, SRCA Forum 2003). Meander scars of unknown age located in the 100-year meander belt indicate a high degree of sinuosity in at least portions of the channel in the relatively recent past (SRCA Forum 2003).[1]

While riparian forest vegetation is generally believed to protect riverbanks from erosion, few studies have quantified the effect of riparian vegetation versus other cover types on rates of river channel migration. Recently, Micheli et al. (2004) compared migration rates and bank erodibilities between 1949 and 1997 for reaches of the Sacramento River between Red Bluff and Colusa. The study compared reaches bordered by riparian forest versus agriculture and showed that agricultural floodplains are 80–150% more erodible than riparian forest floodplains. Larsen et al. (2002a) simulated river migration at river miles 185 to 201 using a channel migration model that is based on mathematical–physical algorithms for flow and sediment transport. The model is based on physical processes to accommodate changes in input variables and thus predicts the consequences of conditions—such as flow regime changes or bank stabilization measures—that have not existed in the past. Modeling results predict the Sacramento River channel migrating towards the Nicolaus property (RM 195) and away from the Singh property (RM 194) between 1997 and 2072. These studies show that advances in the understanding of long term river meander processes in the Sacramento River are underway (Micheli et al. 2004 and Larsen et al. 2002); however; there is still a great deal of uncertainty in the prediction and modeling of the rate, extent, and specific configuration of complex, long-term meander processes.

The USACE has been stabilizing the channel in the vicinity of the Butte Basin Flood Relief Structures with a series of bank protection installations as part of its flood control responsibilities. Because changes in channel alignment in this area (particularly chute cut-offs of meander loops) could potentially lower channel elevation, it was thought that this would result in less flow into Butte Sink via the flood relief structures, and more flow down the leveed river corridor. Recent studies indicate however, that change in channel elevation is insignificant in altering the flow split between Butte Basin and the main channel of the Sacramento River at higher flows.

[1] The *100-year meander belt* is the combination of all channel locations between 1896 and 1991. It is the area along the river that has experienced channel movement in the relative immediate past. Refer to Section 3.1.3 of the "Description of the Proposed Project," for further discussion of this topic.

These studies show that excessive flows would enter the leveed reach regardless of channel alignment (Ayres 1997).

Downstream of the project area, SRFCP levees were constructed along the Sacramento River and its tributaries to prevent the flooding of nearby communities. The levees were designed to confine flows to a relatively narrow channel that would efficiently convey sediment through the system, thereby reducing the dredging necessary to maintain navigation. Today, the Sacramento River downstream of the project area is a leveed and largely straightened channel. The river does not meander as it did historically, but generally conveys flows downstream and into overflow bypass channels, as needed. The banks are routinely managed, but they are prone to erosive forces, especially on outside curves.

Geology and Soils

The project area is in the Sacramento Valley, which constitutes the northernmost third of the Great Valley physiographic province of California—a large, northwest-trending structural trough filled with a tremendously thick layer of sediment ranging in age from Jurassic to Holocene (Bailey 1966). The SRNWR properties exist on and incorporate several types of level, nearly level, and gently sloping alluvial landforms; including floodplains, natural levees, paleochannels, and sloughs, that are composed of sediments deposited by the Sacramento River system (Jennings and Strand 1960, Saucedo and Wagner 1992, Strand 1962). More recent deposits lie on top of older formations and include terrace deposits (including the Modesto Formation), paleochannel deposits, alluvial fans, meander belt deposits, basin, and marsh deposits (SRCA Forum 2003). The terrace deposits of the Modesto Formation flank the river in stair steps away from channel. These deposits tend to erode at a lower rate than the other younger deposits and tend to form higher, more consolidated banks along the river, referred to as geologic control (SRCA Forum 2003). In general, the sediments that comprise the surficial portions of these landforms are of Holocene age and consist of gravel, sand, silt, and minor amounts of clay.

Overlying Holocene alluvial deposits are the relatively young and predominantly coarse- and moderately coarse-textured soils of the Columbia, Gianella, Horst, and Laugenour series (Gowans 1967, Begg 1968, TNC 2001). Soils of the Columbia, Gianella, and Horst series occupy the majority of land area in the project area. These soils typically consist of very deep, well drained sands, loamy sands, sandy loams, loams, and silt loams formed from mixed alluvium. Surface runoff in the project area is slow and the hazard of erosion is slight.

The setback levees of the SRFCP are generally built along the Modesto Formation, along the west side of the river. On the east side, however, the levees lie well within the paleochannel deposits.

4.3.2 REGULATORY SETTING

This section includes applicable laws and regulations for flood safety and water quality that are identified as part of the due diligence process and that could apply to any type of project located in the project area. Those laws and regulations applicable to this proposed project are addressed in the environmental impact section, below.

FLOOD SAFETY

The primary facilities for controlling flood damages in the Sacramento River system are reservoirs providing flood storage and levees along channels. Also important in preventing flood damages are coordinated preparations for flood fighting and emergency planning, including evacuation. Several federal, state, and local agencies have responsibilities for different aspects of operations and maintenance of flood control facilities and for emergency response. The roles of these entities are summarized below.

The flood control facilities on the Sacramento River are part of the joint federal/state SRFCP. The USACE, in conjunction with the State, developed a flood control plan for the Sacramento River as part of the SRFCP, which included levee construction, channel improvements, and reservoir flood storage. It should be noted that SRFCP

flood control projects begin down-river from the Singh Unit and Nicolaus property (located at RM 194–195). The levees along the Sacramento River in the vicinity of the project area are private levees and not within the SRFCP. Public levees extend along Mud Creek though they are not a part of the SRFCP.

The Sacramento River levees were constructed by USACE as part of the SRFCP. These project levees are within an easement obtained by the State through the Sacramento-San Joaquin Drainage District. USACE participates in the flood operation of the river and levee system through the development of flood release schedules. Additionally, construction and repair of the existing levees along the Sacramento River has been undertaken by USACE over the years as part of its ongoing efforts to improve the regional protections provided by the SRFCP. Project levees in California must meet the standards for design and construction specified by the USACE as discussed in Engineering Manual 1110-2-1913 (USACE 2000).

The CVFPB enforces appropriate standards for the maintenance and protection of flood control facilities in the Central Valley (per Water Code Sec. 8520 et. seq.). A Memorandum of Agreement (MOA) dated November 3, 1999, between Butte County and the State Reclamation Board (now CVFPB) delegated regulatory authority for flood control in the proposed project area to Butte County. The MOA states that Butte County cannot delegate its regulatory responsibility to the Sacramento River Reclamation District without the approval of the CVFPB. Additionally, when Butte County learns of a proposed action that it may be without jurisdiction to regulate, the County will notify the CVFPB. In that event, CVFPB may exercise its jurisdiction under Water Code 8710 to require an application for an encroachment permit (See Appendix A, "Responses to Scoping Comments," for further information).

The CVFPB must approve any activity that may affect *project works*, to ensure that the activity maintains the integrity and safety of flood control project levees and floodways and is consistent with the flood control plans adopted by the CVFPB and the State legislature (Water Code Sections 8533 and 8534). Project works are the components of a flood control project in the CVFPB's jurisdiction that the board or the legislature has approved or adopted. Project works include levees, bank protection projects, weirs, pumping plants, floodways, and any other related flood control works or rights-of-way that have been constructed using state or federal funds. Project works also include flood control plans. Rules promulgated in Title 23 of the California Code of Regulations (CCR Title 23, Division 1, Article 8 [Sections 111 through 137]) regulate the modification and construction of levees to ensure public safety. The rules state that existing levees may not be excavated or left partially excavated during the flood season. The flood season for the Sacramento River is November 1 through April 15.

Levee operation and maintenance are overseen by DWR, which inspects the levees and issues a biannual report. The report covers the general condition of the levee, vegetation control, rodent control, and flood preparedness.

The National Weather Service (NWS), U.S. Bureau of Reclamation, and DWR jointly operate the California-Nevada River Forecast Center (CNRFC), which disseminates climatological information and river flow forecasts. Coordination between the CNRFC and entities operating major flood control reservoirs in the state ensures that the CNRFC has necessary information on current and proposed reservoir outflows to allow the NWS to forecast river stages. In addition, DWR and NWS jointly operate the State-Federal Flood Operations Center (Flood Operations Center), which gathers flood information and disseminates it to emergency operations personnel and the public. This agency also coordinates activities of the different flood control agencies and provides data necessary for the informed operation of the reservoirs.

The State Office of Emergency Services (OES) coordinates both state and federal resources in response to flood emergencies. The local offices of emergency services coordinate all local emergency operations. These could include evacuating the floodplain, obtaining state assistance with a flood fight, and implementing recovery actions following a flood. The local office of emergency services in the project area receives its information from the Flood Operations Center and, to some extent, directly from the dam operators.

During floods, the project levees must be continually patrolled so that the functioning of the levee system can be assessed and immediate emergency actions initiated if a defect is detected. Forecasts issued by the Flood Operations Center are the primary notification received by local levee districts for the need to patrol the levees. If levee defects are found that are beyond the capability of the responsible levee district to manage, it will request assistance from the State and USACE. Such requests are coordinated through the State OES system.

SACRAMENTO AND SAN JOAQUIN RIVER BASINS CALIFORNIA COMPREHENSIVE STUDY

The Sacramento and San Joaquin River Basins California Comprehensive Study (Comprehensive Study) was a joint effort by The Reclamation Board (now called CVFPB) and USACE, in coordination with federal, state, and local agencies, groups, and organizations in the Central Valley. The Comprehensive Study was not a regulatory program per se, but consistency with its goals and objectives is important for any project affecting flood control in the Sacramento and San Joaquin River basins. Responding to the flood events in the 1980s and 1990s, the State Legislature and Congress directed USACE to develop a comprehensive plan for flood damage reduction and environmental restoration purposes for the Sacramento and San Joaquin River basins. This effort was conducted in cooperation with The Reclamation Board (now called CVFPB).

In December 2002, an interim report was released by the Comprehensive Study team (USACE and The Reclamation Board 2002). The report identified the Comprehensive Study as an approach to developing projects in the future to reduce damages from flooding and restore the ecosystem in the Sacramento-San Joaquin River basins. As described in the report, the Comprehensive Study has three parts: (1) a set of principles to guide future projects, (2) an approach to develop projects with consideration for system wide effects, and (3) an organization to consistently apply the guiding principles in maintaining the flood management system and developing future projects.

The Comprehensive Study has proposed a set of guiding principles to govern implementation of projects that propose modifying the Sacramento or San Joaquin River flood control systems. These principles have been developed to ensure that projects proposed to be implemented are consistent with the objectives established by USACE and The Reclamation Board (now called CVFPB). The following are the Comprehensive Study's guiding principles:

- recognize that public safety is the primary purpose of the flood management system;
- promote effective floodplain management;
- promote agriculture and open space protection;
- avoid hydraulic and hydrologic impacts;
- plan system conveyance capacity that is compatible with all intended uses;
- provide for sediment continuity;
- use an ecosystem approach to restore and sustain the health, productivity, and diversity of the floodplain corridors;
- optimize use of existing facilities;
- integrate with the CALFED Program and other programs; and
- promote multi-purpose projects to improve flood management and ecosystem restoration.

The proposed project lies at the junction of the upper and middle Sacramento River regions of the Comprehensive Study.

WATER QUALITY

The quality of surface water and groundwater resources in the state is protected under various state and federal laws, including the state Porter-Cologne Water Quality Control Act and the CWA. The U.S. Environmental Protection Agency (EPA) has generally authorized the State Water Board (formerly called the State Water Resources Control Board) and the nine associated Regional Boards to administer all surface water and groundwater quality regulations in the state. Both the EPA and the State Water Board generally provide oversight, while the Regional Boards have primary responsibility for implementation and enforcement. The Central Valley Regional Water Board is responsible for enforcing these regulations in the project area.

Water Quality Control Plan and Applicable Water Quality Criteria

Pursuant to the Porter-Cologne Water Quality Control Act, the Regional Water Board prepares and updates a water-quality control plan (Basin Plan) every three years that identifies water quality protection policies and procedures. The Basin Plan describes the officially designated beneficial uses for specific surface water and groundwater resources and the enforceable water quality objectives necessary to protect those beneficial uses.

The Basin Plan includes numerical and narrative water quality objectives for physical and chemical water quality constituents. Constituents for which numerical objectives are set include temperature; DO; turbidity; pH (i.e., acidity); TDS; EC; bacterial content; and various specific ions, trace metals, and synthetic organic compounds. Narrative objectives are set for parameters such as suspended solids, biostimulatory substances (e.g., nitrogen and phosphorus) (i.e., nutrients), oils and grease, color, taste, odor, and aquatic toxicity. The primary mechanism that the Regional Water Board uses to ensure conformance with Basin Plan water quality objectives and implementation policies and procedures is to issue waste discharge requirements (WDRs) for projects that may discharge wastes to land or water. WDRs specify terms and conditions that must be followed during the implementation and operation of a project.

In addition, the California Toxics Rule is a separate regulatory instrument that prescribes aquatic life and human health protection criteria for trace metals and organic compounds. Federal and state drinking water quality standards regulate the quality of treated municipal drinking water supplies delivered to users.

Clean Water Act, Section 303(d)

The Regional Water Board administers Section 303(d) of the CWA, which requires each state to maintain a list of water bodies in which physical and/or chemical aspects of water quality are limited or impaired by the presence of pollutants. Section 303(d) requires preparation of a total maximum daily load (TMDL) program for waters identified as impaired. The TMDL is a quantitative assessment of the pollutant sources, contaminant loads, assimilative capacity of the water body for the specific contaminants, and allocation of specific load reduction targets that are necessary to ensure compliance with the water quality standards.

Clean Water Act, Section 401

Section 401(a)(1) of the CWA specifies that any applicant for a federal license or permit to conduct any activity that may result in any discharge into navigable waters shall provide the federal licensing or permitting agency a certification that any such discharge will comply with the applicable provision of Sections 301, 302, 303, 306, and 307 of the CWA. The Regional Water Board administers the Section 401 program with the intent of prescribing measures for the applicant's project that are necessary to avoid, minimize, or mitigate adverse impacts on water quality and ecosystems.

Waste Discharge Requirements and National Pollutant Discharge Elimination System Permits

The State Water Board and Central Valley Regional Water Board regulate discharges of waste to land and into waters of the state (i.e., surface water or groundwater) through WDRs, which are authorized under the state Porter-Cologne Water Quality Control Act, and through National Pollutant Discharge Elimination System (NPDES) permits, which are authorized under Section 402 of the CWA.

A Regional Water Board NPDES stormwater permit for general construction activity applies to general ground-disturbing construction activity greater than one acre. Before construction of such projects, applicants must submit to the Regional Water Board a Notice of Intent (NOI) to discharge stormwater and must prepare a Storm Water Pollution Prevention Plan (SWPPP). A SWPPP generally describes proposed construction activities, receiving waters, stormwater discharge locations, best management practices (BMPs) that will be used to reduce project construction effects on receiving water quality, and the BMP inspection and monitoring methods. A number of *good housekeeping* BMPs are also generally included in a SWPPP to control waste discharges during the dry months. An appropriate selection of post-construction permanent pollution control and treatment measures must also be considered for implementation where necessary to prevent long-term water quality impairment.

The Regional Water Board administers a general WDR process for low-threat discharges from construction dewatering activities that discharge to surface waters (i.e., removal of accumulated water during excavation). An NOI is required before the activity, and the general order contains a set of standard terms and conditions for compliance with discharge prohibitions, specific effluent and receiving water limitations, solids disposal activities, water quality monitoring protocols, and applicable water quality criteria. The Regional Water Board can also issue waivers to WDRs for low-threat discharges if the wastes would not be discharged directly into water and would not be exposed to stormwater runoff that could enter surface waters.

Other Regulations for Water Quality Protection

The following other regulations related to water quality conditions are described in other sections of this ~~D~~EIR:

- **CWA, Section 404.** Under Section 404, USACE regulates and issues permits for activities that involve the discharge of dredged or fill materials into "waters of the United States," including wetlands. See Section 4.4, "Biological Resources."

- **Section 1600 et seq. of the California Fish and Game Code.** All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake in California that supports wildlife resources is subject to regulation by DFG, pursuant to Sections 1600 through 1603 of the California Fish and Game Code. See Section 4.4, "Biological Resources."

These regulatory programs typically impose specific measures to reduce water quality impacts on wetlands and aquatic habitat. Local grading and erosion control ordinances may also apply.

4.3.3 ENVIRONMENTAL IMPACTS

THRESHOLDS OF SIGNIFICANCE

These significance thresholds are based on relevant provisions of CEQA, the State CEQA Guidelines, environmental questions in Appendix G of the Guidelines, and significance criteria used in other relevant environmental compliance documents for similar projects.

The proposed project would be considered to have a significant effect on the hydrologic environment or on water quality if it would:

- Cause an increase in the flood stage (i.e., water surface elevation) that would pose a significant risk to people, structures, or the operation of flood control infrastructure;
- Expose people, structures, or flood control infrastructure to a significant increase in the risk of flood hazard from the 100-year flood;
- Result in a substantial degradation of surface water or groundwater quality such that it would violate criteria or objectives identified in the Central Valley Regional Water Board Basin Plan, or otherwise substantially degrade water quality to the detriment of beneficial uses;
- Result in a substantial depletion of groundwater supplies or interfere with groundwater recharge such that a net deficit in aquifer volume or a lowering of the local groundwater table level would occur;
- Result in a substantial alteration of the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in a substantial increase in erosion or siltation;
- Result in a substantial increase in sediment in the Sacramento River; or
- Result in a substantial alteration of water temperatures in the Sacramento River.

ANALYSIS METHODOLOGY

Both quantitative and qualitative methods were used to assess the potential impacts of the proposed project on hydrology, water quality and geomorphology. Because of the availability of an appropriate hydraulic model, quantitative methods were used to assess the proposed project-related changes to local and downstream flood hydrology and, combined with qualitative methods, changes to geomorphic processes.

Project Modeling

The potential hydraulic effects of ~~modifying the vegetation~~berm removal and changing land cover types on the Singh and Nicolaus properties (located between RM 194 and RM 195) were quantitatively estimated through modeling efforts, which are presented in the *Hydraulic Analysis for Flood Neutrality on~~Flood Neutral Hydraulic Analysis for~~ the Nicolaus and Singh Properties, Sacramento River, Mud Creek, and Big Chico Creek~~r RM 194-195~~*, dated ~~December 2007~~May 30, 2008 (Appendix B). The modeling evaluation was based on an updated existing two-dimensional hydraulic model ~~of the 29-mile reach of the Sacramento River between RM 183 and RM 212~~ that was used to evaluate the hydraulic effects of habitat restoration ~~and levee setback options~~and berm removal. The hydraulic model for the project extends along the Sacramento River from RM 196.5 at the upstream end to RM 191 at the downstream end, with the lower three miles on both Mud Creek and Big Chico Creek (see Figure 1 of Appendix B). Flow data used for this model was the peak flow data from the January 1995 flood event published by USGS. For additional information on the assumptions included in this model, refer to the complete report in Appendix B.

Existing models used for large-scale, planning level examinations of the river's hydraulics, such as the USACE Comprehensive Study, would not have been detailed enough to evaluate the specific changes of each area modeled in the *Hydraulic Analysis for Flood Neutrality~~Flood Neutral Hydraulic Analysis~~*. The model results presented below are more detailed than those of the Comprehensive Study model and are sufficient for an investigation of project feasibility.

Addressing Uncertainties

Project condition hydraulic modeling relies on the formulation of reasonable assumptions and, most importantly, calibration efforts to accurately reflect the existing conditions and consequences of future management. The use

of different assumptions in modeling may lead to conclusions that overestimate or underestimate the impact or benefits of implementing the proposed project. The hydraulic modeling was conducted with steady-state conditions (i.e., evaluation of unchanging model parameters to reflect the assumption of a single set of field conditions) and calibration involved assigning generalized roughness values to existing and restored surfaces. Wherever possible, model input variables were calibrated against actual field data such as high water marks collected by DWR during high flow events. Also, wherever possible, local residents were contacted and involved in model calibration efforts. Local residents provided important calibration data such as aerial photographs of their lands taken during and following flood events that show debris lines left at high water marks. These efforts ensured the best possible reflection of current conditions within the models to allow for the most accurate representation of future conditions resulting from the project.

While changes in the channel and stage elevations resulting from natural geomorphic processes (e.g., sediment transport, meander migration, and chute cutoffs) are not captured in the model and may affect the accuracy at small, localized areas; net changes throughout the entire modeled area are expected to be relatively accurate and therefore potential inaccuracies in the model are considered inconsequential in terms of hydraulic analyses for the overall modeled areas. The models also used the most conservative roughness coefficients for all restored units based on conditions described below for all vegetation types. These conditions would represent the worst-case scenario (i.e., conditions that could potentially result in the highest probability for increased flood stage to occur).

Based on monitoring data collected over a 15 year period at 106 long-term monitoring sites, relationships were developed between site characteristics and resulting vegetation communities (TNC 2003a and b). These relationships were used to develop the most realistic planting plan that could be expected within a restoration site. In other words, an area that is very likely to become denser forest is modeled as such. Likewise, an area that would likely remain less dense is modeled as such. This approach precludes the need for future maintenance of these sites and provides the most conservative approach to analysis with hydraulic models.

IMPACT ANALYSIS

IMPACT 4.3-a Changes in Flood Hydrology. ~~*The proposed project would have the potential to change local and downstream flood hydrology on the Sacramento River by changing vegetation densities and land cover types on the floodplain.*~~ *Modeling results predicted no increase in flood stage elevation due to the project and a small section of decrease in flood elevation of approximately 0.10 foot near the oak savannah habitat on the Nicolaus property.* ~~*localized changes in flood stage elevations up to 0.10 foot on State Parks land along with an up to 0.20 foot decrease on the northern private property.*~~ *This small change* ~~*does not represent an increase that*~~ *would not pose a significant risk to people, structures, or the operation of flood control infrastructure and* ~~*does*~~*would not violate existing regulations for risk to flood control infrastructure. Project-related changes in local and downstream flood hydrology would be* ***less than significant****.*

The proposed action would restore orchards to riparian forest, grassland, and savannah communities and develop recreational facilities (see Exhibits 3-7 through 3-9). Some restored areas would have riparian vegetation more dense than current vegetative conditions (i.e., orchards) while areas planned for recreational facility development would be less dense than current conditions. Such changes could cause increases and decreases in the velocity of flood flows that may seasonally inundate the area. When flow velocity decreases as a result of increased friction (i.e., roughness), the water surface elevation may rise. Potential changes in water surface elevations were evaluated in the hydraulic modeling (described above and in Appendix B) using conservative assumptions of projected changes in vegetation densities (restoration) and land cover types (recreation facilities) in the project areas and existing floodplain corridor at the modeled peak flows.

The proposed project condition includes the creation of an access road~~s~~, parking, trails, campgrounds, the restoration of approximately 15~~0~~6 acres to native vegetation communities, and the removal of earthen berms along the bank of Mud Creek. All new recreation facilities would be designed and constructed as prescribed in Park Plan Goal AO-3.1 and Guideline AO-3.1-1. The hydraulic modeling ~~report~~analysis (Appendix B) shows

very little change in water surface elevations within the modeled area (Figure 1 of Appendix B), which includes the Nicolaus property, the Singh Unit, adjacent private agricultural lands to the north and east as well as adjacent public lands. The modeling predicted that the project would not result in any increases to water surface elevation, but would result in a small section of decrease of approximately 0.10 foot near the oak savannah habitat zone on the Nicolaus property.~~the predicted changes in water surface elevations for the modeled subreach, which includes areas of both increased and decreased flood stage elevation. Minor increases (i.e., less than 0.10 foot) occur along the southern edge of the Singh property in areas adjacent to the swale that runs through the entire property and into Big Chico Creek. This minor increase in flood stage elevation would be localized and likely due to flood waters backing up the swale drainage south from Big Chico Creek. Also, a minor decrease (i.e., less than 0.10 foot) in water surface elevation occurs along the northeastern edge of the Nicolaus property possibly due to the removal of earthen berms along Mud Creek. This decrease in flood elevation would occur mainly in the area north of the project area but spills into the very northern edge of the Nicolaus property. Modeling shows that the project does not appear to change flood water depth in the area where recreational facilities are planned.~~

The modeling results indicate that implementation of the proposed project would not increase water surface elevation during a design flood ~~no more than 0.10 foot on State Parks land along with an up to 0.20 foot decrease on the northern private property~~on the project site or adjacent properties. The ~~is~~ small decrease in flood stage elevation on the Nicolaus property~~change~~ would not pose a significant risk to people, structures, or the operation of flood control infrastructure and does not violate existing regulations for risk to flood control infrastructure. Furthermore, implementation of the proposed project would not be anticipated to result in adverse effects downstream near the flood control project levees (beginning on the west bank levee at approximately RM 184 and the east bank levee at RM 176 and continuing southward) as a result of the small, localized changes in water surface elevation in the project area.

The potential project-induced change~~s~~ in surface water elevation during flooding conditions would be small, localized, and would not increase the area inundated by flood flows. Therefore, this impact is considered ***less than significant***.

IMPACT 4.3-b **Changes in Geomorphic Processes.** *Increasing vegetation densities (habitat restoration) and changing land cover types (recreation facility development) on the floodplain would alter water velocities in the existing floodway in the project area~~, possibly changing sediment transport, channel scouring, and meander migration~~. Modeling predicts slight increases in velocities around the Nicolaus oak savanna habitat as well as the grasslands on both sides of the Singh Unit flow-through area requested by neighbors to the north of the Singh Unit. There would be an increase in velocities within and north of the Singh flow-through area. However, a~~A~~ny potential changes in velocities would be too small to substantially affect channel hydraulics or lead to erosive forces that could affect this already dynamic system. The changes in geomorphic processes resulting from restoration activities would be* ***less than significant****.*

Erosion and deposition patterns in the river and floodplain would not be expected to change substantially as a result of the proposed project. The project-related changes in vegetation and land use cover types (recreational facilities) in the ~~portion of the river~~area modeled ~~with the two-dimensional model~~(Figure 1 of Appendix B) ~~(RM 194 to RM 195)~~ are not expected to significantly affect river velocities. At the modeled flow, the velocity contours in Figures 6 and 7 of Appendix B show that the flood flow velocity is between 0.0 and 3.5 feet per second (ft/s) in the project areas for both the existing condition and the with-project condition. ~~maximum velocities are predicted to be less than 2 feet per second (ft/s) and velocity changes are expected to be negligible in most of the project area (Appendix B).~~ The largest change~~s~~ in velocity due to the project would be an increase~~s~~ of up to ~~1.75~~2.0 feet per second within the swale that runs north-south in the western half of the Singh Unit. ~~These~~ This increase~~s~~ in velocity would be due to the conversion from orchard to meadow grasses in the natural low-lying swale. The existing velocity in that area is roughly 1.0 ft/s, and as long as the passageway remains vegetated, this increase should not have any harmful effects. The project would also result in velocity increases on the Singh Unit adjacent to Mud Creek of up to 0. 5 ft/s (from 0.5 ft/s to 1.0 ft/s) due to the removal of the berm adjacent to Mud Creek. The removal of the berm from the southwestern boundary of the Singh Unit would cause

an increase in that area of up to 0.7 ft/s (from 0.7 ft/s to 1.4 ft/s), but would also slightly reduce the velocity on the east bank of the Sacramento River adjacent to the site. The proposed grassland buffers would cause an increase in flood flow velocity on the west side of the Singh Unit and Nicolaus property, with the greatest increase being 1.2 ft/s (from 1.0 ft/s to 2.2 ft/s) at the southwestern boundary of the Nicolaus property. Small increases in flow velocity (0.25 to 1.0 ft/s) would also be anticipated for the oak savannah area near the planned recreational facilities on the Nicolaus property. These minor changes would not be expected to substantially alter sediment transport and deposition within the project area.

Natural geomorphic processes of sediment transport, bank scour, and point bar formation currently exist in this dynamic and meandering river. The proposed changes in vegetation densities and land cover types on the floodplain are relatively small and are not expected to substantially alter the way the system currently functions. Modeling results show that the creation of impervious surfaces associated with recreational facilities would not change geomorphic processes as changes in velocities through the area would not be substantial enough to result in changes in sediment transport and/or deposition. The area to be converted to recreational uses is a small proportion of the greater floodplain and would be surrounded by native vegetation. Additionally, primary geomorphic channel forming processes are most prevalent at bankfull stage (1.5- to 2-year reoccurrence interval) flows. When flood stages rise above bankfull levels, erosive forces in channels are typically decreased as flows spill onto the floodplain resulting in energy dissipation. All of the proposed restoration and recreation facility development activities would occur on the floodplain above the bankfull stage elevation, thus decreasing any affects that may result from these activities.

Also, the restoration of native riparian habitat in the project area on lands that once supported a naturally functioning riverine ecosystem is considered beneficial for reducing the direct and indirect adverse effects of erosion and sediment deposition in the river. It has been demonstrated that floodplains of the Sacramento River are less prone to erosion and more stable when riparian habitat is present as opposed to agricultural land cover (Micheli et al., 2004).Therefore, the ~~M~~minor changes in geomorphic processes resulting from proposed project activities would be ***less than significant***.

IMPACT 4.3-c **Temporary Effects on Water Quality Associated with Proposed Project Implementation.** *Implementation of the project would be accomplished through the use of standard agricultural practices (already being used throughout the project site) and construction activities. Restoration activities would include orchard removal, discing, seeding, planting, and temporary herbicide use. Irrigation system modification and expansion would include standard trench and backfill techniques. Development of recreational facilities would include grading and compaction of park roads and parking spaces, and the installation of park trails, buildings, shelters, and restroom facilities. Utilization of standard agricultural practices for restoration implementation would not be expected to cause soil erosion and/or sedimentation of local drainages or the Sacramento River channel. However, potential temporary effects on water quality associated with the construction of recreational facilities could be* ***potentially significant****.*

Land-disturbing construction activities for the proposed restoration of riparian communities would be minimal because habitat restoration efforts would involve planting operations entailing minimal ground disturbance (tilling and grading). In orchard areas where trees are removed, native vegetation would be replanted directly following site preparation to prevent the possibility of severe erosion from disturbed, unprotected soils. In general, proposed restoration-related activities would occur during the dry season and standard agricultural grading and erosion control practices would be implemented to avoid and minimize potential discharges of runoff from the disturbed areas.

The conversion of orchard to recreation facilities including the creation of roads, parking spaces, campgrounds, trails, and related buildings would involve grading and other non-agriculture-related construction activities. These construction activities would disturb existing vegetation cover and soils, would expose areas of disturbed ground that could be exposed to rainfall and erosion, and could cause temporary discharges of sediment and other contaminants in stormwater runoff to drainage channels and the Sacramento River. Petroleum products or other

construction-related substances (e.g., concrete, asphalt, paint, etc.) also could be discharged inadvertently to the Sacramento River or other waterways via stormwater runoff. Because development of recreational facilities could result in the discharge of construction-related substances into the Sacramento River, implementation of the proposed project could result in a ***potentially significant*** impact to water quality.

IMPACT 4.3-d Long-Term Effects on Water Quality and Water Temperature in the Sacramento River. *Replacing flood-prone agriculture with restored riparian habitat would decrease pesticide and herbicide applications on land adjacent to the river, thereby improving water quality. Additionally, restored riparian forests would buffer and filter toxic and organic matter that originate further away from the river, thereby further enhancing water quality. Restoring native riparian habitat would have no discernible effect on water temperature, and may actually have a moderating effect on water temperature over the long-term. The development of recreational facilities would involve the conversion of orchards to roads, campgrounds, trails, and other facilities; which would increase human uses and potentially result in the degradation of runoff water quality from the project site. However, human uses of these areas would generally be low-intensity and facilities would be managed to minimize potential water quality effects. This impact would be* ***less than significant****.*

Inundation of agricultural areas could cause transport of pesticides, herbicides, or hazardous waste residues that are present as a result of historical agricultural land uses. Replacing flood-prone agriculture with restored riparian habitat would decrease pesticide and herbicide applications on land adjacent to the river, thereby increasing water quality. Additionally, consistent with Park Plan Goals ER-1.1 and ER-3.2 and Guidelines ER-1.1-1, ER-1.1-2, ER-3.2-1, and ER-3.2-2 restored riparian forests would buffer and filter toxic and organic matter that originate further away from the river, thereby further enhancing water quality. Measurable changes in water temperatures are not expected to result from the proposed restoration activities. In the long-term, mature riparian forest could provide additional shading of the drainage channels resulting in potential beneficial effects on water temperature.

In the area of the Nicolaus property where orchards would be converted to recreational facilities, there would likely be limited long-term water quality impacts due to human recreation activities on-site. The project would create a road, ~~recreational vehicle campsites,~~ vehicle camp sites, and walk in campsites that would all generate vehicle and pedestrian traffic within the project site. Vehicle traffic could leave oil, gas, and other chemical residues on the roads that could be picked up by runoff and/or flood flows and transported into the Sacramento River. The majority of these residues would accumulate throughout the summer and fall when uses are highest, and conveyed into the Sacramento River in the winter or spring during large precipitation events or flood conditions. However, human uses would generally be low-intensity and the expected amount of contaminants deposited on the project site would likely be comparable to the existing conditions due to agricultural-related equipment and vehicles.

Potential impacts to water quality due to the restroom/shower facility, vault toilets or septic system leach field would be minimal, as these facilities would be designed and operated to prevent any potential wastewater discharge under flood flow conditions in compliance with State Water Quality Control Board requirements. The existing Nicolaus property farm complex, including the existing septic system/leach field, is above the normal flood stage. This existing septic system would be used to service the relocated BSRSP headquarters. A new septic system/leach field would be installed above the normal flood stage (such as near the Nicolaus farm complex) to service the combination restroom/shower building. These septic systems would be outside of the normal flood levels and in preparation for more extreme flood events, the check-valves at the facilities could be turned off. The other restroom facilities would be pre-manufactured vault toilets placed on raised pads. Vault toilets are impervious to water, which is why they are safe to use in floodplains and why they require pumping for maintenance. In preparation of flood events, the vault toilets would be pumped, hosed out, and sealed. By cleaning and sealing the vault toilets, these facilities do not leak wastewater during flood events.

BSRSP monitors real-time flow conditions at upstream locations to monitor for potential flood conditions at the Park. When there is indication of potentially approaching flood levels, standard BSRSP maintenance measures are enacted, including: removing equipment and vehicles from potentially effected park and service yards to higher

ground; turning off utilities (electricity, water, and gas); pumping and sealing vault toilets; and cleaning and sealing restroom/shower buildings (sand bags in toilets, urinals, floor drains and door thresholds; sink drains and door jams are duct taped; water heater removed if not installed above flood threat). Additionally, after flood events, the septic tanks are pumped (Akers 2007). As part of BSRSP, the facilities on the Singh Unit and the Nicolaus property would be subject to these maintenance measures.

~~Potential impacts to water quality from restroom/shower facility vaults and/or leachfields would be minimal as these facilities would be designed and operated to minimize any potential wastewater discharge to the river under flood flow conditions. BSRSP monitors real-time flow conditions at upstream locations to monitor for potential flood conditions at the Park. When there is indication of potentially approaching flood levels, equipment and vehicles are removed from potentially effected park and service yards to higher ground; utilities (i.e., electricity, water, and gas) are turned off; restrooms are sealed (sand bags in toilet, urinal, floor drains and door thresholds; sink drains and door jambs are duct taped; water heater removed if not installed above flood threat). Additionally, after flood events, the septic tanks are pumped (Akers 2007).~~

Long term project-related changes in water quality would be expected to improve in restored areas and any potential adverse impacts would be less than significant in areas where recreational facilities are proposed. Therefore, this impact would be ***less than significant***.

IMPACT 4.3-e Change in Water Demand and Available Water Supply. *Over the long term, the proposed project would result in a decrease in the use of groundwater. The conversion of orchards to native vegetation would require less water for irrigation; especially after planted vegetation has become established. An existing domestic groundwater well~~One~~ would remain in-use to provide water for recreational facilities.~~;~~ ~~however, there would be a~~The net decrease in water demand/use compared to existing conditions~~. This decrease in water demand~~ is considered a* ***beneficial*** *effect.*

The Singh Unit has one groundwater well with a current capacity of approximately 500 gallons per minute (Luster 2007). There are five groundwater wells on the Nicolaus property. Four of the wells are intended for agricultural use; however, only one of the agricultural wells (located in the north-central part of the property) is used to water the entire orchard. This well has a current capacity of approximately 1,800–2,000 gallons per minute (Luster 2007). The other three agricultural wells are drilled and cased and could be functional, although they do not currently have pumps or motors. The fifth well is the existing domestic water source, with a capacity of approximately 25 gallons per minute, which is located adjacent to the existing farm house.

The proposed project would remove land from irrigated agricultural use. Habitat restoration activities would require irrigation for the first three years until the native vegetation becomes established. ~~The Singh Unit has one groundwater well with a current capacity of approximately 500 gallons per minute and the Nicolaus property has one groundwater well with a current capacity of approximately 2,000 gallons per minute (Luster 2007).~~ Based on similar riparian habitat restoration projects that TNC has implemented, the first year of the restoration project is anticipated to utilize an approximately equivalent amount of water to the existing orchards for irrigation to support the establishment of the new riparian vegetation. In the second year, the restoration area would require approximately half the water that the existing orchards utilize, and in the third year, the restoration area would use approximately one-quarter of the current water usage. Once established, vegetation in the restored project area would not require continued irrigation; therefore, from the forth year onward, the long-term water usage would be reduced to zero. Therefore, is sufficient water supply from the groundwater wells on the Singh Unit and the Nicolaus property to support the irrigation needs to establish the new vegetation in the restoration areas. Additionally, the long-term water use on both the Singh Unit and the Nicolaus property would be substantially less than the current agricultural demands.

The agricultural groundwater wells on the Singh Unit and the Nicolaus property would provide irrigation water for the first three years of restoration and would remain active as long as the wells remain productive.

When these groundwater wells ~~on the Singh Unit is~~are no longer productive and/or no longer necessary to support the restoration area, ~~it~~ they would be properly decommissioned according to DWR specifications (filled and capped). The decommissioning of the wells would prevent infiltration of floodwater into ~~an~~ uncapped wells that could otherwise contaminate the local groundwater aquifer surrounding the wells with surface contaminants carried in flood flows.

The domestic water well on the Nicolaus property, located adjacent to the farmhouse, would continue to be used to serve the BSRSP headquarters (relocated to be in the farm buildings) and the recreational facilities on the Nicolaus property.

~~The groundwater well on the Nicolaus property would remain active, as long as the well remains productive, to not only provide irrigation to the restoration area for the first 3 years, but also to provide water for the proposed recreation facilities.~~ There is sufficient water supply from this groundwater well (approximately ~~2,000~~25 gallons per minute) to ~~support the irrigation needs to establish the new vegetation in the restoration area (as described above) and to~~ supply the proposed recreation facilities once they are operational. The long-term recreational facilities' water use would be ~~substantially less than the current agricultural demands on the Nicolaus property~~similar to the existing use for the farm complex. An onsite water treatment facility would be installed to maintain acceptable water quality levels from this domestic groundwater well as regulated by the State Division of Drinking Water.

Ceasing agricultural practices in the project area would benefit adjacent and downstream agricultural lands by substantially decreasing long-term water use and by allowing groundwater levels to recharge via habitat restoration, which would improve the natural hydrology of the site. Therefore, implementation of the proposed project would result in ***beneficial*** long-term changes in water demand and available groundwater supply.

4.3.4 MITIGATION MEASURES

Mitigation Measure 4.3-c: Acquire Appropriate Regulatory Permits and Implement SWPPP and BMPs.

Before the approval of grading permits and improvement plans for proposed recreational facilities, the project applicant shall obtain a SWRCB statewide NPDES stormwater permit for general construction activity, and any other necessary site-specific WDRs or waivers under the Porter-Cologne Act. The project applicant shall prepare and submit the appropriate Notice of Intents (NOIs) and prepare the SWPPP with BMPs and any other necessary engineering plans and specifications for pollution prevention and control.

Implementation of Mitigation Measure 4.3-c would reduce Impact 4.3-c to a ***less-than-significant*** level.

4.4 BIOLOGICAL RESOURCES

This section includes an analysis of the potential effects of the proposed project on biological resources, including plants, wildlife, and fish that occur or have the potential to occur in the project area. The analysis tiers off of the Bidwell-Sacramento River Park (BSRSP) General Plan and Draft Environmental Impact Report (Park Plan) which considered the potential impacts to biological resources resulting from implementation of the Park Plan (Park Plan Section 4.6.4). As described in Chapter 1 of this EIR, the proposed project actions are consistent with those identified in the Park Plan.

4.4.1 ENVIRONMENTAL SETTING

SOURCES OF INFORMATION

The information presented in this section is based on review of existing documents and other relevant information, including aerial photography, habitat maps, and biological resource databases. The following documents were reviewed during preparation of the biological resources analyses:

- California Department of Parks and Recreation. 2003 (December). *Bidwell-Sacramento River Park General Plan and Draft Environmental Impact Report.* Prepared by EDAW, Sacramento, CA.
- California Bay-Delta Authority. 2005 (June). *Sacramento River–Chico Landing Subreach Habitat Restoration Project Draft Environmental Impact Report.* Prepared by EDAW, Sacramento, CA.
- U.S. Fish and Wildlife Service. 2005a (July). *Comprehensive Conservation Plan and Environmental Assessment–Sacramento River National Wildlife Refuge*. California/Nevada Refuge Planning Office, Sacramento, CA.
- California Department of Fish and Game. 2003. *Comprehensive Management Plan for the Sacramento River Wildlife Area*.
- California Department of Parks and Recreation. 2007 (August 31). *Riparian Habitat Restoration Plan for the Nicolaus Property Sacramento River (RM 195).* Prepared by The Nature Conservancy, North Central Valley Office, Chico, CA.
- California Department of Parks and Recreation. 2007 (December). *Riparian Habitat Restoration Plan for Singh Unit Sacramento River (RM 194).* Prepared by The Nature Conservancy, North Central Valley Office, Chico, CA.

Documents that provided information relevant to this analysis are cited throughout this section, and corresponding references are included in Chapter 9, "References."

In addition to the resources listed above, EDAW biologists conducted a reconnaissance survey of the project area on September 27, 2007. The biologists walked the full extent of both parcels, including the riparian habitats along Mud Creek and Big Chico Creek.

REGIONAL CONTEXT

The proposed project area is located in the floodplain of the Sacramento River between river miles (RM) 195 and 194. Both the Singh and Nicolaus units are within the "Inner River Zone," which is defined as the estimated portion of river system that has experienced river channel migration in the past 100 years and is likely to experience channel movement over the next 50 years (Sacramento River Conservation Area Forum [SRCAF] 2002).

The biological resources of the project area are shaped and supported by the physical and hydrological patterns of the Sacramento River system. As is characteristic of the middle Sacramento River, major physiographic features of the project area include floodplains, basins, terraces, active and remnant channels, and oxbow sloughs. These features, together with the historic and current hydrologic and dynamic meander patterns of the Sacramento River, provide for a diverse array of riparian plan communities along the rive channel. The majority of the historic riparian forest habitat in California was converted over the past 150 years to agricultural, urban, and rangeland uses, and many river systems are now bounded by levees. Conversion of riparian habitat along the Sacramento River was extensive, as well; however, much of the river between Red Bluff and Colusa remains unleveed, enabling substantial areas of remnant riparian communities, especially in the Inner River Zone. As a result of the conversion, most of the mature valley oak woodland and savannah and other mature riparian forest community types further from the river's edge are now absent from much of the Sacramento River corridor.

In the reach adjacent to the Singh and Nicolaus properties, the Sacramento River is a large, meandering river. Large gravel bars are common throughout the greater reach, often becoming islands as channels shift. In certain stretches, riparian vegetation and floodplain areas remain connected to the river due to the lack of narrowly spaced levees. Flows vary seasonally due to precipitation patterns and release schedules out of Shasta Dam. In the winter and spring of high precipitation years the Sacramento River reaches high flow levels and spills onto its floodplain. In the project vicinity, the Sacramento River may expand into the project site and/or back up Big Chico and Mud creeks to flood the project area. See Section 4.3, "Hydrology, Water Quality, and River Geomorphology," for a discussion of the current hydrological and geomorphological conditions of the project area.

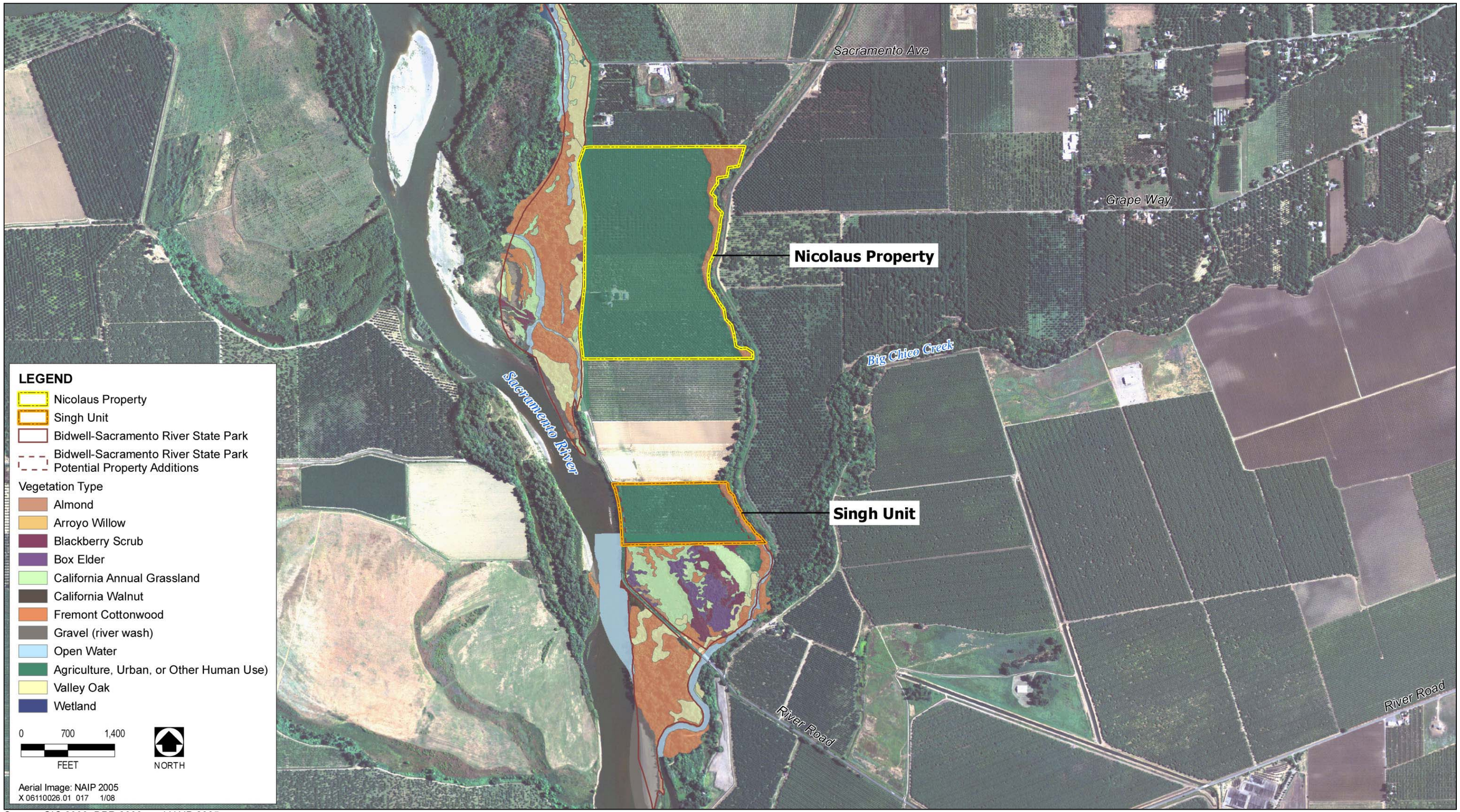
HABITAT TYPES

The Singh Unit and Nicolaus property are presently in walnut and almond orchard production, the two crop types in the project area where project activities are planned to occur. The adjacent lands support a variety of habitat types, including orchards, row crops, blackberry scrub, willow scrub, cottonwood riparian forest, mixed riparian forest, valley oak woodland, and freshwater marsh. The only native habitat type present within the parcel boundaries are narrow stands of cottonwood riparian forest on the eastern edge of the properties along Mud Creek. The location and extent of the habitat types present in the project area are depicted in Exhibit 4.4-1. Descriptions of native habitat types occurring in the project area are based on those contained in Preliminary Descriptions of the Terrestrial Natural Communities of California (Holland 1986) and the California Manual of Vegetation (Sawyer and Keeler-Wolf 1995).

Cottonwood riparian forest is a tall, dense, winter deciduous riparian forest dominated by Fremont cottonwood (*Populus fremontii*) and one or more species of willow (typically Goodding's black willow [*Salix gooddingii*] in the project area). The understory vegetation is dense and typically includes seedlings and saplings of shade tolerant species such as California box elder (*Acer negundo* var. *californica*) and Oregon ash (*Fraxinus latifolia*), as well as cottonwood and willow seedlings and saplings. Vines such as California wild grape (*Vitis californica*) are also common. This habitat type is referred to as Fremont Cottonwood Series in the *Bidwell-Sacramento River Park General Plan and Draft Environmental Impact Report*.

NONNATIVE INVASIVE PLANT SPECIES

Nonnative (exotic, alien, non-indigenous) species are those that have been introduced through human activities, either incidentally or deliberately. Many nonnative plant species are not invasive and do not have adverse effects on native plant and animal communities. However, some invasive nonnative species have resulted in the transformation of native plant communities to nonnative plant communities with fewer native plants and degraded wildlife habitat. Table 4.4-1 contains a list of invasive species known to occur within the project area.



Source: GIC 2003, DPR 2003, and NAIP 2005

Existing Habitat Types in the Project Area **Exhibit 4.4-1**

Table 4.4-1
Invasive Plants Known to Occur in the Project Area

Scientific Name	Common Name	Cal-IPC/State Status [1]
Ailanthus altissima	Tree-of-heaven	Moderate/P
Arundo donax	Giant reed	High/P
Centaurea solstitialis	Yellow starthistle	High/C
Conium maculatum	Poison hemlock	Moderate/--
Eucalyptus camaldulensis, E. sp.	Red gum, eucalyptus	Moderate/-- (*E. globulus*)
Ficus carica	Edible fig	Moderate/--
Juglans californica (orchard rootstock or other hybrids[2])	California walnut	--/--
Lepidium latifolium	Perennial pepperweed	High/B
Parthenocissus cinquefolia	Virginia creeper	--/--
Prunus dulcis, P. sp.	Almond, prune (orchard rootstock)	Limited/--
Robinia pseudoacacia	Black locust	Limited/--
Rubus armeniacus	Himalayan blackberry	High/--
Tamarix parviflora	Tamarisk, salt cedar	High/P
Vinca major	Periwinkle	Moderate/--
Phytolacca Americana	Common poleweed	--/--

[1] Cal-IPC Status:

High = species that have severe ecological impacts on physical processes, plant and animal communities and vegetation structure; widespread.

Moderate = species with substantial and apparent-but generally not severe-ecological impacts on physical processes, plant and animal communities and vegetation structure; regional

Low = species that are invasive but their ecological impacts are minor on a statewide level; species that may be locally persistent and problematic

State (CDFA) Status:

B = Eradication, containment, control or other holding action at the discretion of the commissioner.

C = State endorsed holding action and eradication only when found in a nursery, action to retard spread outside of nurseries at the discretion of the commissioner, reject only when found in a crop seed for planting, or at the discretion of the commissioner.

P = Proposed additions to the CDFA Noxious Weed List in the California Code of Regulations

[2] The ecology and taxonomy of this species as well as the extent of hybridization between native and nonnative walnut species needs study. It may be considered an invasive plant after further research and evaluation.

Source: Cal-IPC 2006, EDAW 2007

The state and federal government both have laws and regulations protecting commerce and environmental lands from damages caused by invasive plants. The California Department of Food and Agriculture and federal government maintain lists of noxious weeds for the purpose of eradication or control.

The California Invasive Plant Council (Cal-IPC) has developed a list of nonnative plants that pose serious problems in native ecosystems and rangelands (Cal-IPC 2006). These species are classified based on the level of threat and invasiveness. Plant are given an overall rating of “High”, “Moderate”, or “Limited” based on an evaluation of 13 criteria, which are divided into three sections assessing Ecological Impacts, Invasive Potential and Ecological Distribution. Plants with an overall rating of “high” (species that have severe ecological impacts on physical processes, plant and animal communities and vegetation structure; widespread) that were found in the

vicinity of the project area include giant reed, yellow starthistle, Himalayan blackberry, tamarisk, and perennial pepperweed. These species have been documented as aggressive invaders that displace natives and transform or disrupt native habitats. Plants with an overall rating of "moderate" (species with substantial and apparent-but generally not severe-ecological impacts on physical processes, plant and animal communities and vegetation structure; regional) that occur in the vicinity of the project area include tree-of-heaven, eucalyptus, periwinkle, poison hemlock and edible fig. Plants in the project area with an overall rating of "limited" (species that are invasive but their ecological impacts are minor on a statewide level; species that may be locally persistent and problematic) include black locust and wild almond.

WILDLIFE

The current wildlife habitat value of the project site is limited, as both properties are actively managed for walnut and almond production, and are kept clear of understory vegetation. Walnut and almond orchards support a relatively low diversity of wildlife species, and typically support only those species that are common throughout the Central Valley and occupy a variety of habitats. Common wildlife species that may currently use the project site orchards include American robin (*Turdus migratorius*), the nonnative European starling (*Sturnus vulgaris*), gopher snake (*Pituophis catenifer*), western gray squirrel (*Sciurus griseus*), and the nonnative black rat (*Rattus rattus*).

Remnant native riparian habitats, primarily mixed riparian forest, occur to the west of the Nicolaus property and south of the Singh Unit. These habitats are expected to support a variety of breeding bird species, which have been documented in BSRSP and nearby areas (PRBO 2002, Manolis 1998). Breeding territories of 24 riparian bird species have been documented in and adjacent to the Capay unit of the Sacramento River National Wildlife Refuge, which is located directly across the Sacramento River from the Singh and Nicolaus properties (Gilchrist et al. 2002). Among the more common of these species are black phoebe (*Sayornis nigricans*), western wood-pewee (*Contopus sordidulus*), black headed grosbeak (*Pheucticus melanocephalus*), and spotted towhee (*Pipilo maculatus*). The riparian habitats adjacent to the project site are also expected to support common reptiles and amphibians, such as Pacific chorus frog (*Pseudacris regilla*) and common garter snake (*Thamnophis sirtalis*); and common mammals, such as western gray squirrel (*Sciurus griseus*) and raccoon (*Procyon lotor*).

The project site is also bounded by aquatic habitat and a small amount of freshwater marsh, with Mud Creek forming the eastern border of both properties and the Sacramento River forming the west border of the Singh Unit. These waterways are known to be inhabited by belted kingfisher (*Ceryle alcyon*), mallard (*Anas platyrhynchos*), American beaver (*Castor canadensis*), common muskrat (*Ondatra zibethicus*), and the nonnative bullfrog (*Rana catesbiana*), all of which are expected to occur near the project site.

Orchards and row crops also border the project site, to the north and south of the Nicolaus property and to the north of the Singh Unit. Wildlife common to nearby row crop habitats include killdeer (*Charadrius vociferous*), red-tailed hawk (*Buteo jamaicensis*), house finch (*Carpodacus mexicanus*), western fence lizard (*Sceloporus occidentalis*), desert cottontail (*Sylvilagus audubonii*), and California vole (*Microtus californicus*).

FISHERIES

The Sacramento River provides vital fish spawning, rearing, and/or migratory habitat for a diverse assemblage of native and introduced fish species. Native species include both anadromous (i.e., species that spawn in freshwater after migrating as adults from marine habitat), and resident species. Native anadromous species that occur in the Sacramento River include four runs of chinook salmon (*Oncorhynchus tshawytscha*), steelhead (*Oncorhynchus mykiss*), green and white sturgeon (*Acipenser medirostris* and *A. transmontanus*), and pacific lamprey (*Lampetra tridentata*). Native resident species include Sacramento pikeminnow (*Ptychocheilus grandis*), Sacramento splittail (*Pogonichthys macrolepidotus*), Sacramento sucker (*Catostomus occidentalis*), hardhead (*Mylopharodon conocephalus*), and rainbow trout (*Oncorhynchus mykiss*). Introduced anadromous species include striped bass (*Morone saxatilis*) and American shad (*Alosa sapidissima*). Introduced resident species include largemouth bass

(*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieu*), white and black crappie (*Pomoxis annularis* and *nigromaculatus*), channel catfish (*Ictalurus punctatus*), white catfish (*Ameiurus catus*), brown bullhead (*Ictalurus nebulosus*), bluegill (*Lepomis macrochirus*), green sunfish (*Lepomois cyanellus*), golden shiner (*Notemigonus crysaleucas*), and brown trout (*Salmo trutta*).

Mud Creek, which flows adjacent to the project area before entering Big Chico Creek and, later, the Sacramento River, supports native and nonnative warmwater fish species including many mentioned above. Mud Creek originates at approximately 3,800 feet in elevation in the foothills before flowing approximately 26 miles to join Big Chico Creek. Flows in Mud Creek become extremely low in late summer, which may exclude the presence of many native species including salmon and trout.

Big Chico Creek originates at about 6,000 feet on Colby Mountain and flows for 45 miles to its confluence with the Sacramento River. It supports trout and salmon runs, mainly in mountainous upstream reaches. Similar to Mud Creek, flows in Big Chico Creek become very low as days grow warmer in late summer. Both creeks are bordered by agricultural lands that are protected by levees or earthen berms.

Shaded riverine aquatic vegetation and instream tree and shrub debris provide important fish habitat. Shaded riverine aquatic habitat is defined as the nearshore aquatic habitat occurring at the interface between a river and adjacent woody riparian habitat. The principal attributes of this cover type are: (1) an adjacent bank composed of natural, eroding substrates supporting riparian vegetation that either overhang or protrude into the water; and (2) water that contains variable amounts of woody debris, such as leaves, logs, branches, and roots and has variable depths, velocities, and currents. Riparian habitat provides structure (through shaded riverine aquatic habitat) and food for fish species. Shade decreases water temperatures, while low overhanging branches can provide sources of food by attracting terrestrial insects. As riparian areas mature, the vegetation sloughs off into the rivers, creating structurally complex habitat consisting of large woody debris that furnishes refugia from predators, creates higher water velocities, and provides habitat for aquatic invertebrates. For these reasons, many fish species are attracted to shaded riverine aquatic habitat.

The use of different areas within the project area by fish species is influenced by variations in habitat conditions, each species' habitat requirements, life history timing, and daily and seasonal movements and behavior. Altered flow regimes, flood control, and bank protection efforts along much of the Sacramento River have reduced sediment transport, channel migration and avulsion, large woody debris recruitment, and have isolated the channel from its floodplain in many reaches. Historically, seasonal flooding covered extensive floodplains and provided spawning and rearing habitat for many fish species, including Sacramento splittail and juvenile chinook salmon and steelhead. Flooded areas are highly productive rearing habitats in which young fish tend to grow very rapidly (Jones & Stokes 1999). Levee construction and channel confinement have caused a reduction in the overall amount of seasonal flooding and shallow water habitat in the Sacramento River system. In the winter and spring of wet years, however, some agricultural fields are allowed to flood (e.g., Butte Basin, Yolo Bypass, and Sutter Bypass) during heavy storms and are used by splittail for spawning and rearing, and by chinook salmon and steelhead for rearing.

SENSITIVE BIOLOGICAL RESOURCES

Sensitive biological resources addressed in the following sections include those that are afforded special protection through the California Environmental Quality Act (CEQA), the federal Endangered Species Act (ESA), the California Endangered Species Act (CESA), the California Fish and Game Code, and the federal Clean Water Act (CWA).

Special-status Species

Special-status species include plants and animals that are legally protected or are otherwise considered sensitive by federal, state, or local resource conservation agencies and organizations. Special-status species addressed in this section include:

- Species listed or proposed for listing as threatened or endangered under ESA or CESA
- Species considered as candidates for listing as threatened or endangered under ESA or CESA
- Species identified by the California Department of Fish and Game (DFG) as California Species of Special Concern
- Animals fully protected in California under the California Fish and Game Code
- Plants listed as Endangered or Rare under the California Native Plant Protection Act
- Plants designated by the California Native Plant Society (CNPS) as List 1B (plants rare, threatened or endangered in California and elsewhere) or List 2 (plants rare, threatened or endangered in California but more common elsewhere)
- CALFED Bay–Delta Program Multi-Species Conservation Strategy Goals

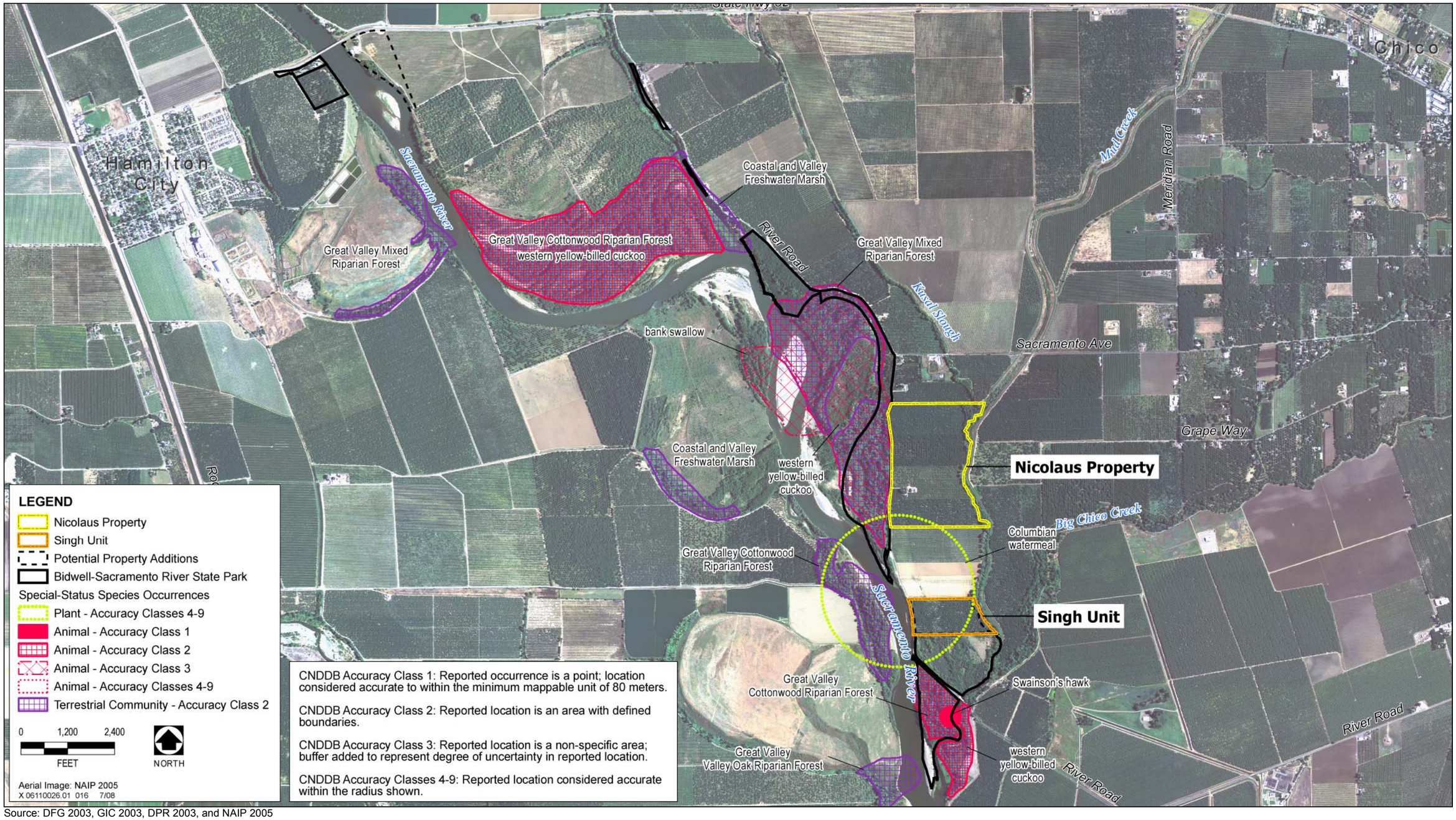
An evaluation of special-status species with potential to occur on and adjacent to the project area was conducted, based on searches of the DFG's California Natural Diversity Database (CNDDB) (2007) and the CNPS Electronic Inventory of Rare and Endangered Plants of California (CNPS 2007), review of existing biological resource documents, and a reconnaissance survey on September 27, 2007. CNDDB and CNPS inventory and searches were conducted for the Ord Ferry, Hamilton City, Chico, Glenn, Llano Seco, Nelson, Foster Island, Nord, and Richardson Springs USGS 7.5-minute quadrangles. Exhibit 4.4-2 shows the location of special-status species that occur in the vicinity of the project area.

Special-status Plants

Existing habitat within the project area is limited to agricultural lands that are currently under cultivation and are consequently not expected to provide suitable habitat for special status plant species. Table 4.4-2 provides information on special-status plants that are known from the vicinity of the project area and that have potential to occur in the riparian habitats adjacent to the existing orchards that characterize the project area. Information regarding each species' regulatory status, habitat requirements, and blooming period is also provided in the table.

Seventeen species in the database searches are known to occur in the nine quadrangle area surrounding the project area, but were eliminated from the table and from further review because the project area does not contain suitable habitat or they do not typically occur in the project area elevation range. These species are Ferris's milkvetch (*Astragalus tener* var. *ferrisiae*), round-leaved filaree (*California macrophylla*), pink creamsacs (*Castilleja rubicundula* ssp. *rubicundula*), Hoover's spurge (*Chamaesyce hooveri*), white-stemmed clarkia (*Clarkia gracilis* ssp. *albicaulis*), recurved larkspur (*Delphinium recurvatum*), Butte County fritillary (*Fritillaria eastwoodiae*), adobe-lily (*Fritillaria pluriflora*), Red Bluff dwarf rush (*Juncus leiospermus* var. *leiospermus*), Butte County meadowfoam (*Limnanthes floccosa* ssp. *californica*), veiny monardella (*Monardella douglasii* ssp. *venosa*), Ahart's paronychia (*Paronychia ahartii*), Butte County checkerbloom (*Sidalcea robusta*), and flagella-like atractylocarpus (*Atractylocarpus flagellaceous*).

As listed in Table 4.4-2, seven special-status plant species—fox sedge (*Carex vulpinoidea*), silky cryptantha (*Cryptantha crinita*), four-angled spike rush (*Eleocharis quadrangulata*), rose-mallow (*Hibiscus lasiocarpus*),



Source: DFG 2003, GIC 2003, DPR 2003, and NAIP 2005

Location of Special-Status Species in the Vicinity of the Project Area

Exhibit 4.4-2

Table 4.4-2
Special-status Plants with Potential to Occur Adjacent to the Project Area

Species	Status [1]				Habitat and Blooming Period	Potential for Occurrence [2]
	Federal	State	CNPS	MSCS Goals [3]		
Plants						
Fox sedge *Carex vulpinoidea*	—	—	2	—	Freshwater marshes and swamps, riparian woodland Blooms May–June	Could occur; suitable freshwater marsh and riparian woodland habitat is present adjacent to the project area.
Silky cryptantha *Cryptantha crinita*	—	—	1B	m	Gravelly streambeds within cismontane woodland, lower montane coniferous forest, riparian scrub, riparian woodland, and valley and foothill grassland Blooms April–May	Unlikely to occur; suitable gravelly streambeds occur well outside of the project area.
Four-angled spike rush *Eleocharis quadrangulata*	—	—	2	m	Freshwater marshes and swamps Blooms May–September	Could occur; suitable freshwater marsh is present adjacent to the project area.
Rose-mallow *Hibiscus lasiocarpus*	—	—	2	m	Freshwater marshes and swamps Blooms June–September	Could occur; suitable freshwater marsh is present adjacent to the project area.
California beaked-rush *Rhynchospora californica*	—	—	1B	m	Bogs and fens, lower montane coniferous forest, freshwater marshes and swamps Blooms May–July	Could occur; suitable freshwater marsh is present adjacent to the project area.
Sanford's sagittaria *Sagittaria sanfordii*	—	—	1B	—	Shallow freshwater marshes and swamps Blooms May–October	Could occur; suitable freshwater marsh is present adjacent to the project area.
Columbian watermeal *Wolffia brasilienensis*	—	—	2	—	Assorted shallow freshwater marshes and swamps Blooms in April–December	Could occur: A historic population is known from the area around Chico Landing boat ramp in BSRSP.

[1] **Legal Status Definitions**

CNPS Categories

1B Plant species considered rare or endangered in California and elsewhere

2 Plant species considered rare or endangered in California but more common elsewhere

[2] **Potential for Occurrence Definitions**

Unlikely to occur: Suitable habitat is available on or adjacent to the project area; however, the amount of habitat is limited.

Could occur: Suitable habitat is available on or adjacent to the project area; however, there are little to no other indicators that the species is present.

[3] **Multi-Species Conservation Strategy Goals**

R Recovery. Recover species' populations within the MSCS focus area to levels that ensure the species' long-term survival in nature.

r Contribute to recovery. Implement some of the actions deemed necessary to recover species' populations within the MSCS focus area.

m Maintain. Ensure that any adverse effects on the species that could be associated with implementation of CALFED actions will be fully offset through implementation of actions beneficial to the species (CALFED Bay–Delta Program 2000).

California beaked-rush (*Rhynchospora californica*), Sanford's sagittaria (*Sagittaria sandfordii*), and Columbian watermeal (*Wolffia brasiliensis*)—have moderate to low potential to occur in freshwater marsh or riparian habitat adjacent to the eastern, southern, and western edges of the project area. However, the extent and quality of freshwater marsh habitat directly adjacent to the project area is low and limits the potential for the plants' occurrence.

Fox Sedge

Fox sedge (*Carex vulpinoidea*) is a perennial herb in the sedge family (Cyperaceae). It is a CNPS List 2 species. This species produces small, inconspicuous flowers from May to June. Suitable habitat consists of riparian woodland and freshwater marshes and swamps. Fox sedge has been reported not far from the project area, east of the Sacramento River, just north of Golden State Island and between lower Foster Island and the southern end of Dicus Slough (CNDDB 2007).

Silky Cryptantha

Silky cryptantha (*Cryptantha crinita*) is an annual herb in the Borage family (Boraginaceae). It is a CNPS List 1B species, and produces small, inconspicuous white flowers from April to May. The plant is found on gravelly streambeds within lower montane coniferous forest, cismontane woodland, riparian scrub, riparian woodland, and valley and foothill grassland habitats.

Four-angled Spikerush

Four-angled spikerush (*Eleocharis quadrangulata*) is also a CNPS List 2 species and member of the sedge family. As its common name suggests, the stem of this perennial herb is strongly four-sided. It blooms from May to September and grows in freshwater marshes and swamps as well as along pond and lake margins.

Rose-mallow

Rose-mallow (*Hibiscus lasiocarpus*) is an emergent perennial herb in the mallow family (Malvaceae) that produces large white or pink flowers. This CNPS List 2 species blooms from June to September and grows in freshwater marshes and swamps. Rose-mallow has been reported to occur in an oxbow north of Golden State Island and east of the Sacramento River, within the area covered by the Park Plan (CNDDB 2007).

California Beaked Rush

California beaked rush (*Rhynchospora californica*), a member of the Rush family (Juncaceae), is a CNPS List 1B plant. It is a medium sized clumping rush with clustered heads of reddish-brownish lowers subtended by a distinctive awn-like bract. California beaked rush can be found in bogs, fens, freshwater marshes and swamps.

Sanford's Sagittaria

Sanford's sagittaria (*Sagittaria sanfordii*) is a CNPS List 1B species in the water-plantain family (Alismataceae). This emergent perennial herb produces white flowers from May to October. Unlike other sagittaria species, it does not have arrow-shaped leaves. Suitable habitat typically consists of shallow, standing fresh water associated with marshes and swamps. Sanford's sagittaria can also occur within slow-moving water bodies such as ponds, lakes, sloughs, ditches, canals, streams, and rivers.

Columbian Watermeal

Columbian watermeal (*Wolffia brasilienensis*) is a CNPS List 2 species in the duckweed family (Lemnaceae). It is a perennial aquatic herb that produces inconspicuous flowers from April to December. Columbian watermeal produces a transparent green, spheric plant body that is less than 1.5 mm. This species grows in colonies on the

water surface within shallow freshwater marshes. Columbian watermeal has been reported within the BSRSP, in the sloughs near Chico Landing (CNDDB 2007).

Special-status Wildlife

Table 4.4-3 provides information on special-status wildlife species with potential to occur on or adjacent to the project site, including the species' regulatory status, habitat requirements, CALFED MSCS conservation goals, and an assessment of their potential for occurrence. As described above, existing habitat within the project site is limited to walnut and almond orchards, and does not provide suitable nesting habitat for any of the special-status wildlife described. Eleven special-status wildlife species have potential to nest in suitable habitats adjacent to the project site. An additional nine special-status species have potential to forage adjacent to the project site. Four of these species may also forage occasionally in the project site orchards, but are more strongly associated with riparian forest habitats.

Table 4.4-3
Special-status Wildlife with Potential to Occur In or Adjacent to the Project Area

Species	Status [1]			Habitat	Potential for Occurrence [2]
	Federal	State	MSCS Goals [3]		
Invertebrates					
Valley elderberry longhorn beetle *Desmocerus californicus dimorphus*	T	—	R	Elderberry shrubs, typically in riparian habitats	Could occur; elderberry shrubs present in riparian habitats adjacent to the project area.
Reptiles					
Giant garter snake *Thamnophis gigas*	T	T	r	Slow-moving streams, sloughs, ponds, marshes, inundated floodplains, rice fields, and irrigation and drainage ditches	Unlikely to occur; Mud Creek adjacent to the project site offers potentially suitable habitat; however, giant garter snakes have not been recorded between the levees of the Sacramento River floodplain and uplands on the project site are unsuitable due to ongoing agricultural cultivation.
Northwestern pond turtle *Actinemys marmorata marmorata*	—	SSC	m	Ponds, marshes, rivers, streams, sloughs	Known to occur; suitable aquatic habitat in Mud Creek adjacent to the project site.
Birds					
American white pelican *Pelecanus erythrorhynchos*	—	SSC	—	Marshes, rivers, and other aquatic habitats	Known to occur; suitable foraging habitat in Sacramento River adjacent to the project site; however, sites not within species breeding range.
Double-crested cormorant *Phalacrocorax auritus*	—	SSC	m	Isolated islets or tall lakeside trees near fish-bearing waters	Known to occur; suitable foraging habitat in Sacramento River adjacent to the project site; however, no nesting colonies are expected to occur nearby.
Osprey *Pandion haliaetus*	—	SSC	m	Coastal habitats, freshwater lakes and reservoirs, and large rivers	Known to occur; suitable foraging habitat in Sacramento River adjacent to the project site; could nest in large trees adjacent to project site.

Table 4.4-3
Special-status Wildlife with Potential to Occur In or Adjacent to the Project Area

Species	Status [1]			Habitat	Potential for Occurrence [2]
	Federal	State	MSCS Goals [3]		
Southern bald eagle *Haliaeetus leucocephalus leucocephalus*	—	E, FP	m	Large rivers, freshwater lakes and reservoirs, and marshes	Known to occur; suitable foraging habitat in Sacramento River adjacent to the project site; however, sites not within species breeding range.
White-tailed kite *Elanus leucurus*	—	FP	m	Forage in grasslands and agricultural fields; nest in isolated trees or small woodland patches	Known to occur; suitable foraging habitat in row crop fields adjacent to project site; suitable nesting habitat in adjacent riparian forest.
Northern harrier *Circus cyaneus*	—	SSC	m	Forage and nest in grasslands, agricultural fields, and marshes	Known to occur; suitable foraging habitat in marsh and row crop fields adjacent to project site; however, unlikely to nest on or adjacent to project site.
Cooper's hawk *Accipter cooperii*	—	SSC	m	Forage and nest in open woodlands and woodland margins	Known to occur; suitable foraging and nesting habitat in riparian forest adjacent to project site.
Sharp-shinned hawk *Accipter striatus*	—	SSC	—	Forage and nest in open woodlands and woodland margins	Known to occur; suitable foraging habitat in riparian forest adjacent to project site; however, sites not within species breeding range.
Swainson's hawk *Buteo swainsoni*	—	T	R	Forage in grasslands and agricultural fields; nest in open woodland or scattered trees	Known to occur; suitable foraging habitat in row crop fields adjacent to project site; suitable nesting habitat in adjacent riparian forest.
Burrowing owl *Athene cunicularia*	—	SSC	—	Grasslands and agricultural fields, especially where ground squirrel burrows are present	Unlikely to occur; suitable foraging and nesting habitat in row crop fields adjacent to project site; however, has not been documented on or adjacent to the project site, and ground squirrel colonies are not present.
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	C	E	R	Riparian forest, typically with mature cottonwoods and willows	Known to occur; suitable foraging and nesting habitat in riparian forest adjacent to project site; nesting has been documented by CNDDB directly across the Sacramento River from project site.
Bank swallow *Riparia riparia*	—	T	R	Forage in various habitats; nests in banks or bluffs, typically adjacent to water	Known to occur; suitable aerial foraging habitat present throughout the project area; nesting colonies documented by CNDDB across Sacramento River from project site.

Table 4.4-3
Special-status Wildlife with Potential to Occur In or Adjacent to the Project Area

Species	Status [1]			Habitat	Potential for Occurrence [2]
	Federal	State	MSCS Goals [3]		
Little willow flycatcher *Empidonax traillii brewsteri*	—	E	—	Riparian woodland and scrub; typically nests in willow and alder patches	Known to occur; suitable foraging habitat in riparian forest and scrub adjacent to project site; however, not within species breeding range.
Loggerhead shrike *Lanius ludovicianus*	—	SSC	—	Forage in grasslands, and agricultural fields; nest in scattered shrubs and trees	Known to occur; suitable foraging habitat provided by row crop fields adjacent to project site; nesting habitat provided by adjacent riparian habitat.
Yellow warbler *Dendroica petechia*	—	SSC	—	Riparian woodland and scrub	Known to occur; suitable foraging and nesting habitat in riparian forest adjacent to project site; nesting has been documented nearby at Capay.
Yellow-breasted chat *Icteria virens*	—	SSC	m	Riparian woodland and scrub, with dense shrub cover	Known to occur; suitable foraging and nesting habitat in riparian forest adjacent to project site; nesting has been documented nearby at Capay.
Mammals					
Ringtail *Bassariscus astutus*	—	FP	—	Riparian forest and shrubland	Could occur; suitable foraging and nesting habitat in riparian forest adjacent to project site.

[1] **Legal Status Definitions**

Federal
- E Endangered
- T Threatened
- C Candidate for Listing

State
- E Endangered
- T Threatened
- FP Fully Protected
- SSC Species of Special Concern

[2] **Potential for Occurrence Definitions**

Unlikely to occur: Habitat on or adjacent to the project site is generally suitable; however, the species is not known to occur in the vicinity and is not expected to occur due to one or more important habitat factors.

Could occur: Suitable habitat is available on or adjacent to the project site; however, the species has not been documented on or adjacent to the project site.

Known to occur: The species was reported in a TNC Site Assessment as having been observed within 5 miles of the project site and within the Sacramento River levees (Hubbell et al. 2003a and 2003b).

[3] **Multi-Species Conservation Strategy Goals**

- R Recovery. Recover species' populations within the MSCS focus area to levels that ensure the species' long-term survival in nature.
- r Contribute to recovery. Implement some of the actions deemed necessary to recover species' populations within the MSCS focus area.
- m Maintain. Ensure that any adverse effects on the species that could be associated with implementation of CALFED actions will be fully offset through implementation of actions beneficial to the species (CALFED Bay–Delta Program 2000).

Special-status Invertebrates

Valley elderberry longhorn beetles require elderberry shrubs for reproduction and survival, spending most of their life cycle as larvae within the stems. The larval stage may last 2 years, after which the larvae enter the pupal stage and transform into adults. Adults are active (feeding and mating) from March to June (USFWS 1984). Valley elderberry longhorn beetles are patchily distributed throughout riparian forests of the Central Valley, although they appear to be only locally common (i.e., found in population clusters that are not evenly distributed across the Central Valley) (USFWS 1984). Elderberry shrubs are likely to occur in riparian habitats adjacent to the project site; therefore, valley elderberry longhorn beetles could also occur in these locations.

During site reconnaissance surveys conducted by EDAW in September 2007, no elderberry shrubs were observed on the project site. However, the riparian habitats adjacent to the project site have potential to support elderberry shrubs, and elderberry shrubs with stems measuring 1.0 inch or greater in diameter when measured at ground level have the potential to harbor valley elderberry longhorn beetle larvae (USFWS 1999a). Elderberry is a fast-growing species, and seedlings may reach 1-inch diameters in as little as 1–2 years under ideal conditions, or more commonly after 2–3 years (Holyoak and Talley, pers. comm., 2007). Elderberry shrubs may thus become established in the project site' adjacent riparian habitat between the time of EDAW's September 2007 reconnaissance survey and future construction of the proposed project, if approved.

The U.S. Fish and Wildlife Service (USFWS) has recently proposed to delist valley elderberry longhorn beetles from their current protected status under the ESA, due in part to the success of past riparian habitat restoration projects (USFWS 2006). The final ruling of whether or not to delist this species will take place after substantial data review, public comment, and potential litigation, and will likely take more than a year to complete.

Special-status Reptiles

Giant garter snakes inhabit a variety of aquatic habitats, such as marshes, sloughs, ponds, flooded rice fields, irrigation canals and drainage ditches, and inundated floodplains. They are typically absent from large or swift-moving rivers, heavily wooded riparian habitats, and from wetlands with sand, gravel, or rock substrates (USFWS 1999a). These snakes also require adjacent upland habitat for basking and burrows that provide sufficient cover and are at high enough elevations to function as refuges from flood waters during the snakes' inactive season (October–May). The project site is within the geographic range of this species. Although the majority of giant garter snakes occur much farther south in the Sacramento Valley, rare occurrences of this species have been documented in the vicinity of Chico, both in the 1970s (USFWS 1999b) and recently at the oxidation ponds adjacent to the Chico Wastewater Treatment Plant (Fitzgerald, pers. comm., 2005). The project site is within approximately 5 miles of these ponds, and home ranges of individual giant garter snakes have been recorded up to 3 square miles in size (Wylie and Casazza 2000). In a single day, individual giant garter snakes have been recorded traveling over one mile, and may move as much as two miles in a day (Hansen and Brode 1993). Although the Sacramento River, riparian forest habitats, orchards, and row crop fields adjacent to the project site does not provide suitable habitat for giant garter snakes, Mud Creek could offer suitable habitat for this species. However, giant garter snakes are unlikely to occur in any habitat between the flood control levees of the Sacramento River, due to the high flows in winter (Hansen, pers. comm., 2006). Because they depend on year-round habitat suitability, these snakes generally do not occupy otherwise suitable habitat that is located within flood control levees, even during their summer active season when flows are lower. This trend has been observed throughout the Central Valley (Hansen, pers. comm., 2006). In addition, giant garter snakes are unlikely to occur on the project site, because it is actively cultivated and does not provide suitable upland habitat.

Northwestern pond turtles generally occur in streams, ponds, freshwater marshes, and lakes. They require still or slow moving water with emergent woody debris, rocks, or other similar features for basking sites. Nests are typically located on unshaded upland slopes in dry substrates with clay or silt soils. Northwestern pond turtles could occur in the slow-moving aquatic habitat of Mud Creek, adjacent to the project site. They are unlikely to occur in the Sacramento River, which is generally fast-moving and unlikely to provide suitable habitat. Upland

habitats on and adjacent to the project site are unlikely to be suitable for nesting, because of the long agricultural history of ground disturbance in the orchard and row crop sites, and the heavy shade of the riparian forest.

Special-status Birds

Aquatic habitats adjacent to the project site provide suitable foraging habitat for American white pelicans and double-crested cormorants. Double-crested cormorants also have limited potential to nest in trees and snags in less disturbed locations along the Sacramento River and adjacent areas, though no known nesting colonies are present. The project site is not within the known breeding range of the American white pelican.

Osprey and southern bald eagles nest along the shores of large rivers and lakes and prey primarily on fish in such water bodies. Osprey are known to nest at BSRSP (Elliott, pers. comm., 2002) and directly across the Sacramento River from the project site, adjacent to the Sacramento River National Wildlife Refuge's Capay Unit (Gilchrist et al. 2002). Bald eagles do not nest in the Central Valley, but wintering, migrating, and non-breeding individuals are known to occur along the Sacramento River and could forage and roost adjacent to the project site.

Swainson's hawks and white-tailed kites typically nest in scattered riparian or woodland trees adjacent to grasslands and/or row crop fields that provide suitable foraging habitat. Swainson's hawks are known to nest at BSRSP, and have been recorded one mile south of the project site (Exhibit 4.4-2) (CNDDB 2007). The riparian forest adjacent to the project site provides potential nesting habitat for both Swainson's hawks and white-tailed kites, and the row crop fields adjacent to the project site provide suitable foraging habitat for both species.

Northern harriers and burrowing owls nest and forage in grasslands and row crop fields; northern harriers also nest and forage in marsh habitats. Both species have potential to occur in the row crop fields adjacent to the project site. Burrowing owl, however, is unlikely to occur because this species has not been documented during the several years of bird surveys conducted in the vicinity, and because of the area's extensive agricultural pest control activities which have precluded the establishment of ground squirrel colonies on or adjacent to the project site. It is considered very unlikely that burrowing owl will occur in the project vicinity (Joe Silveira, pers. comm., 2005).

Cooper's hawks and sharp-shinned hawks nest and forage primarily in riparian forest habitats. Cooper's hawks have potential to nest and forage in such habitats adjacent to the project site. Sharp-shinned hawks are not known to nest in the Central Valley, but wintering, migrating, and non-breeding individuals are known to occur along the Sacramento River and could forage and roost adjacent to the project site.

Yellow-billed cuckoos require large blocks (greater than 40 hectares) of riparian forest vegetation for nesting (Laymon et al. 1997). Historically, this species was common and widespread in river bottom riparian habitat throughout California, but numbers have declined dramatically as a result of habitat loss. Cuckoos have recently been documented nesting at Phelan Island, less than two miles south of the project site (Small et al. 2000), and they were detected at BSRSP, within one mile of the project site, in 1998 (Manolis 1998) and 2002 (Gilchrist et al. 2002). Nests have also been recorded in riparian forest habitats directly across the river from the project site, less than two miles north of the project site, and less than one mile south of the project site (Exhibit 4.4-2) (CNDDB 2007). Western yellow-billed cuckoos are not currently known to nest in the riparian habitat directly adjacent to the project site, although there is potential for them to do so.

Bank swallows nest colonially in vertical banks and cliffs with fine-textured sandy soils and tend to return to these colonial nests year after year. Foraging occurs primarily over open riparian areas, but also over grassland, shrubland, and savannah habitats during the breeding season. Historically, bank swallows nested on coastal bluffs in southern California and in riverbanks throughout the Central Valley and northern California, but the current nesting population is concentrated on the banks of Central Valley rivers. Approximately 75% of the current breeding population occurs along banks of the Sacramento and Feather rivers (City of Sacramento et al. 2003). Nesting colonies are present in the Sacramento River bank across from the project site (Exhibit 4.4-2) (CNDDB 2007).

Willow flycatchers have been eliminated from much of their former range in California, and breeding populations in northern California are now primarily restricted to montane meadows in the Sierra Nevada. This species nests in shrubby riparian vegetation, typically in areas with at least some surface water (Bombay et al. 2000). Willow flycatchers are likely to occur in riparian habitat adjacent to the project site during migration, but they are not expected to nest there.

Loggerhead shrike, yellow warbler, and yellow-breasted chat are known to occur in the vicinity of the project site. Loggerhead shrikes occur in open areas and use scattered shrubs and trees for nesting. They are likely to nest and forage in open habitats near the project site, and may also nest along the ecotone between the riparian forest and row crop fields adjacent to the project site (Gilchrist et al. 2002). Yellow warblers typically nest in willow thickets, and yellow-breasted chats typically nest in riparian habitats with a dense shrub layer. Yellow warblers are relatively uncommon breeders in the Central Valley, but a breeding territory has been documented at BSRSP (Manolis 1998), and a breeding pair was recorded nesting in riparian habitat across the Sacramento River from the project site in 1999, adjacent to the Sacramento River National Wildlife Refuge's Capay Unit (TNC 1999). Yellow-breasted chats are also known to breed in riparian habitat adjacent to the Capay Unit and are likely to nest in such habitats adjacent to the project site (Gilchrist et al. 2002).

Special-status Mammals

Ringtails occur in mixed riparian and other forest and shrubby habitats, in close association with permanent water and rocky areas. They nest in rock crevices, hollow trees, logs, snags, abandoned burrows, or woodrat nests, with young typically born in May and June (DFG 1983). The riparian forest adjacent to the project site provides suitable habitat for ringtails. Undocumented occurrences of ringtails have been noted emerging from nest trees in the oak woodland near the current office complex and service yard of the BSRSP at the Indian Fishery Unit, adjacent to the Nicolaus parcel.

Special-status Fish

Table 4.4-4 provides information on special-status fish species known to occur in the Sacramento River, including the species' regulatory status and habitat description. A total of seven special-status fish species are known to occur adjacent to the project area during at least a portion of their life cycles. In some cases, it is an evolutionarily significant unit (ESU) of a fish species, rather than the entire population, that is listed as special-status. (An ESU is a distinctive group of Pacific salmon. ESU is further described below.) Special-status fish species occurring in the vicinity of the proposed project include Central Valley fall-/late-fall-run chinook salmon, Sacramento River winter run chinook salmon, Central Valley spring run chinook salmon, steelhead, green sturgeon, Sacramento splittail, and hardhead. Most of these species are anadromous and spend various life stages in the project area. These species may only be present near the project site during certain times of year, described in the text following Table 4.4-4. The only exceptions are splittail and hardhead, which are resident species. Table 4.4-4 also identifies goals for certain species evaluated as part of the CALFED MSCS.

Chinook Salmon

Four runs of chinook salmon occur in the Sacramento River, including fall-, late fall-, winter-, and spring-run. The distribution and abundance of each run is limited by the availability of suitable habitat during their respective spawning seasons. Chinook salmon use this portion of the Sacramento River as a migratory pathway for adults and as rearing habitat for emigrating juveniles. Fall-run chinook salmon is the most abundant ESU, documented to comprise about 80% of the Sacramento Basin stock in the early 1980s (Kjelson et al. 1982). Under ESA, an ESU is considered a population (or group of populations) that is reproductively isolated from other populations of the same species and that contributes substantially to the ecological/genetic diversity of the species (Waples 1991). Different runs of the same salmon species are often considered separate ESUs because the populations are reproductively isolated due to different spawning times. The portion of the Sacramento River adjacent to the project site (along with other areas) is designated as critical habitat for winter-run and spring-run chinook salmon.

Critical habitat includes the river water, river bottom, and adjacent riparian zone (i.e., those adjacent terrestrial areas that directly affect a freshwater aquatic ecosystem).

Table 4.4-4
Special-status Fish with Potential to Occur Adjacent to the Project Area

Species	Status [1]			Habitat
	Federal	State	MSCS Goals [2]	
Chinook salmon – Sacramento River winter-run *Oncorhynchus tshawytscha*	E	E	R	Rivers and streams, including the Sacramento River.
Chinook salmon - Central Valley spring-run *Oncorhynchus tshawytscha*	T	T	R	Rivers and streams, including the Sacramento River.
Chinook salmon - Central Valley fall-/late fall-run *Oncorhynchus tshawytscha*	—	SSC	R	Rivers and streams, including the Sacramento River.
Central Valley steelhead *Oncorhynchus mykiss*	T	—	R	Rivers and streams, including the Sacramento River.
Green sturgeon *Acipenser medirostris*	T	—	R	Bay-Delta and associated large rivers, including the Sacramento River.
Sacramento splittail *Pogonichthys macrolepidotus*	—	SSC	R	Bay-Delta and associated rivers and streams, including the Sacramento River.
Hardhead *Mylopharodon conocephalus*	—	SSC	m	Rivers and streams, including the Sacramento River.

[1] **Legal Status Definitions**

Federal		State	
E	Endangered	E	Endangered
T	Threatened	T	Threatened
C	Candidate for listing	SSC	Species of Special Concern

[2] **Multi-Species Conservation Strategy Goals**

R Recovery. Recover species' populations within the MSCS focus area to levels that ensure the species' long-term survival in nature.

r Contribute to recovery. Implement some of the actions deemed necessary to recover species' populations within the MSCS focus area.

m Maintain. Ensure that any adverse effects on the species that could be associated with implementation of CALFED actions will be fully offset through implementation of actions beneficial to the species (CALFED Bay–Delta Program 2000).

All chinook salmon require cold, freshwater streams with suitable gravel for reproduction. Females deposit their eggs in nests, or "redds," which they excavate in the gravel bottom in areas of relatively swift water (Moyle 2002). For maximum survival of incubating eggs and larvae, water temperatures must be between 39°F and 57°F. After emerging, chinook salmon fry tend to seek shallow, nearshore habitat with slow water velocities and move to progressively deeper, faster water as they grow (DFG 1998). Freshwater rearing habitat extends from upstream spawning reaches to the Bay-Delta and Suisun Bay (USFWS 1997). Juveniles typically rear in fresh water for up to 5 months before migrating to sea, although spring-run juveniles frequently reside in freshwater habitat for 12–16 months. Chinook salmon spend 2–4 years maturing in the ocean before returning to their natal streams to spawn. All adult chinook salmon die after spawning.

Winter-run chinook salmon typically migrate by the project area from December through July as adults, and from November through May as emigrating juveniles. Adult spring-run generally migrate by the project area from March to September, while juveniles and yearlings emigrate downstream from March to June and November to April, respectively. Adult fall-run chinook salmon enter the Sacramento River system from July through

December and spawn from October through December. Late fall-run chinook salmon enter the river from October to April and spawn from January to April (Vogel and Marine 1992).

Since 1981, USFWS personnel have captured juvenile chinook salmon using beach seines at 13 sampling sites between RM 298 (Redding) and RM 164 (Princeton), including a RM 193 site. USFWS data provides information on presence/absence, timing of migration, and size of juvenile chinook salmon runs. The four different runs of chinook salmon exhibit different rearing strategies that are partially explained by the availability of food, river flows, and water temperatures in the upper and lower river and Bay-Delta area. Generally, fall and spring-run chinook salmon move out of the upper river 1–2 months after emergence, and are hypothesized to rear in the lower river or in the Bay-Delta. A portion of the winter-run chinook salmon migrate out of the upper river soon after emergence; however, the majority appear to rear in the upper river and tributaries (Maslin et al. 1997 and 1998). Late-fall-run chinook salmon tend to reside 4–6 months in the upper river before moving out of the system (USFWS 1992).

Juvenile chinook salmon captured at RM 193 during 1990–1999 follow the above patterns, and their presence at this location suggests they were likely migrating down the river, so occurrences here were temporary and indicate timing of outmigration. Fall-run chinook salmon were the most abundant run captured at RM 193, and occurred in greater numbers during March, which corresponded to a time of high streamflows. Winter-run outmigration peaked during November, a likely response to increasing streamflows due to winter rains. Late-fall run outmigration was bimodal with some moving out as fry in May and the majority as smolts in October. Spring-run outmigration occurred soon after emergence and was also bimodal corresponding to peak streamflows during the winter (rain events) and spring (snowmelt) (USFWS 1992).

Steelhead

Steelhead use the portion of the Sacramento River adjacent to the project site (along with other areas) as a migratory pathway for adults and as rearing habitat for emigrating juveniles. Historical records indicate that adult steelhead enter the mainstem Sacramento River in July, reach peak abundance in the fall, and continue migrating through February or March (McEwan and Jackson 1996). Juveniles emigrate downstream to the ocean beginning in November and continuing through May (Schaffter 1980), although most Sacramento River steelhead emigrate in spring and early summer. Sacramento River steelhead generally migrate as 1-year-olds (Barnhart 1986, Reynolds et al. 1993). The portion of the Sacramento River adjacent to the project site is designated critical habitat for Central Valley steelhead.

Green Sturgeon

Green sturgeon has recently has been listed as threatened by NMFS (71 FR 17757). Green sturgeon occur in the lower reaches of large rivers, including the Sacramento–San Joaquin River basin, and in the Eel, Mad, Klamath, and Smith rivers (Moyle et al. 1992). Green sturgeon adults and juveniles occur throughout the upper Sacramento River, based upon observations incidental to winter-run Chinook monitoring at the Red Bluff Diversion Dam in Tehama County (Brown 2006). Green sturgeon spawn predominantly in the upper Sacramento River. They are thought to spawn every 3–5 years. Their spawning period is March to July, with a peak in mid-April to mid-June (Moyle et al. 1992). Juveniles inhabit the estuary until they are approximately 4–6 years old, when they migrate to the ocean (Kohlhorst et al. 1991). Juvenile fish have been collected in the vicinity of the project area, near Hamilton City.

Sacramento Splittail

Sacramento splittail were historically widely distributed throughout much of the Central Valley, but dams and diversions have prevented them from reaching many upstream reaches, and the current population is concentrated in the Bay-Delta region. Recent data indicate that splittail occur in the Sacramento River as far upstream as the Red Bluff Diversion Dam (RM 240) (Sommer et al. 1997, Maslin et al. 1997), and that some adults spend the summer in the mainstem Sacramento River rather than return to the estuary (Baxter 1999). Several adults were

observed in Mud Creek and Kusal Slough in 1996 and 1997 (Maslin et al. 1997). The distribution and extent of spawning and rearing along the mainstem Sacramento River is unknown. Splittail spawn over flooded terrestrial or aquatic vegetation (Moyle 2002, Wang 1986) in early March and May in the lower reaches of the Sacramento River (Moyle et al. 1989). Spawning has been observed as early as January and continues through July (Wang 1986). Larval splittail are commonly found in the shallow, vegetated areas where spawning occurs. Larvae eventually move into deeper open water habitats as they grow and become juveniles. Riparian vegetation in the project area that is prone to sustained flooding provides potential splittail spawning and rearing habitat.

Hardhead

Hardhead are widely distributed throughout the low- to mid-elevation streams in the main Sacramento–San Joaquin drainage as well as in the Russian River drainage. Hardhead prefer the undisturbed portions of larger streams at low to middle elevations. They are able to withstand summer water temperatures above 68°F; however hardhead will select lower temperatures when they are available. They are fairly intolerant of low-oxygenated waters, particularly at higher water temperatures. Pools with sand-gravel substrates and slow water velocities are the preferred habitat; adult fish inhabit the lower half of the water column, while the juvenile fish remain in the shallow water closer to the stream edges. Hardhead typically feed on small invertebrates and aquatic plants at the bottom of quiet water (Moyle 2002).

SENSITIVE HABITATS

Sensitive habitats include those that are of special concern to resource agencies or that are afforded specific consideration through CEQA, Section 1602 of the California Fish and Game Code, or Section 404 of the federal CWA as discussed further in Section 4.4.2, "Regulatory Setting." Sensitive habitats are of special concern because they are of high value to plants, wildlife, and fish species and have high potential to support special-status species. Sensitive habitats also provide other important ecological functions, such as enhancing flood and erosion control and maintaining water quality.

There are no sensitive habitats within the project site. A variety of sensitive habitats, including Great Valley willow scrub, Great Valley cottonwood riparian forest, freshwater marsh, and wetlands are present adjacent to the project site. These habitats are protected under the Fish and Game Code and/or federal CWA.

4.4.2 REGULATORY SETTING

Important regulations that protect biological resources and could be applicable to the proposed project are discussed below.

FEDERAL REGULATIONS

Federal Endangered Species Act

The USFWS and the National Marine Fisheries Service (NMFS) have authority over projects that may affect the continued existence of a federally-listed (threatened or endangered) species. Section 9 of ESA prohibits the take of federally-listed species; take is defined under ESA, in part, as killing, harming, or harassment. Under federal regulations, take is further defined to include habitat modification or degradation where it actually results in death or injury to wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering.

Section 7 of ESA outlines procedures for federal interagency cooperation to conserve federally-listed species and designated critical habitat. Section 7(a)(2) requires federal agencies to consult with USFWS to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species. For projects where federal action is not involved and take of a listed species may occur, the project

proponent may seek to obtain incidental take under Section 10(a) of ESA. Section 10(a) of ESA allows USFWS to permit the incidental take of listed species if such take is accompanied by a Habitat Conservation Plan (HCP) that includes components to minimize and mitigate impacts associated with the take.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA), first enacted in 1918, provides for international migratory bird protection and authorizes the Secretary of the Interior to regulate the taking of migratory birds. MBTA provides that it shall be unlawful, except as permitted by regulations, to pursue, take, or kill any migratory bird, or any part, nest or egg of any such bird. The list of species protected by MBTA has recently been updated by USFWS; the current list can be found in the August 24, 2006 Federal Register (71 FR 50194). The list includes nearly all birds native to the United States. Loss of nonnative species, such as house sparrows, European starlings, and rock pigeons, are not covered by this statute.

Clean Water Act

Pursuant to Section 404 of the CWA, the USACE regulates discharge of dredge or fill material into waters of the United States. Waters of the United States and their lateral limits are defined in 33 CFR Part 328.3 (a) and include navigable waters of the United States, interstate waters, all other waters where the use or degradation or destruction of the waters could affect interstate or foreign commerce, tributaries to any of these waters, and wetlands that meet any of these criteria or that are adjacent to any of these waters or their tributaries. Fill is defined as any material that replaces any portion of a water of the United States with dry land or changes the bottom elevation of any portion of a water of the United States. Any activity resulting in the placement of dredge or fill material to waters of the United States requires a permit from the USACE. Pursuant to Section 401 of the CWA, projects that apply for a USACE permit for discharge of dredge or fill material must obtain water quality certification from the Regional Board (formerly called RWQCB) indicating that the project would uphold state water quality standards.

Magnuson-Stevens Fishery Conservation and Management Act

The amended Magnuson-Stevens Fishery Conservation and Management Act, also known as the Sustainable Fisheries Act, requires all federal agencies to consult with the Secretary of Commerce on activities or proposed activities authorized, funded, or undertaken that may adversely affect Essential Fish Habitat (EFH) of commercially managed marine and anadromous fish species (Office of Habitat Conservation 1999). The EFH provisions of the Sustainable Fisheries Act are designed to protect fishery habitat from being lost due to disturbance and degradation. The act requires that EFH must be identified for all species federally managed under the Pacific Fisheries Management Council (PFMC). PFMC is responsible for managing commercial fisheries resources along the coasts of Washington, Oregon, and California. Managed species are covered under three fisheries management plans: Pacific Groundfish Fishery Management Plan, Coastal Pelagic Fishery Management Plan, and Pacific Salmon Fishery Management Plan.

STATE REGULATIONS

California Endangered Species Act

Pursuant to the CESA and Section 2081 of the Fish and Game Code, a permit from DFG is required for projects that could result in the take of a state-listed Threatened or Endangered species. Under CESA, the definition of "take" is understood to apply to an activity that would directly or indirectly kill an individual of a species, but the definition does not include "harm" or "harass," as the federal act does. As a result, the threshold for a take under the CESA is typically higher than that under the ESA. Take may be authorized by DFG as long as it is incidental to an otherwise lawful activity and the impacts of authorized take must be minimized and fully mitigated.

California Fish and Game Code Section 2800 et seq. – Natural Communities Conservation Planning Act

The Natural Communities Conservation Planning (NCCP) Act of 1991 was established by the California legislature, is directed by DFG, and is being implemented by the state, and public and private partnerships to protect habitat in California. The DFG NCCP program is the mechanism for implementation of the NCCP Act. As opposed to the single species interpretation of the ESA, this act aims at protecting many species using a regional approach to habitat preservation. NCCPs describe conservation programs designed to minimize and mitigate effects to specified biological resources. The program takes a broad-based ecosystem approach to conservation planning. Its primary objective is to conserve natural communities at the ecosystem scale while accommodating compatible land uses. An NCCP identifies and provides for the regional protection of plants, animals, and their habitats, including species protected under CESA, while allowing compatible and appropriate economic activity.

California Fish and Game Code Sections 3503 and 3513 – Protection of Birds

Section 3503 of the Fish and Game Code states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3503.5 specifically states that it is unlawful to take, possess, or destroy any raptors (i.e., eagles, hawks, owls, and falcons), including their nests or eggs. Section 3513 of the California Fish and Game Code provides for adoption of MBTA's provisions. It states that it is unlawful to take or possess any migratory nongame bird as designated in the MBTA or any part of such migratory nongame bird. These state codes offer no statutory or regulatory mechanism for obtaining an incidental take permit for the loss of nongame, migratory birds. Typical violations include destruction of active nests resulting from removal of vegetation in which the nests are located. Violation of Sections 3503.5 and 3513 could also include failure of active raptor nests resulting from disturbance of nesting pairs by nearby project construction.

Fully Protected Species under the Fish and Game Code

Protection of fully protected species is described in four sections of the Fish and Game Code that list 37 fully protected species (Fish and Game Code Sections 3511, 4700, 5050, and 5515). These statutes prohibit take or possession at any time of fully protected species. DFG is unable to authorize incidental take of fully protected species when activities are proposed in areas inhabited by those species. DFG has informed non-federal agencies and private parties that they must avoid take of any fully protected species when carrying out projects.

California Fish and Game Code Section 1602 – Streambed Alteration

All diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream or lake in California that supports wildlife resources are subject to regulation by DFG, pursuant to Section 1602 of the California Fish and Game Code. Section 1602 states that it is unlawful for any person, governmental agency, state, local, or any public utility to substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake without first notifying DFG of such activity. The regulatory definition of stream is a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports wildlife, fish or other aquatic life. This includes watercourses having a surface or subsurface flow that supports or have supported riparian vegetation. DFG's jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife.

Porter-Cologne Water Quality Control Act

Under the Porter-Cologne Water Quality Control Act, "waters of the state" fall under the jurisdiction of the Regional Water Quality Control Board (RWQCB). Under the act, the Regional Board must prepare and periodically update its Basin Plan. Each Basin Plan sets forth water quality standards for surface water and

groundwater, as well as actions to control non-point and point sources of pollution to achieve and maintain these standards. Projects that affect wetlands or waters must meet waste discharge requirements of the Regional Board, which may be issued in addition to a water quality certification or waiver under Section 401 of the CWA.

BUTTE COUNTY GENERAL PLAN

The Conservation element of the Butte County General Plan (approved in 1971) provides the following guidance regarding wildlife and fisheries resources, which are applicable to the proposed project.

Wildlife

Acknowledgment by game management officials of deterioration of existing wildlife habitat by intrusion of urban development, with the possibility of certain species becoming endangered to the point of extinction, should also be a consideration of land use.

The migratory routes of wildlife which have been established by the basic survival requirements of the individual species should be recognized as an integral part of the ecosystem.

Riparian lands which support streamside vegetation become extremely important inasmuch as the food and cover these lands provide are necessary for a great variety of wildlife (i.e., pheasants, quail, doves, songbirds and a large number of fur-bearing mammals). This particular type of habitat, by the very nature of its aesthetics, is in great demand for development and in many areas has been totally eliminated by intensive land use. Two of these remaining areas of "premium riparian habitat" in the State of California are located in Butte County, one on the Sacramento River from Keswick to the Delta, which includes Butte County, and the other the Feather River from Oroville south to the Sutter and Yuba County lines. These areas should be very carefully controlled to protect this environment if the wildlife that depends on this particular habitat is to continue to survive.

Fisheries

Within the Protected Waterways Plan (Initial Element), a report was prepared by a study staff assembled from the five departments in The Resources Agency: Fish and Game, Parks and Recreation, Water Resources, Navigation and Ocean Development, and Conservation (Division of Forestry) in which Chapter II is directed to Section 3 of the Protected Waterways Act which requires, among other elements, specific identification of waterways for "extraordinary value."

Butte County possesses several waterways which have been classified in this report as possessing extraordinary value as fisheries. The classifications are Class I, Premium Waterways; Class II, Very Good Waterways; and Class III, Important Waterways. These fishery classifications include anadromous fish and inland fish. Anadromous fish include King and Silver Salmon, Steelhead Trout, Striped Bass, American Shad, and White and Green Sturgeon, while inland fish include cold-water and warm-water species (i.e., Trout, Bass, Sunfish and Catfish).

The Sacramento and Feather Rivers, Butte Creek and Big Chico Creek received Class I, Premium, for anadromous fish, while Butte Creek, Fall River, French Creek and the Little North Fork of the Middle Fork of the Feather River received Class III, Important, for inland fish (Trout). The Sacramento and Feather Rivers also received classifications for inland fish: the Sacramento, Class I, Premium; the Feather, Class II, Very Good. Lake Oroville received Class I for combination reservoir (inland fish). Inasmuch as the Middle Fork of the Feather River from its source to Lake Oroville has been placed in the National Wild and Scenic Rivers Act, the extraordinary values of this waterway have already been recognized.

The preservation of these already classified extraordinary fisheries and all other waterways depends entirely on all land use, not just the land immediately adjacent to any one development.

Healthy waterways which contain clean cobbles create ideal spawning beds and create the habitat required for aquatic insects that are essential as food for fish. Sedimentation, siltation and turbidity destroy the basic conditions required for spawning beds and aquatic insect production.

Soil erosion occurs naturally, but as man alters the soil, vegetation and runoff, the problems are accelerated. Intensified land use within areas of severe soil erodibility greatly increases the sedimentation conditions in waterways.

OTHER LOCAL REGULATIONS

See Section 3.3.1 of this EIR, "Local and Regional Conservation Planning," for a description of the BSRSP General Plan and EIR, Sacramento River Conservation Area, Sacramento Wildlife Area Management Plan, and USFWS Comprehensive Conservation Plan.

4.4.3 ENVIRONMENTAL IMPACTS

THRESHOLDS OF SIGNIFICANCE

These significance thresholds are based on relevant provisions of CEQA, the State CEQA Guidelines, environmental questions in Appendix G of the Guidelines, and significance criteria used in other relevant environmental compliance documents for similar projects.

The proposed habitat restoration project would be considered to have a significant effect on biological resources if it would:

- Result in a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by DFG or USFWS;
- Result in a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA;
- Conflict with any local policies or ordinances protecting biological resources;
- Conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or state habitat conservation plan;
- Result in the substantial loss or degradation of native vegetation;
- Result in a substantial net loss of important wildlife habitat, including habitat occurring on agricultural fields;
- Result in a substantial net loss of important fisheries habitat, or EFH;
- Result in a construction-related temporary loss of substantial areas of native habitat or a substantial disturbance of sensitive wildlife on or near the project site;
- Result in a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by DFG or USFWS;
- Result in a substantial reduction of the habitat of a fish or wildlife species;
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites;

- Cause a fish or wildlife population to drop below self-sustaining levels, or threaten to eliminate a plant or animal community; or

- Result in a substantial reduction in the number or restrict the range of an endangered, rare, or threatened plant or animal.

The proposed project would not result in impacts to federally protected wetlands; conflict with any local policies or ordinances protecting biological resources; conflict with an adopted habitat conservation plan; or adversely affect riparian habitat or other sensitive natural communities. Rather, the restoration of the project site would restore riparian habitat and would increase the amount of protected biological resources in the project area. Therefore, no further discussion pertaining to these thresholds of significance is included in this analysis.

4.4.4 IMPACT ANALYSIS

Plants

IMPACT 4.4-a Change in Habitat Conditions. *Implementation of the proposed project would involve restoration of native Sacramento River riparian habitat on land that has been actively cultivated. It would not result in the loss or disturbance of native habitats or special-status plant species because these resources are not present in areas that would be disturbed during restoration activities. Restoration of native habitat would, in fact, have a long-term* ***beneficial*** *effect to native vegetation and associated plant species.*

Restoration of riparian habitat at the project site would occur on approximately 15~~0~~6 acres of almond and walnut orchards that has been in continual cultivation for at least 10 years (the age of the youngest cohort of orchards). These lands would be taken out of almond and walnut production and restored to native habitat, including a combination of mixed riparian forest, valley oak forest, cottonwood riparian forest, valley oak savanna, and valley needlegrass grassland (Exhibits 3-7 and 3-8). This restoration could temporarily reduce the local populations of common plant species (ruderal species along the edges of the orchards), but these species are locally and regionally abundant and are not considered sensitive. Sensitive habitats, including Great Valley willow scrub, Great Valley cottonwood riparian forest, and freshwater marsh, are present adjacent to the project area. In addition, six special-status plant species have potential to occur in riparian and freshwater marsh habitats adjacent to the project area. However, none of these habitats would be adversely affected by the proposed restoration project, and the project would result in a long-term increase in the overall amount of sensitive habitat within the project area. Furthermore, the proposed project would support Park Plan Goal ER-1.1 and Guideline ER-1.1-1, which calls for restoration on parcels acquired for habitat values. Therefore, impacts to vegetation, including sensitive habitats and special-status plants, would be ***beneficial***.

IMPACT 4.4-b Introduction and Spread of Invasive Plants (Weeds). *Implementation of the proposed project would involve initial ground clearing and an eventual reduction in the active management and control of nonnative invasive plants from the present level associated with agricultural activities on the project site. The restoration plans for both the Singh Unit and the Nicolaus property have specific measures for the control of nonnative invasive plant species. Therefore, the potential for project implementation to increase the risk of spreading nonnative invasive plant species into adjacent existing native habitats is low. The potential introduction and spread of nonnative invasive plants would be a* ***less-than-significant*** *impact.*

A number of nonnative species tracked by CDFA and Cal-IPC and considered serious problems in native ecosystems and rangelands are present in the existing riparian habitat adjacent to the project site and in the fallow edges and roadsides along the orchards. These include giant reed, yellow-star thistle, Himalayan blackberry, tamarisk, perennial pepperweed, tree-of-heaven, eucalyptus, periwinkle, poison hemlock, edible fig, black locust and wild almond. As part of the ground clearing and replanting that would take place as part of the habitat restoration and establishment of recreation facilities there is potential for these species to colonize the open

ground, establish populations, and become of source of spread and future infestations in neighboring areas where those species did not yet exist. However, the restoration plans for both units have specific maintenance schedules for control of nonnative weed species, consistent with Park Plan Goal ER-1.3 and Guidelines ER-1.3-1 and ER-1.3-2. These plans call for active maintenance for three years following implementation and include control of weeds through herbicide application, mowing, and discing where appropriate (see Appendix C for details). The ultimate objective of the weed control measures is to optimize growth of the planted riparian species past a point where they can compete effectively with the nonnative invasive plant species. With these maintenance measures in place as part of the project description, the impact from introduction and spread of nonnative invasive plants is expected to be ***less than significant***.

Wildlife

IMPACT 4.4-c Potential Effects to Wildlife. *Implementation of the proposed project would result in an overall **benefit** to wildlife. Approximately 15~~0~~6 acres would be restored from cultivated orchard to native riparian habitat, which supports a greater diversity and abundance of wildlife, including many special-status species.*

Implementation of the proposed project would result in an overall ***benefit*** to wildlife. Approximately 15~~0~~6 acres would be restored from cultivated orchard to native riparian habitat, which supports a greater diversity and abundance of wildlife, including many special-status species. The benefits of riparian restoration have been confirmed by recent research, which has shown substantial population increases for a variety of bird species at riparian restoration sites, with eight species increasing by more than 10% in ten years, and with significantly higher rates of population growth at restored sites than in the Sacramento Valley as a whole or the state of California (Gardali et. al., 2006). In addition, the USFWS proposal to delist valley elderberry longhorn beetles from their current threatened status was due in part to the success of past riparian restoration projects (USFWS 2006), and the first Central Valley nest of endangered least Bell's vireos in over 60 years was recorded in a San Joaquin River restoration site in 2005 (USFWS 2005b).

Restoration of native habitats would eliminate existing orchard habitat which is inhabited by some common wildlife species such as American robin, European starling, gopher snake, western gray squirrel, and black rat. However, most of these species are also likely to use the riparian habitats that would replace the orchards. In addition, orchards and the wildlife they support are locally and regionally common. Therefore, no substantial net loss of wildlife habitat would occur, and the restoration of higher-quality riparian habitat would be considered beneficial.

The proposed project would also enhance existing wildlife movement corridors along the Sacramento River and Mud Creek, by adding 15~~0~~6 acres of riparian habitat to an existing 2,887 acres of protected and restored habitat along the Sacramento River between river miles 199 and 193, and shortening the distance between riverside habitat parcels. Wildlife movement is not expected to be substantially affected by construction and maintenance of the proposed recreational facilities. Relatively small patches of orchard would be disturbed and/or removed by facility development, and the existing riparian habitat adjacent to the project site would remain undeveloped. Potential project impacts to wildlife corridors would thus be expected to be beneficial.

The proposed expansion of recreational facilities, including parking, campgrounds, picnic/day use areas, and trails is expected to increase visitor use of existing habitats adjacent to the project site and within the Park as a whole. Potential secondary impacts to wildlife that could result from increased visitor use include disturbance from visitor activities (e.g., hiking and camping), introduction/expansion of invasive species, increased populations of native predators (e.g., crows and raccoons) due to the availability of human food waste, and disturbance by domestic dogs. However, such impacts would be minimized by the Park Plan goals and guidelines, which would be followed for both short-term construction and long-term maintenance of the proposed project. These measures include monitoring of special-status species within the Park and development of specific measures to avoid and minimize adverse impacts that could result from facility construction, maintenance activities, and visitor use (Goal ER-1.2 and Guidelines ER-1.2-1 through ER-1.2-5). In addition, the Park Plan includes minimization

measures for the potential impacts of nonnative animals on wildlife in the Park, through monitoring efforts, development and implementation of a control plan, and public education to reduce release and feeding of nonnative animals (Goal EIR-1.4 and Guidelines ER-1.4-1 through ER-1.4-3). Further, all of the new facility development is proposed on existing orchard land which currently provides little habitat value, and the majority of such impacts would be expected to remain within the developed Nicolaus parcel, with a lesser amount of additional use impacts on the adjacent trails and habitats.

The project area and adjacent sensitive habitats are known to support several special-status wildlife species and could support a number of others (Table 4.4-3). Aquatic species, such as giant garter snake and western pond turtle, would not be adversely affected by the proposed project because restoration activities would be restricted to disturbed upland habitats that are unlikely to be utilized by these species. Similarly, ringtail would not be adversely affected because it is restricted to riparian habitat and is unlikely to use the project site while it remains in cultivation. Ringtail would instead benefit from the proposed project's restoration of riparian habitat.

IMPACT 4.4-d **Potential Effects to Valley Elderberry Longhorn Beetles.** *No elderberry shrubs would be directly affected by habitat restoration activities or recreation facilities construction, because these activities would be restricted to areas that have long been subject to high levels of disturbance from agricultural activities and do not support any elderberry shrubs. In addition, the restoration plans do not include planting elderberry shrubs. However, elderberry shrubs that could support valley elderberry longhorn beetle are likely to occur adjacent to the project site. Therefore, focused surveys for elderberry shrubs would be conducted on land within 100 feet of the project site prior to construction. If any elderberry shrubs with 1.0 inch or greater stem diameter are found, USFWS conservation guidelines for valley elderberry longhorn beetles would be followed. Therefore, the proposed project would result in a* ***less than significant*** *impact to valley elderberry longhorn beetles.*

No elderberry shrubs would be directly affected by habitat restoration activities or recreation facilities construction, because these activities would be restricted to areas that have long been subject to high levels of disturbance from agricultural activities and do not support any elderberry shrubs. In addition, the proposed restoration plans do not include planting any elderberry shrubs. This would minimize the potential for recruitment of elderberry shrubs into areas subject to regular maintenance or other disturbances (levees, other flood control structures, and/or adjacent agricultural lands) that could result in adverse effects to the shrubs.

Elderberry shrubs that could support valley elderberry longhorn beetle are likely to occur adjacent to the project site. Although there is little potential for disturbance to nearby elderberry shrubs during project implementation, focused pre-construction surveys for elderberry shrubs would be conducted on land within 100 feet of the project site. If elderberry shrubs with 1.0 inch or greater stem diameter are found, USFWS conservation guidelines for valley elderberry longhorn beetles would be followed by establishing a 100-foot buffer around such shrubs, wherever feasible, to completely avoid potential impacts to valley elderberry longhorn beetles (USFWS 1999a). Earthmoving activities, pesticide use, and other construction and maintenance activities with potential to impact valley elderberry longhorn beetles and their host shrubs would be avoided within these buffer zones. If the establishment of a 100-foot buffer is infeasible, then USFWS would be consulted. It is anticipated that either a new buffer width would be agreed upon along with additional protections for the safety of the beetles and shrubs, or that shrubs that could not be adequately protected would be transplanted to a protected location before construction would begin, in accordance with established USFWS guidelines (USFWS 1999a). If valley elderberry longhorn beetles are delisted in the future, as has recently been proposed by USFWS (USFWS 2006), these measures may be amended to conform to any revised USFWS guidelines regarding this species.

Because the project would avoid adverse effects to elderberry shrubs and valley elderberry longhorn beetles, the proposed project would result in a ***less-than-significant*** impact on valley elderberry longhorn beetles.

IMPACT 4.4-e Potential Disturbance of Nesting Raptors, Special-status Birds, Migratory Birds, and Bats. *Implementation of the proposed project could result in a* ***potentially significant*** *construction-related loss and/or disturbance of birds and bats nesting or roosting in or near the project site.*

Implementation of the proposed project could result in construction-related loss and/or disturbance of birds and bats nesting or roosting in or near the project site. Several special-status birds are known or have the potential to nest adjacent to the project site (Table 4.4-3). Many common bird species may also nest in or near the project site, and are protected under MBTA and the California Fish and Game Code, with raptors receiving additional protection. Restoration activities could result in direct loss of orchard nests and bat roosting sites when orchard vegetation is removed. Birds nesting in habitat adjacent to the project site could also be disturbed by restoration activities, potentially resulting in nest abandonment and mortality of eggs or chicks. These disturbances could result in a ***potentially significant*** impact.

Fisheries

IMPACT 4.4-f Potential Effects to Fisheries. *Implementation of the proposed project would not result in loss or disturbance of fish habitat or special-status fish because these resources are not present in areas that would be disturbed during restoration activities. The creation of recreational facilities would involve construction activities and increased visitation of the project area; however, this potential impact would be minimized with implementation of a storm water pollution prevention plan and therefore would not result in significant impacts to the Sacramento River fisheries. Restoration of riparian habitat would be expected to have a long-term* ***beneficial*** *effect to fish.*

Implementation of the proposed project would result in an overall net benefit to fisheries and aquatic resources of the Sacramento River. Implementation of the proposed project would not directly alter any instream fish habitat as all project activities and construction would take place on the floodplain. Implementation of the habitat restoration would utilize standard agricultural practices already in use throughout the project area, including orchard removal, discing, seeding, and planting. Irrigation system modification and expansion would include standard trench and backfill techniques. Minor and temporary increases in sediment load to the river could also occur during flood events. Increased sediment input could increase turbidity and reduce feeding efficiency of juvenile and adult fish. However, native vegetation would be planted concurrently or soon after removal of existing vegetation to minimize the potential for severe erosion to occur on disturbed, unprotected land. Because the Sacramento River is typically a turbid system during flood events, additional sediment input resulting from the proposed restoration project activity would be comparatively minimal, and is not anticipated to have any noticeable effect relative to the overall condition of the river. Gravel recruitment rates would not be significantly affected. In addition, restoration of agricultural lands to natural riparian areas would result in long-term beneficial effects to fish in the Sacramento River by increasing the complexity of the floodplain aquatic environment and providing cover, food, and other habitat components.

The construction of recreational facilities on the Nicolaus property would convert approximately 2~~1~~0 acres from orchard and related agricultural facilities to recreational day use facilities, campgrounds, and an access road. Ground-disturbing activities could potentially result in soil erosion and/or sedimentation of local drainages or the Sacramento River channel and subsequent water quality degradation, which in turn could result in potential adverse effects to special-status fish. However, these impacts would be minimized with implementation of a Storm Water Pollution Prevention Plan and best management practices (see Impact 4.3c in Section 4.3, "Hydrology, Water Quality, and River Geomorphology"). Additionally, replacing the existing agriculture land use with restored riparian habitat and recreation facilities would result in a decrease in pesticide and herbicide applications, reducing the potential impacts of these chemicals to fish during flood events. Operation of recreational facilities would increase the amount of vehicle traffic in the project area, thus potentially increasing the amount of vehicle-related contaminants entering the Sacramento River during flood events (see Impact 4.3d in Section 4.3, "Hydrology, Water Quality, and River Geomorphology"). However, any increase in vehicle-related

contaminants on the project site would be expected to be relatively small due to the anticipated low-intensive and seasonal use of the area.

Because the benefits to fisheries of the proposed habitat restoration are expected to be more substantial than any potential construction, maintenance, or visitor use impacts that may occur, the overall effect of the proposed project is considered ***beneficial*** to fish habitat and special-status fish species.

4.4.4 MITIGATION MEASURES

The proposed project would implement specific actions to ensure avoidance of impacts to plants, wildlife, and fisheries during both habitat restoration and recreation facility development at the project site. These actions support the goals and guidelines of the Park Plan, which emphasizes the protection of special-status species as well as the restoration and conservation of native ecosystems.

Mitigation Measure 4.4-e: Avoidance of Disturbance to Nesting Raptors and Special-status Birds.

Osprey, white-tailed kite, northern harrier, Cooper's hawk, Swainson's hawk, western yellow-billed cuckoo, bank swallow, loggerhead shrike, yellow warbler, and yellow-breasted chat are known to or have potential to nest adjacent to the project site. In addition to these special-status species, the nests of all raptor species are protected under §3503.5 of the California Fish and Game Code. Nest disturbance may be entirely avoided by limiting construction to the non-breeding season (generally September 1 to January 31) to the extent feasible. To avoid nest disturbance and a potential reduction in fledging success resulting from construction activities during the breeding season (February 1 to August 31), focused surveys for raptors and special-status birds would be conducted by a qualified biologist no more than 14 days prior to the beginning of construction. Surveys for Swainson's hawk nests would include all areas of suitable nesting habitat within 0.25-mile of the two sites. To the extent feasible, guidelines provided in the Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in the Central Valley (Swainson's Hawk Technical Advisory Committee 2000) would be followed. Surveys for other raptors and special-status birds would include suitable nesting habitat within 500 feet of each site.

If no active nests are found, no further measures would be needed. If active nests are found, impacts would be avoided by the establishment of appropriate buffers and/or nest monitoring by a qualified biologist. The size of the buffer would be determined by a qualified biologist and may vary, depending on the species biology, location, nest stage, and specific construction activities to be performed while the nest is active. No construction activities would occur within a buffer zone until a qualified biologist confirms that the nest is no longer active.

Mitigation Measure 4.4-e: Avoidance of Disturbance to Nesting Migratory Birds and Roosting Bats.

As discussed for nesting raptors and special-status birds, nest disturbance of other migratory birds may be entirely avoided by limiting construction to the autumn and winter non-breeding season to the extent feasible. To avoid nest disturbance and a potential reduction in fledging success during any construction activities during the spring and summer breeding season, the project site's walnuts and almonds would be harvested for the last time the previous autumn, and standard orchard maintenance practices (e.g., mowing and herbicide applications) would continue until construction begins to discourage bird nesting and bat roosting in the orchard prior to felling of the trees.

Because orchards would be restored to native habitats anticipated to support a higher diversity and abundance of wildlife species without significantly reducing populations of the species currently on site, the proposed restoration of native riparian habitat would have a long-term beneficial effect on wildlife. Potential impacts to existing wildlife that may occur during construction, maintenance, and visitor use of the proposed riparian habitat and recreational facilities would be expected to be minor, and would be largely avoided or minimized through the wildlife protection measures described in Mitigation Measure 4.4-e. These measures comply with the Park Plan

and all applicable state and federal laws. Because the benefits to wildlife of the proposed habitat restoration are expected to be more substantial than any potential construction, maintenance, or visitor use impacts that may occur, the overall effect of the proposed project is considered ***beneficial*** to wildlife species, and there would not be any substantial adverse effect to special-status species, their use of wildlife movement corridors, or nursery sites.

4.5 CULTURAL RESOURCES

This section presents a description of the cultural resources setting for the proposed project. The affected environment described in this section is based upon information gathered during research and field investigations conducted by EDAW in 2006, which was presented in the *Cultural Resources Inventory and Assessment, Singh and Nicolaus Restoration and Public Access Project*, dated March 2007 (Appendix E). The cultural resource impact analysis subsection addresses the potential for disturbance of documented and undocumented cultural resources during construction activities. Mitigation measures are recommended to reduce any potentially significant impacts.

This analysis reiterates the findings in the Bidwell-Sacramento River State Park (BSRSP) General Plan and EIR (Park Plan), regarding impacts to cultural resources (Preliminary General Plan and Draft EIR, Impact CUL). The proposed project actions are consistent with the Park Plan, as described in Chapter 1, "Introduction," of this DEIR. While the Singh Unit was discussed in Section 2.3.3 of the Park Plan), the Nicolaus property was not identified as a potential acquisition site at the time the Park Plan was prepared. Therefore, this analysis addresses project-specific impacts on the proposed project site, including the Nicolaus property, to ensure complete analysis of the project's potential effects on cultural resources.

4.5.1 ENVIRONMENTAL SETTING

NATURAL SETTING

The project area and its vicinity have been occupied and used by diverse peoples for thousands of years. The varied natural setting and accessibility to other areas of the valley, the Sierra Nevada foothills, and the coastal regions have attracted a wide range of native and immigrant cultural groups. Evidence for prehistoric patterns of land use is located within the vicinity: however, the remains of major historic land-use along the Sacramento River appear, from the results of limited investigations, to have been obliterated by seasonal flooding, erosion, and channel migration along the Sacramento River. Topography, vegetation, water sources, and the ease of waterway and overland transportation to a much wider geographic region make it likely that the area was heavily utilized throughout prehistoric and early historic times. However, seasonal flooding of the Sacramento River has deposited large amounts of silt on agricultural lands, which has resulted in the covering of archaeological deposits; particularly along the east bank of the river. Given such a landscape, it is almost certain that undocumented archaeological sites, features, and artifacts are present within the project site and the immediate vicinity. As such, encountering such resources during ongoing and future development needs to be addressed if these resources are to be preserved for future generations.

Patterns of historic-era and prehistoric land-use and activities within the project site and the surrounding area have been dictated to a great extent by the nature of the area's geomorphology and the biotic resources that are found in this unique and dynamic setting. The Sacramento River and its associated tributary creeks, while constituting a great attraction for settlement and resulting in the deposition of many cultural remains, has also affected those same sites through heavy erosion and the meandering of river and stream courses over centuries. Consequently, it is not possible to discuss the nature of cultural resources in the area without first examining the nature of the river system itself.

Three Sacramento Valley geomorphic regions (i.e., floodplains and natural levees, flood basins, and low alluvial plains and fans) are located within the project site and the immediate vicinity (see Bryan 1923; Hinds 1952:145–157; Poland and Evenson 1966:239). Prior to the heavy gold mining operations of the 19th and 20th centuries and large-scale reclamation projects, several of the perennial and intermittent streams (e.g., Butte and Big Chico Creeks) were prevented from flowing into the Sacramento River by natural levees that bordered the river. These water courses drained into the valley floor, eventually dispersing in tule marshlands bordering the main river or in the flood basins (Thompson 1961:299; Warner and Hendrix 1985:5.8–5.9 in Bayham and Johnson 1990:20).

It was the rich and diverse floral and faunal species fostered by these marshland environments that attracted Native Americans.

Historic aerial photographs, coupled with sediment analysis of the Sacramento River floodplain, provide evidence of a dynamic system in a state of constant change. The area west of Pine Creek, and the west side of the Sacramento River opposite Mud and Big Chico creeks, has seen numerous changes in the river channel over the last 120 years (Larsen et al. 2002:14–16). Some of these channel shifts resulted in prominent landforms that are visible today. Pine Creek Bend (Dunning Slough), in particular, changed and steadily migrated downstream throughout the late 1800s and well into the 20th century. Between 1870 and 1920, the Jenny Lind Bend, located between Pine and Big Chico creeks, also migrated downstream. During the late 1800s the ever-shifting river channel formed the area known as the Indian Fishery to the west of the current project. Coupled with heavy historic mining and reclamation impacts to the river channel and the surrounding floodplain areas, the constant channel migrations of the Sacramento River and nearby creeks have likely obliterated many historic and prehistoric sites.

CULTURAL SETTING

To place the prehistoric and historic resources of the project area into a broader context, they need to be discussed within a larger cultural framework. The presence of a variety of natural resources, topography, and proximity to important transportation routes made the project area an ideal location for prehistoric and historic settlement. Consequently, although no sites, features or artifacts have been formally recorded within the project site, many such resources are likely to be encountered, although they may be buried under a foot or more of sediments.

Prehistoric Archaeological Context

Archaeological investigations in the general area have been somewhat limited, and while contributing a great deal to the body of knowledge of the prehistory of the region, there are many issues which are poorly understood. The first scientific studies relevant to the region occurred in 1907 when the University of California, Berkeley conducted reconnaissance projects in the Tehama and Red Bluff areas (Nelson 1907). Little else in the way of academic research was conducted until the 1950s when various large-scale water projects were constructed. The River Basin Survey resulted in a considerable body of research prior to the construction of a number of large water projects. One of the most important portions of this study included extensive inventories and excavations of prehistoric sites for the Oroville Dam (Treganza 1954). Treganza also conducted salvage excavations at prehistoric sites prior to the construction of the Redbank Reservoir in nearby Tehama County (Treganza 1954). Investigations by Chartkoff and Chartkoff (1983) at the Patrick Site (4-But-1), to the east of the current project, built upon the prehistoric cultural sequence developed for the Oroville vicinity first proposed by Olsen and Riddell (1963) (based in part of Treganza's 1953 work), which was further updated and expanded by Ritter (1970) and Kowta (1988).

Apart from the more broad-based findings of the work of Treganza, Chartkoff and Chartkoff, Riddell, Olsen, Ritter, and Kowta, locally focused archaeological investigations have occurred in the immediate project vicinity. These include the excavations conducted by Bayham and Johnson (1990) at CA-Gle-105 on the west bank of the Sacramento River. The archaeological remains at this site were interpreted as those of a small summer camp occupied during the Early/Middle Horizon (ca. 3000 years before present [BP]), and again following a hiatus around 2000–2500 BP. Deal (1987), reported on research on the site of CA-But-288, east of the Sacramento River and west of Pine Creek, that revealed evidence for shifting subsistence strategies over time.

Along with numerous cultural resource management studies that have been performed in the general area, the results of these investigations constitute the bulk of what is known regarding early Native American cultural sequences in the region. However, while relatively little may be known about specific variations in early Native American subsistence, technological, and ritual practices, broad patterns of material culture have been documented over large geographic regions in California, including the area surrounding the current project.

The earliest well-documented entry and spread of humans into California occurred at the beginning of the Paleo-Indian Period (12,000–8,000 BP). Social units are thought to have been small and highly mobile. Known sites have been identified within the contexts of ancient pluvial lake shores in the Great Basin and the coastline of California and are evidenced by such characteristic hunting implements as fluted projectile points and flaked stone crescent forms. Prehistoric adaptations over the ensuing centuries have been identified in the archaeological record by numerous researchers working in the area since the early 1900s, as summarized by Fredrickson (1974), Moratto (1984), and White (2003a).

Beardsley (1948) and Lillard et al. (1939) and others conducted numerous studies that form the core of our early understanding of upper Central Valley archaeology. Little has been found archaeologically which dates to the Paleo-Indian or the subsequent Lower Archaic time periods (White 2003a:11–12). The lack of sites from these earlier periods may be due to high sedimentation rates, which have left the earliest sites deeply buried and inaccessible. However, archaeologists have recovered a great deal of data from sites occupied during the Middle Archaic period (5000–3000 BP). During this time, the broad regional patterns of foraging subsistence strategies gave way to more intensive procurement practices. Subsistence economies were more diversified, possibly including the introduction of acorn processing technology. Human populations were growing and occupying more diverse settings. Permanent villages that were occupied throughout the year were established; primarily located along major waterways.

The onset of status distinctions and other indicators of growing sociopolitical complexity mark the Upper Archaic Period (3000–1500 BP). Archaeological evidence suggests exchange systems became more complex and formalized and evidence of regular, sustained trade between groups was seen for the first time (White 2003a: Fig. 4).

Several technological and social changes characterized the Emergent Period (1500–150 BP) when the bow and arrow were introduced, ultimately replacing the dart and atl-atl. Territorial boundaries between groups became well established and were recorded in early historic and ethnographic accounts. It became increasingly common that distinctions in an individual's social status could be linked to acquired wealth. Exchange of goods between groups became more regularized with more goods, including raw materials, entering into the exchange networks. In the latter portion of this period (500–200 BP), exchange relations became highly regularized and sophisticated. The clamshell disk bead became a monetary unit for exchange, and increasing quantities of goods moved greater distances just prior to large-scale European settlement of California (White 2003a:13–14).

Ethnographic Context

Ethnographically, the east bank of the Sacramento River was inhabited primarily by the Maidu (also referred to as the Konkow or the Mechoopda) who controlled extensive territory (Dreyer 1984:41, 43, White 2003a:21). The most extensive documentation of the Maidu was compiled by Dixon (1905), with other works by Hill (1978), Kroeber (1925, 1932), Riddell (1978), and Voegelin (1942).

The name Konkow, derived from the anglicized version of the native term koyo-mkawi, meaning "meadow land," refers to peoples whose territory included sections of the Sacramento Valley floor and portions of the Sierra foothills east of the present-day cities of Chico and Oroville (White 2003a: 21, Fig. 11). Formal delineations of the territory may have included prominent physiographic features and landforms, although any certainty as to the early historic-period boundaries have been lost through decimation of the tribe resulting from disease and the removal of the people from their traditional lands during the 19th century. In general, such boundaries may not have been as hard and fast as reported in ethnographic accounts as extensive trail systems existed within the valley and foothill regions that connected the Konkow with other Maidu groups and tribes throughout northern and central California.

With a few notable exceptions, the lifeways of the Konkow differed little from their neighbors in the valley and in the Sierra foothills to the east. Probably the main difference, other than linguistic variation, occurred in the

spiritual realm as the Konkow adhered to the ritual and belief systems associated with the Kuksu cult involving the impersonation of deity figures (White 2003a:21). Many other groups in the area did not practice these rituals, although the Nisenan and other non-Maiduan central California peoples did (Dixon 1905:322).

Konkow settlement conformed to a "village community" pattern that served as the only formal political structure of the tribe (Kroeber 1925:398). Village communities, which consisted of several closely spaced small settlements and a larger village containing a semi-subterranean earth-covered ceremonial lodge, were autonomous and self-sufficient units (White 2003a:21). Individual communities probably numbered around 200 inhabitants and "owned" or controlled specific territories in which hunting, gathering, and fishing areas were considered common property. The most politically influential man of each community lived in the central village. This head-man acted as an advisor and spokesman for his group, although he possessed little in the way of concrete power. This individual was not selected by members of the village community nor was the position hereditary. Rather, the head-man was chosen by the village shaman with the aid of various messenger spirits who could also remove him as they saw fit (Dixon 1905:223–224).

Konkow economic and subsistence patterns were largely based on a seasonal cycle that involved residence in winter village sites in the valley and summer journeys into the mountains for hunting. In the spring, various types of roots, stems, leaves, seeds, and fruits were gathered in large quantities to be dried for winter consumption (Dixon 1905:187). As with many Native American groups in California, the acorn, gathered from a variety of oak species, formed the staple food of the Konkow diet.

In general, Konkow and Maidu life remained unchanged for generations until 1833, when a disease epidemic, possibly malaria, decimated tribes throughout central California. During his expedition north along the Sacramento River in 1833, John Work noted the decimation of villages which had been observed earlier in December of 1832 (Maloney 1943 and 1944). The Konkow population and cultural systems probably never fully recovered from the effects of the epidemic that was followed by the Gold Rush period starting in 1849. These two factors combined to thoroughly disrupt their social, spiritual, economic, and subsistence patterns to a point that the Konkow and Maidu were quickly reduced to a marginal existence in the region. Most illustrative of the impact these events had on the Konkow and their Nisenan neighbors are population estimates: in 1846, approximately 8,000 people from these groups were recorded. By 1910, that population had been reduced to less than 1,000 (Riddell 1978:386).

Historic Context

A detailed overview of history pertinent to the area can be found in Hood and McGuire (1981). The historic context presented below summarizes this work and includes additional information obtained from other specific historic accounts and documents.

The earliest documented European entry into the region around the project site occurred in 1808. That year, Gabriel Moraga led an expedition that eventually traveled up the Feather River and then proceeded north along the banks of the Sacramento River, possibly to the current location of Butte City. The purpose of Moraga's travels was largely to search for suitable locations for new missions and to further establish Spanish rule in the face of increasing foreign pressure, from the Russians in particular. Thirteen years would pass before another formal exploratory expedition into the region was launched. In 1821, Mexican governor Pablo Vicente de Sola sent Captain Luis Arguello with 55 soldiers to drive out reported American and Russian intruders from the areas north and east of San Francisco. Although Arguello's route is somewhat speculative, it appears he and his party may have eventually followed the Sacramento River north towards the general region located at the confluences of Mud and Big Chico Creeks (Beck and Haase 1974).

Hudson Bay trappers probably visited the project area during the early decades of the 19th century. One such expedition was led by John Work in 1832 and 1833 (Maloney 1943 and 1944). Work's description of the area provides an excellent account of the area prior to Euro-American development. On his return trip north in August

of 1833 he indicates that the weather was excessively hot with no wind. Two beaver and one elk were killed near the confluence of the Sacramento River and Chico Creek, and he indicates that they camped at a location which has subsequently been identified as Pine Creek (Maloney 1944:133 and 144). The next major exploratory or emigrant group to venture into the area was the Charles Wilkes expedition, led by Lieutenant George Emmons. This party led a group of emigrants into California from the Columbia River, passing south along the west bank of the Sacramento River in October of 1841. Lansford W. Hastings (best known for his scouting of the "Hastings Cut-off" in Utah that eventually doomed the Donner Party) and Joseph B. Chiles led an emigrant party into California, through the area in 1843. This was the same year that John Bidwell, who would have a dramatic impact on the area, first viewed the area surrounding Chico Creek.

The first in a series of events that shaped the economic and cultural landscape in the area occurred during the middle 19th century with the formation of Mexican land grants. In 1844 three such grants were issued and led to the establishment of several prominent ranchos. *Rancho de Farwell*, granted to Edward A. Farwell, was located to the south of the current project; *Rancho Arroyo Chico*, which included the land now occupied by the Singh and Nicolas properties, was awarded to William Dickey; and *Rancho Capay* to the west of the project was granted to Josefa Sotao. John Bidwell, who had supervised some gold mining operations for William Dickey, purchased *Rancho Arroyo Chico* in 1849 and by 1852 had 200 to 300 acres under cultivation.

While wheat was the primary crop during the early agricultural period, it was slowly replaced with orchards between 1883 and 1900. The prominence of agriculture in the region and the profitability of large-scale operations were soon reflected in transportation improvements and innovations in the area that continued to be established well into the 20th century. One notable example of the mutually supporting industries can be seen in the operations of David Reavis, who acquired some 12,000 acres of the Farwell Grant and soon had over 7,000 acres sown in wheat in the 1870s. In part to aid in the transportation of goods to and from his property, he established Reavis Ferry, which crossed the Sacramento River just north of Chico Landing. Later river crossings included the Chico Free Bridge that was first erected in 1882. Flooding destroyed the bridge in 1889, but it was quickly rebuilt and subsequent replacements occurred in 1894, 1901, and 1913.

While various ferries and river crossings facilitated local commerce and transportation, the movement of the vast agricultural output of the region to market relied chiefly on river-borne, and eventually railroad transit. By the late 19th century, river navigation contributed to the viability of the vast rancho holdings, and it was during this time that Chico Landing, situated near the confluence of Big Chico Creek and the Sacramento River, became a substantial link in the shipment of agricultural products from the Bidwell and Richard J. Walsh ranches in particular. As competition to serve these and other large ranch and farm enterprises increased, the principal steamboat owners formed the California Steam Navigation Company in 1854, which basically controlled navigation on the river north of Sacramento. By 1913 the company was operating seven steamers and 23 barges, primarily between Chico Landing east of Chico, and San Francisco Bay (McGowan 1961:304–305).

Although railroads were being built in the Central Valley of California during the 1850s and 1860s, rail lines were not built into the vicinity of the project until the early 1870s, when the California and Oregon Railroad, (a subsidiary of the Central Pacific) was extended to Chico in July of 1870, providing a faster and more efficient means of bringing produce and cattle to market (White 2003a:50–51). As the area became more connected by rail to Sacramento, commercial river traffic soon decreased. One of the more notable lines in the area was the Northern Electric Rail, which connected Chico directly with Sacramento. This line ceased to exist as a separate company in 1921 when it was absorbed by the Southern Pacific Railroad, which still operates in the area today as the Union Pacific Railroad.

4.5.2 REGULATORY SETTING

CEQA

Cultural resources in California are protected by a number of federal, state, and local regulations, statutes, and ordinances. Prior to approval of discretionary projects, potentially significant impacts of the project on unique archaeological resources and historical resources must be considered under CEQA (Public Resources Code Sections 21083.2 and 21084.1) and the State CEQA Guidelines (California Code of Regulations Title 14, Section 15064.5). The State CEQA Guidelines define a "historical resource" as "a resource listed or eligible for listing on the California Register of Historical Resources" (CRHR) (Public Resources Code Section 5024.1). A historical resource may be eligible for inclusion on the CRHR if it:

- is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage; or
- is associated with the lives of persons important in our past; or
- embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
- has yielded, or may be likely to yield, information important in prehistory or history.

In addition, the State CEQA Guidelines (Section 15064.5) require consideration of "unique archaeological resources." If an archaeological site does not meet the criteria for inclusion on the CRHR (which would qualify it as an historical resource), but does meet the definition of a unique archeological resource as outlined in the Public Resource Code (Section 21083.2), substantial adverse effects to it may be treated as a significant impact under CEQA. Mitigation treatment options under Public Resources Code Section 21083.2 for significant impacts to unique archaeological resources include a project that preserves such resources in place in an undisturbed state. Other acceptable methods of mitigation under Section 21083.2 include excavation and curation or study in place without excavation and curation (if the study finds that the artifacts would not meet one or more of the criteria for defining a "unique archaeological resource").

Section 15064.5(e) of the State CEQA Guidelines and State law (Health and Safety Code Section 7050) requires that excavation activities be stopped whenever human remains are uncovered and that the county coroner be called in to assess the remains. If the county coroner determines that the remains are those of Native Americans, the Native American Heritage Commission (NAHC) must be contacted within 24 hours. State CEQA Guidelines Section 15064.5(d) and State law directs the lead agency/property owner to consult with the appropriate Native Americans as identified by the NAHC and directs the lead agency (or property owner) to develop an agreement with the Native Americans for the treatment and disposition of the remains.

The State CEQA Guidelines Section 15064.5(b)(3) indicates that where significant impacts to an historical resource occurs, if a project follows the federal *Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings, or the Secretary of the Interior's Standards for Rehabilitation and Guidelines for Rehabilitating Historic Buildings* (1995), the impact shall generally be mitigated to a level of less than significant.

PARK PLAN GOALS AND GUIDELINES FOR CULTURAL RESOURCES

Recorded and unrecorded cultural resources within the Bidwell-Sacramento State Park and in the surrounding areas are an important component of the cultural heritage of the region. These include prehistoric and historic sites, features, and artifacts, and include those linked to the prominent Bidwell family who donated much of the Park's land to the Department for the use and inspiration of the people of California. Preservation and

interpretation of cultural resource features would be crucial in understanding early Native American and historic land use patterns in the vicinity of the Sacramento River.

As part of their commitment to the preservation of archaeological and historic values, the following goal and guidelines provide the basis for management of cultural resources within Bidwell-Sacramento State Park.

Goal ER-2.1: Locate and assess the significance of cultural resources within the Park.

- **Guideline ER-2.1-1:** Develop a Cultural Resource Management Plan (CRMP) for the Park. As part of the development of a CRMP, a comprehensive survey of the Park is necessary to survey, assess, and record known archaeological and historical resources within the Park. In addition, the CRMP will provide recommendations for the protection, preservation, and interpretation of significant cultural resources.

- **Guideline ER-2.1-2:** Perform cultural resource investigations of development sites prior to the construction of facility developments. If significant cultural resources are found, implement protective measures in compliance with federal and state laws and regulations.

- **Guideline ER-2.1-3:** Investigate the presence of cultural resources on nearby properties in collaboration with other stakeholders, where feasible.

4.5.3 ENVIRONMENTAL IMPACTS

CULTURAL RESOURCE INVENTORIES

Numerous sources were contacted and consulted to gather information regarding the existing conditions and cultural resources that may be located within the project area. A records search was conducted at the Northeast Information Center at California State University (CSU), Chico in February 2003, and updated with documents obtained in November 2006. Historic maps that were examined consisted of General Land Office (GLO) plat maps, including *Sacramento Valley* 1844, *Rancho Capay* 1858, *Rancho Arroyo Chico* 1859, and historic Butte County maps dated 1886, 1894, 1901, and 1913.

A small number of cultural resource inventories have been conducted within the vicinity of the project, but have met with only limited success in identifying archaeological resources associated with the prehistoric and early historic eras. Archival research, however, indicates a rich historic relationship between early agriculture, and development within the region and sites, features, and artifacts associated with these periods and activities likely exist within the immediate vicinity.

Inventories conducted thus far have primarily been limited to those associated with transportation, reclamation, and recreation projects. These investigations are summarized in Table 4.5-1. The entire Irvine Finch River Access was inventoried by the Department of Transportation as part of an assessment for a proposed bridge replacement on State Route (SR) 32. Small portions of the Bidwell-Sacramento River State Park Indian Fishery, Pine Creek Landing, and Big Chico Creek subunits were inventoried for various projects (Jones and Stokes 1996, Hood and McGuire 1981, Johnson 1975). These investigations have located four prehistoric sites (CA-But-189, CA-But-191, CA-But-402, CA-But-717) and a historic water transmission facility (CA-But-1352) within 1 mile of the project area.

As part of a large management plan, CSU, Chico conducted surveys of approximately 7,100 acres along the Sacramento River, including 657 acres along the west side of the river opposite the Singh parcel. Within this survey block no sites were discovered; however, five isolated finds, a trailer frame (P-11-625), two basket fish traps (P-11-625), a metasedimentary cobble core tool, a 20th-century building pad, and a piece of 19th-century glass were located (White 2003b).

Table 4.5-1
Previous Cultural Resource Investigations Conducted Within and Near the Project Site

Report	Author / Date	NEIC No.
Cultural Resources Inventory Report for the M&T Ranch/Parrott Pumping Plant and Fish Screen Project, Butte County, California	Jones and Stokes (1996)	B-L-633
No Title	Manning (1983)	B-L-574
Archaeological Reconnaissance of 26 Erosion Sites along the Sacramento River, Chico Landing to Red Bluff, Butte, Glenn, and Tehama counties, California	Johnson (1975)	B-150
Bidwell River Park Project (Chico Landing)	Hood and McGuire (1981)	--
Archaeological Reconnaissance of the Bidwell River Park	Hetherington (1980)	--
Cultural Resource Study for the Bidwell-Sacramento River Restoration Project, Butte County, California	Atchley (2000)	
Cultural Resource Overview and Management Plan	White (2003b)	6867

Source: EDAW 2006

NATIVE AMERICAN CONSULTATION

Project input was solicited from the NAHC, the Mechoopda Indian Tribe of Chico, and chairpersons with the Enterprise and Mooretown Rancherias at Oroville. A review of the Sacred Land Files by the NAHC did not reveal the presence of sensitive resources within the proposed project.

In a phone conversation between EDAW and Arlene Ward with the Mechoopda Indian Tribe of Chico, Ms. Ward expressed concern for the potential presence of subsurface deposits. She requested that a monitor affiliated with the Mechoopda Tribe be present during the removal of tree stumps and during any subsurface excavations associated with facilities development within the Nicolaus and Singh parcels. Further, the Mechoopda would like to see protocols established for the treatment of archaeological deposits that may be discovered during monitoring, and mitigation procedures to be followed in the event that significant subsurface deposits are encountered.

THRESHOLDS OF SIGNIFICANCE

The proposed project would be considered to have a significant effect on cultural/archaeological resources if it would:

- Cause a substantial adverse change in the significance of a historical resource, as defined by State CEQA Guidelines Section15064.5(a);
- Cause damage to or destroy a unique archaeological resource, as defined by State CEQA Guidelines Section 21083.2(g);
- Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature;
- Disturb any human remains, including those interred outside of formal cemeteries (PRC Section 5097.98).

A historical resource may include archaeological sites. Substantial adverse change means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of the historical resources is materially impaired. Material impairment occurs when a project demolishes or materially alters, in an adverse manner, those physical characteristics that convey a resource's historical significance.

If an archaeological resource is neither a unique archaeological resource nor a historical resource, the effects on that resource shall not be considered a significant effect on the environment.

In order to be considered a fossil, a paleontological specimen must be more than 10,000 years old. Generally, rock formations within 8 to 10 feet of the soil surface are composed of deposits that are less than 10,000 years old. Since ground disturbing project activities would take place only within the top foot of soil, potential impacts to paleontological resources are not further addressed in this DEIR.

IMPACT ANALYSIS

IMPACT 4.5-a Potential Disturbances to Undocumented Cultural Resources. *Implementation of the project, including site preparation, planting, and recreation facilities development, may affect currently undiscovered or unrecorded archaeological sites. The possibility of disturbing unrecorded resources is considered a potentially significant impact.*

Background research coupled with field observations indicates the presence of a historic farmstead consisting of four buildings and three isolated prehistoric artifacts on the project site. There is also the potential for the presence of subsurface deposits particularly in the southeast corner of the Nicolaus parcel, where the three isolated finds are associated with a terrace consisting of older alluvium, which appears to be covered with a layer of finer silt deposited during recent and historic flooding episodes. The historic-era farmstead was recommended not eligible for inclusion in the CRHR. In addition, because of their lack of data potential and association, none, of the isolated prehistoric artifacts noted within the project site are considered eligible for CRHR listing (EDAW 2006). However, areas surrounding the Sacramento River were important to Native Americans as evidenced by the large number of habitation sites in the vicinity of the project. Because of this sensitivity, there is a high potential for the presence of subsurface archaeological deposits and human remains, particularly on the old alluvial terrace in the southeast corner of the Nicolaus property, which may be impacted by project-related ground disturbing activities. This impact is considered ***potentially significant***.

IMPACT 4.5-b Potential Disturbances to Undocumented Human Remains. *Currently undiscovered human remains may be uncovered during proposed project activities. The possibility of disturbing human remains is considered a potentially significant impact.*

Activities related to implementation of the proposed project would include orchard removal, discing, seeding, planting, and development of recreational facilities. Many of these activities are standard agricultural practices already in use throughout the study area. Irrigation system modification and expansion would include standard trench and backfill techniques. Because of the proximity to the Sacramento River, and previous investigations in the region which have resulted in the discovery of human remains often associated with Native American habitation locales, there is a high potential for human remains to be uncovered during ground disturbing activities. The potential for buried human remains to be disturbed as a result of proposed project activities is considered a ***potentially significant*** impact.

4.5.4 MITIGATION MEASURES

Mitigation Measure 4.5-a: If unrecorded cultural resources are encountered during project-related ground-disturbing activities, a qualified cultural resources specialist shall be contacted to assess the potential significance of the find.

All excavations shall be monitored by a qualified professional archaeologist. If a discovery of cultural materials (e.g., unusual amounts of shell, animal bone, bottle glass, ceramics, structure/building remains, etc.) is made during project-related construction activities, ground disturbances in the area of the find will be halted within a 100-foot radius of the find, and State Parks staff shall be notified of the discovery. State Parks shall retain a professional archaeologist who, in consultation with the Mechoopda Tribe of Chico, shall determine whether the

resource is potentially significant as per the CRHR and develop appropriate mitigation. Appropriate mitigation may include no action, avoidance of the resource, and potential data recovery.

Implementation of Mitigation Measure 4.5-a would reduce potentially significant impacts resulting from inadvertent damage or destruction of unknown cultural resources during ground disturbing activities to a ***less-than-significant*** level.

Mitigation Measure 4.5-b: Stop potentially damaging work if human remains are uncovered during project-related ground-disturbing activities, assess the significance of the find, and pursue appropriate management.

California law recognizes the need to protect interred human remains, particularly Native American burials and associated items of patrimony, from vandalism and inadvertent destruction. The procedures for the treatment of discovered human remains are contained in California Health and Safety Code Section 7050.5 and Section 7052 and California Public Resources Code Section 5097.

In accordance with the California Health and Safety Code, if human remains are found in any location other than a dedicated cemetery, the California Health and Safety Code requires that excavation is halted in the immediate area. The county coroner shall be notified and is required to examine all discoveries of human remains within 48 hours of receiving notice of a discovery on private or state lands (Section 7050.5[b]). If the coroner determines that the remains are those of a Native American, he or she must contact the NAHC by phone within 24 hours of making that determination (Section 7050.5[c]).

The responsibilities of the NAHC for acting upon notification of a discovery of Native American human remains are identified within the California Public Resources Code (PRC Section 5097.9). The NAHC is responsible for immediately notifying the person or group it believes is the Most Likely Descendant (MLD). With permission of the legal landowner(s), the MLD may visit the site and make recommendations regarding the treatment and disposition of the human remains and any associated grave goods. This should be conducted within 24 hours of their notification by the NAHC (PRC Section 5097.98[a]). If an agreement for treatment of the remains cannot be resolved satisfactorily, any of the parties may request mediation by the NAHC (PRC Section 5097.94[k]). Should mediation fail, the landowner or the landowner's representative must re-inter the remains and associated items with appropriate dignity on the property in a location not subject to further subsurface disturbance (PRC Section 5097.98[b]).

Through agreement on the treatment and disposition of human remains reached between the MLD and the California Department of Parks and Recreation with the assistance of the archaeologist, or through mediation by the NAHC, implementation of Mitigation Measure 4.5-b would reduce potentially significant impacts associated with the discovery of human remains to a ***less-than-significant*** level.

4.6 AIR QUALITY AND CLIMATE CHANGE

Park Plan Guideline AO-3.3-1 states:

> *Consult with applicable air pollution control districts (APCDs) and/or air quality management districts (AQMDs) prior to any major facility development projects in the Park, and implement all rules and regulations as required by these agencies.*

Pursuant to this Guideline, this section includes a description of existing air quality conditions, summary of applicable regulations, and an analysis of potential short-term and long-term air quality impacts of the proposed project. The method of analysis for short-term construction, long-term regional (operational), local mobile source, odor, and toxic air contaminant (TAC) emissions is consistent with the recommendations of the Butte County Air Quality Management District (BCAQMD). The analysis also includes consideration of the potential contribution of the project to global climate change through the production of greenhouse gas emissions (GHGs). In addition, mitigation measures are recommended, as necessary, to reduce significant air quality impacts.

4.6.1 ENVIRONMENTAL SETTING

The project site is located in Butte County, which is within the Northern Sacramento Valley Air Basin (NSVAB). The NSVAB also comprises all of Shasta, Tehama, Glenn, Butte, Colusa, Sutter, and Yuba counties (BCAQMD 2004). The ambient concentrations of air pollutant emissions are determined by the amount of emissions released by pollutant sources and the atmosphere's ability to transport and dilute such emissions. Natural factors which affect transport and dilution include terrain, wind, atmospheric stability, and the presence of sunlight. Therefore, existing air quality conditions in the area are determined by such natural factors as topography, meteorology, and climate, in addition to the amount of emissions released by existing air pollutant sources, as discussed separately below.

TOPOGRAPHY, METEOROLOGY, AND CLIMATE

The NSVAB is bounded on the north and west by the Coastal Mountain Range and on the east by the southern portion of the Cascade Mountain Range and the northern portion of the Sierra Nevada Mountains. These mountain ranges reach heights in excess of 6,000 feet with peaks rising much higher. The mountain ranges provide a substantial physical barrier to locally created pollution as well as pollution that is transported northward on prevailing winds from the Sacramento Metropolitan area. Although a significant area of the NSVAB is 1,000 above feet sea level, the vast majority of its populace lives and works below that elevation. The valley is often subjected to inversion layers that, coupled with geographic barriers and high summer temperatures, create a high potential for air pollution problems (BCAQMD 2004).

Meteorology (weather) and topography play major roles in ozone formation in the NSVAB. When the weather is warm and the winds are light, a vertical downward motion of air and a natural cooling of the earth's surface act together to form an inversion that traps pollutants. Sunlight then causes a chemical reaction between the hydrocarbons and oxides of nitrogen (NO_X) to form ozone. The NSVAB is shaped like an elongated bowl. Temperature inversion layers can clamp a lid on the bowl, allowing air pollution to rise to unhealthy levels. Weather conditions cause air pollution concentrations to fluctuate widely from day to day and season to season.

Topography alone gives the NSVAB great potential for trapping and accumulating air pollutants. The strong inversions typical of NSVAB summers are caused by subsidence, the slow sinking of air causing compress ional warming. The surface inversions typical of winter are formed primarily at night as air is cooled when it comes in contact with the earth's cold surface. These are called radiation inversions. Temperature inversions prevent pollutants from rising and being diluted vertically. Thus, pollutants remain trapped in the layer of air where people breathe. Summer subsidence inversions occur on over 90% of summer days; they persist throughout the day and tend to intensify during the afternoon. Winter radiation inversions occur on over 70% of winter nights,

but are usually destroyed by daytime heating, bringing a rapid improvement in air quality by afternoon. Both types of inversion mechanisms may operate at any time of the year, and in the fall both may occur together to produce the heaviest pollution potential (BCAQMD 2004).

EXISTING AIR QUALITY—CRITERIA AIR POLLUTANTS

Concentrations of the following air pollutants: ozone, carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable and fine particulate matter (PM_{10} and $PM_{2.5}$), and lead are used as indicators of ambient air quality conditions. Because these are the most prevalent air pollutants known to be deleterious to human health and extensive health-effects criteria documents are available, they are commonly referred to as "criteria air pollutants" (CAPs).

A brief description of each criteria air pollutant including source types, health effects, and future trends is provided below along with the most current attainment area designations and monitoring data for the project area.

Ozone

Ozone is a photochemical oxidant, a substance whose oxygen combines chemically with another substance in the presence of sunlight, and the primary component of smog. Ozone is not directly emitted into the air, but is formed through complex chemical reactions between precursor emissions of reactive organic gases (ROG) and NO_X in the presence of sunlight. ROG are volatile organic compounds that are photochemically reactive. ROG emissions result primarily from incomplete combustion and the evaporation of chemical solvents and fuels. NO_X are a group of gaseous compounds of nitrogen and oxygen that results from the combustion of fuels.

Ozone located in the upper atmosphere (stratosphere) acts in a beneficial manner by shielding the earth from harmful ultraviolet radiation that is emitted by the sun. However, ozone located in the lower atmosphere (troposphere) is a major health and environmental concern. Meteorology and terrain play a major role in ozone formation. Generally, low wind speeds or stagnant air coupled with warm temperatures and clear skies provide the optimum conditions for formation. As a result, summer is generally the peak ozone season. Because of the reaction time involved, peak ozone concentrations often occur far downwind of the precursor emissions. Therefore, ozone is a regional pollutant that often affects large areas. In general, ozone concentrations over or near urban and rural areas reflect an interplay of emissions of ozone precursors, transport, meteorology, and atmospheric chemistry (Godish 2004).

The adverse health effects associated with exposure to ozone pertain primarily to the respiratory system. Scientific evidence indicates that ambient levels of ozone affect not only sensitive receptors, such as asthmatics and children, but healthy adults as well. Exposure to ambient levels of ozone ranging from 0.10 to 0.40 parts per million (ppm) for 1 to 2 hours has been found to significantly alter lung functions by increasing respiratory rates and pulmonary resistance, decreasing tidal volumes, and impairing respiratory mechanics. Ambient levels of ozone above 0.12 ppm are linked to symptomatic responses that include such symptoms as throat dryness, chest tightness, headache, and nausea. In addition to the above adverse health effects, evidence also exists relating ozone exposure to an increase in the permeability of respiratory epithelia; such increased permeability leads to an increase in responsiveness of the respiratory system to challenges, and the interference or inhibition of the immune system's ability to defend against infection (Godish 2004). Ground level ozone also damages forests, agricultural crops, and some human-made materials, such as rubber, paint, and plastics.

Carbon Monoxide

CO is a colorless, odorless, and poisonous gas produced by incomplete burning of carbon in fuels, primarily from mobile (transportation) sources. In fact, 77% of the nationwide CO emissions are from mobile sources. The other 23% consists of CO emissions from wood-burning stoves, incinerators, and industrial sources.

CO enters the bloodstream through the lungs by combining with hemoglobin, which normally supplies oxygen to the cells. However, CO combines with hemoglobin much more readily than oxygen does, resulting in a drastic reduction in the amount of oxygen available to the cells. Adverse health effects associated with exposure to CO concentrations include such symptoms as dizziness, headaches, and fatigue. CO exposure is especially harmful to individuals who suffer from cardiovascular and respiratory diseases (EPA 2006a).

The highest concentrations are generally associated with cold stagnant weather conditions that occur during the winter. In contrast to ozone, which tends to be a regional pollutant, CO problems tend to be localized.

Nitrogen Dioxide

NO_2 is a brownish, highly reactive gas that is present in all urban environments. The major human-made sources of NO_2 are combustion devices, such as boilers, gas turbines, and mobile and stationary reciprocating internal combustion engines. Combustion devices emit primarily nitric oxide (NO), which reacts through oxidation in the atmosphere to form NO_2 (EPA 2006a). The combined emissions of NO and NO_2 are referred to as NO_X, which are reported as equivalent NO_2. Because NO_2 is formed and depleted by reactions associated with photochemical smog (ozone), the NO_2 concentration in a particular geographical area may not be representative of the local NO_X emission sources.

Inhalation is the most common route of exposure to NO_2. Because NO_2 has relatively low solubility in water, the principal site of toxicity is in the lower respiratory tract. The severity of the adverse health effects depends primarily on the concentration inhaled rather than the duration of exposure. An individual may experience a variety of acute symptoms, including coughing, difficulty with breathing, vomiting, headache, and eye irritation during or shortly after exposure. After a period of approximately 4 to 12 hours, an exposed individual may experience chemical pneumonitis or pulmonary edema with breathing abnormalities, cough, cyanosis, chest pain, and rapid heartbeat. Severe, symptomatic NO_2 intoxication after acute exposure has been linked on occasion with prolonged respiratory impairment with such symptoms as chronic bronchitis and decreased lung functions.

Sulfur Dioxide

SO_2 is produced by such stationary sources as coal and oil combustion, steel mills, refineries, pulp and paper mills. The major adverse health effects associated with SO_2 exposure pertain to the upper respiratory tract. SO_2 is a respiratory irritant with constriction of the bronchioles occurring with inhalation of SO_2 at 5 ppm or more. On contact with the moist mucous membranes, SO_2 produces sulfurous acid, which is a direct irritant. Concentration rather than duration of the exposure is an important determinant of respiratory effects. Exposure to high SO_2 concentrations may result in edema of the lungs or glottis and respiratory paralysis.

Particulate Matter

Respirable particulate matter with an aerodynamic diameter of 10 micrometers or less is referred to as PM_{10}. PM_{10} consists of particulate matter emitted directly into the air, such as fugitive dust, soot, and smoke from mobile and stationary sources, construction operations, fires and natural windblown dust, and particulate matter formed in the atmosphere by condensation and/or transformation of SO_2 and ROG (EPA 2006a). Fine particulate matter ($PM_{2.5}$) includes a subgroup of smaller particles that have an aerodynamic diameter of 2.5 micrometers or less (ARB 2006a).

The adverse health effects associated with PM_{10} depend on the specific composition of the particulate matter. For example, health effects may be associated with metals, polycyclic aromatic hydrocarbons, and other toxic substances adsorbed onto fine particulate matter, which is referred to as the piggybacking effect, or with fine dust particles of silica or asbestos. Generally, adverse health effects associated with PM_{10} may result from both short-term and long-term exposure to elevated concentrations and may include breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular diseases, alterations to the immune system, carcinogenesis,

and premature death (EPA 2006a). $PM_{2.5}$ poses an increased health risk because the particles can deposit deep in the lungs and may contain substances that are particularly harmful to human health.

Lead

Lead is a metal found naturally in the environment as well as in manufactured products. The major sources of lead emissions have historically been mobile and industrial sources. As a result of the phase-out of leaded gasoline, as discussed in detail below, metal processing is currently the primary source of lead emissions. The highest levels of lead in air are generally found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers.

Twenty years ago, mobile sources were the main contributor to ambient lead concentrations in the air. In the early 1970s, the U.S. Environmental Protection Agency (EPA) set national regulations to gradually reduce the lead content in gasoline. In 1975, unleaded gasoline was introduced for motor vehicles equipped with catalytic converters. EPA banned the use of leaded gasoline in highway vehicles in December 1995 (EPA 2006a).

As a result of EPA's regulatory efforts to remove lead from gasoline, emissions of lead from the transportation sector have declined dramatically (95% between 1980 and 1999), and levels of lead in the air decreased by 94% between 1980 and 1999. Transportation sources, primarily airplanes, now contribute only 13% of lead emissions. A recent National Health and Nutrition Examination Survey reported a 78% decrease in the levels of lead in people's blood between 1976 and 1991. This dramatic decline can be attributed to the move from leaded to unleaded (EPA 2006a).

The decrease in lead emissions and ambient lead concentrations over the past 25 years is California's most dramatic success story. The rapid decrease in lead concentrations can be attributed primarily to phasing out the lead in gasoline. This phase-out began during the 1970s, and subsequent ARB regulations have virtually eliminated all lead from gasoline now sold in California. All areas of the state are currently designated as attainment for the state lead standard (EPA does not designate areas for the national lead standard). Although the ambient lead standards are no longer violated, lead emissions from stationary sources still pose "hot spot" problems in some areas. As a result, ARB identified lead as a TAC.

MONITORING STATION DATA AND ATTAINMENT AREA DESIGNATIONS

Criteria air pollutant concentrations are measured at several monitoring stations in the NSVAB. The monitoring station closest to the proposed project site is located approximately 8 miles east of the Singh and Nicolaus parcels at on Manzanita Avenue in Chico. Table 4.6-1 summarizes the air quality data from these two stations for the most recent 3 years, 2004 through 2006. The data is not necessarily representative of the project site, because of the distance from the monitor to the site and the monitor location was meant to measure the highest urban ozone concentrations in Chico.

Both ARB and EPA use this type of monitoring data to designate areas according to attainment status for criteria air pollutants established by the agencies. The purpose of these designations is to identify those areas with air quality problems and thereby initiate planning efforts for improvement. The three basic designation categories are nonattainment, attainment, and unclassified. Unclassified is used in an area that cannot be classified on the basis of available information as meeting or not meeting the standards. In addition, the California designations include a subcategory of the nonattainment designation, called nonattainment-transitional. The nonattainment-transitional designation is given to nonattainment areas that are progressing and nearing attainment. The most current attainment designations for the Butte County portion of the NSVAB are shown in Table 4.6-2 for each criteria air pollutant.

Table 4.6-1
Summary of Annual Ambient Air Quality Data (2004–2006) — Chico Monitoring Station[1]

	2004	2005	2006
Ozone			
Maximum concentration (1-hr/8-hr, ppm)	0.088/0.073	0.083/0.077	0.090/0.080
Number of days state standard exceeded (1-hr)	0	0	0
Number of days national standard exceeded (1-hr/8-hr)	0/0	0/0	0/0
Nitrogen Dioxide (NO_2)			
Maximum concentration (1-hr, ppm)	0.056	0.048	0.048
Number of days state standard exceeded (1-hr)	0	0	0
Annual Average (ppm)	0.011	0.009	0.009
Fine Particulate Matter ($PM_{2.5}$)			
Maximum concentration ($\mu g/m^3$)	76.3	82.7	76.1
Number of days national standard exceeded (measured[2])	0	1	1
Respirable Particulate Matter (PM_{10})			
Maximum concentration ($\mu g/m^3$)	115.0	76.0	81.0
Number of days state standard exceeded (calculated[2])	5	5	7
Number of days national standard exceeded (calculated[2])	0	0	0

Notes: ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter

[1] Measurements of ozone, NO_2, PM_{10}, and $PM_{2.5}$ are from the Manzanita Avenue Station, Chico, CA

[2] Measured days are those days that an actual measurement was greater than the level of the state daily standard or the national daily standard. Measurements are typically collected every 6 days. Calculated days are the estimated number of days that a measurement would have been greater than the level of the standard had measurements been collected every day. The number of days above the standard is not necessarily the number of violations of the standard for the year.

Sources: ARB 2007b, EPA 2006b.

Table 4.6-2
Ambient Air Quality Standards and Butte County Attainment Status

Pollutant	Averaging Time	California		National Standards [1]		
		Standards [2,3]	Attainment Status [4]	Primary [3,5]	Secondary [3,6]	Attainment Status [7]
Ozone	1-hour	0.09 ppm (180 µg/m^3)	N	-[9]	-	-
	8-hour	0.070 ppm[8] (137 µg/m^3)	–	0.08 ppm (157 µg/m^3)	Same as Primary Standard	N
Carbon Monoxide (CO)	1-hour	20 ppm (23 mg/m^3)	U[11]	35 ppm (40 mg/m^3)	–	U/A
	8-hour	9 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)		
Nitrogen Dioxide (NO_2)[12]	Annual Arithmetic Mean	0.030 ppm (56 µg/m^3)	–	0.053 ppm (100 µg/m^3)	Same as Primary Standard	U/A
	1-hour	0.18 ppm (338 µg/m^3)	A	–		–
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	–	–	0.030 ppm (80 µg/m^3)	–	U
	24-hour	0.04 ppm (105 µg/m^3)	A	0.14 ppm (365 µg/m^3)	–	
	3-hour	–	–	–	0.5 ppm (1300 µg/m^3)	
	1-hour	0.25 ppm (655 µg/m^3)	A	–	–	–
Respirable Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 µg/m^3	N	–[13]	Same as Primary Standard	A
	24-hour	50 µg/m^3		150 µg/m^3		
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 µg/m^3	N	15 µg/m^3	Same as Primary Standard	A
	24-hour	–	–	35 µg/m^3		
Lead[10]	30-day Average	1.5 µg/m^3	A	–	–	–
	Calendar Quarter	–	–	1.5 µg/m^3	Same as Primary Standard	
Sulfates	24-hour	25 µg/m^3	A	**No National Standards**		
Hydrogen Sulfide	1-hour	0.03 ppm (42 µg/m^3)	U			
Vinyl Chloride[10]	24-hour	0.01 ppm (26 µg/m^3)	U/A			

Table 4.6-2
Ambient Air Quality Standards and Butte County Attainment Status

Pollutant	Averaging Time	California		National Standards [1]		
		Standards [2,3]	Attainment Status [4]	Primary [3,5]	Secondary [3,6]	Attainment Status [7]
Visibility-Reducing Particle Matter	8-hour	Extinction coefficient of 0.23 per kilometer — visibility of 10 miles or more (0.07—30 miles or more for Lake Tahoe) because of particles when the relative humidity is less than 70%.	U			

[1] National standards (other than ozone, PM, 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 fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. The PM_{10} 24-hour standard is attained when 99% of the daily concentrations, averaged over 3 years, are equal to or less than the standard. The $PM_{2.5}$ 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact EPA for further clarification and current federal policies.

[2] California standards for ozone, CO (except Lake Tahoe), SO_2 (1- and 24-hour), NO_2, PM, and visibility-reducing particles are values that are not to be exceeded. All others are not to be equaled or exceeded. CAAQS are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations. The California ambient air quality standard for NO_2 was amended on February 22, 2007 to lower the 1-hour standard to 0.18 ppm and establish a new annual standard of 0.030 ppm.

[3] Concentration expressed first in units in which it was promulgated [i.e., parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$)]. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

[4] Unclassified (U): a pollutant is designated unclassified if the data are incomplete and do not support a designation of attainment or nonattainment.
Attainment (A): a pollutant is designated attainment if the state standard for that pollutant was not violated at any site in the area during a 3-year period.
Nonattainment (N): a pollutant is designated nonattainment if there was a least one violation of a state standard for that pollutant in the area.
Nonattainment/Transitional (NT): is a subcategory of the nonattainment designation. An area is designated nonattainment/transitional to signify that the area is close to attaining the standard for that pollutant.

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

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

[7] Nonattainment (N): any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) the national primary or secondary ambient air quality standard for the pollutant.

Attainment (A): any area that meets the national primary or secondary ambient air quality standard for the pollutant.

Unclassifiable (U): any area that cannot be classified on the basis of available information as meeting or not meeting the national primary or secondary ambient air quality standard for the pollutant.

[8] This concentration effective May 17, 2006.

[9] The 1-hour ozone NAAQS was revoked on June 15, 2005.

[10] ARB has identified lead and vinyl chloride as TACs with no threshold of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.

[11] Designation for Butte County; the designation is different for one or more other counties in the NSVAB.

[12] The CAAQS were amended on February 22, 2007, to lower the 1-hour standard to 0.18 ppm and establish a new annual standard of 0.03 ppm. These changes become effective after regulatory changes are submitted and approved by the Office of Administrative Law, expected later this year.

[13] Because of a lack of evidence linking health problems to long-term exposure to coarse particle pollution, EPA revoked the annual PM_{10} standard on September 21, 2006.

Source: BCAQMD 2007a; ARB 2007b

EXISTING AIR QUALITY—GREENHOUSE GASES AND LINKS TO GLOBAL CLIMATE

Change

Various gases in the earth's atmosphere, classified as GHGs, play a critical role in determining the earth's surface temperature. Solar radiation enters the earth's atmosphere from space. A portion of the radiation is absorbed by the earth's surface, and a smaller portion of this radiation is reflected back toward space. This absorbed radiation is then emitted from the earth, not as high-frequency solar radiation, but lower frequency infrared radiation. The frequencies at which bodies emit radiation are proportional to temperature. The earth has a much lower temperature than the sun; therefore, the earth emits lower frequency radiation. Most solar radiation passes through GHGs; however, infrared radiation is absorbed by these gases. As a result, radiation that otherwise would have escaped back into space is instead "trapped," resulting in a warming of the atmosphere. This phenomenon, known as the Greenhouse Effect, is responsible for maintaining a habitable climate on Earth. Without the Greenhouse Effect, Earth would not be able to support life as we know it.

Prominent GHGs contributing to the Greenhouse Effect are carbon dioxide (CO_2), methane (CH_4), ozone, nitrous oxide, hydrofluorocarbons, chlorofluorocarbons, and sulfur hexafluoride. Human-caused emissions of these GHGs in excess of natural ambient concentrations are responsible for intensifying the Greenhouse Effect and have led to a trend of unnatural warming of the earth's climate, known as global climate change or global warming (Ahrens 2003). It is *extremely unlikely* that global climate change of the past 50 years can be explained without the contribution from human activities (Intergovernmental Panel on Climate Change [IPCC] 2007).

Climate change is a global problem. GHGs are global pollutants, unlike CAPs and TACs, which are pollutants of regional and local concern. Whereas pollutants with localized air quality effects have relatively short atmospheric lifetimes (about 1 day), GHGs have long atmospheric lifetimes (1 year to several thousand years). GHGs persist in the atmosphere for long enough time periods to be dispersed around the globe. Although the exact lifetime of any particular GHG molecule is dependent on multiple variables and cannot be pinpointed, it is understood that more CO_2 is emitted into the atmosphere than is sequestered by ocean uptake, vegetation, and other forms of sequestration. Of the total annual human-caused CO_2 emissions, approximately 54% is sequestered through ocean uptake, uptake by northern hemisphere forest regrowth, and other terrestrial sinks within a year, whereas the remaining 46% of human-caused CO_2 emissions remains stored in the atmosphere (Seinfeld and Pandis 1998).

Similarly, impacts of GHGs are borne globally, as opposed to localized air quality effects of CAPs and TACs. The quantity of GHGs that it takes to ultimately result in climate change is not precisely known; suffice to say, the quantity is enormous, and no single project alone would be expected to measurably contribute to a noticeable incremental change in the global average temperature, or to global, local, or micro climate. From the standpoint of CEQA, GHG impacts to global climate change are inherently cumulative.

Feedback Mechanisms and Uncertainty

Many complex mechanisms interact within Earth's energy budget to establish the global average temperature and global and regional climate conditions. For example, increases in atmospheric temperature would lead to increases in ocean temperature. As atmospheric and ocean temperatures increase, sea ice and glaciers are expected to melt, adding more fresh water to the ocean and altering salinity conditions. Both increases in ocean temperature and changes in salinity would be expected to lead to changes in circulation of ocean currents. Changes in current circulation would further alter ocean temperatures and alter terrestrial climates where currents have changed. Several interacting atmospheric, climatic, hydrologic, and terrestrial factors affecting global climate change are described below. These factors result in feedback mechanisms that could potentially increase or decrease the effects of global climate change. There is uncertainty about how some factors may affect global climate change because they have the potential to both intensify and neutralize future climate warming. Examples of these conditions are described below.

Direct and Indirect Aerosol Effects

Aerosols, including particulate matter, reflect sunlight back to space. As air quality goals for particulate matter are met and fewer emissions of particulate matter occur, the cooling effect of aerosols would be reduced, and the Greenhouse Effect would be further intensified. Similarly, aerosols act as cloud condensation nuclei, aiding in cloud formation and increasing cloud lifetime. Under some circumstances (see discussion of the cloud effect below), clouds efficiently reflect solar radiation back to space. With a reduction in emissions of particulate matter, including aerosols, the direct and indirect positive effect of aerosols on clouds would be reduced, potentially further amplifying the Greenhouse Effect.

The Cloud Effect

As global temperature rises, the ability of the air to hold moisture increases, facilitating cloud formation. As stated above, clouds can efficiently reflect solar radiation back to space. If an increase in cloud cover occurs at low or middle altitudes, resulting in clouds with greater liquid water content, such as stratus or cumulus clouds, more radiation would be reflected back to space than under current conditions. This would result in a negative feedback mechanism, in which the increase in cloud cover resulting from global climate change acts to balance the amount of further warming. If clouds form at higher altitudes in the form of cirrus clouds, however, these clouds allow more solar radiation to pass through than they reflect and ultimately act as GHGs themselves. This results in a positive feedback mechanism, in which the side effect of global climate change (an increase in cloud cover) acts to intensify the warming process. Because of the conflicting feedback mechanisms to which increasing cloud cover can contribute, this cloud effect is an area of relatively high uncertainty for scientists when projecting future global climate change conditions.

Other Feedback Mechanisms

As global temperature continues to rise, CH_4 gas trapped in permafrost is expected to be released into the atmosphere. As identified above in the description of CO_2 equivalents, CH_4 is approximately 23 times as efficient a GHG as CO_2; therefore, this release of CH_4 would accelerate and intensify global climate change if current trends continue. Additionally, as the surface area of polar and sea ice continues to diminish, Earth's albedo, or reflectivity, also is anticipated to decrease. More incoming solar radiation likely will be absorbed by the earth rather than be reflected back into space, further intensifying the Greenhouse Effect and associated global climate change. These and other both positive and negative feedback mechanisms are still being studied by the scientific community to better understand their potential effects on global climate change. The specific incremental increase in global average temperature that will result from the interaction of all the pertinent variables has not been pinpointed at this time. Although the amount and rate of increase in global average temperature are uncertain, there is no longer much debate within the scientific community that global climate change is occurring and that human-caused GHG emissions are contributing to this phenomenon.

ATTRIBUTING CLIMATE CHANGE—GREENHOUSE GAS EMISSION SOURCES

Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the industrial/manufacturing, utility, transportation, residential, and agricultural sectors (California Energy Commission [CEC] 2006a). In California, the transportation sector is the largest emitter of GHGs, followed by electricity generation (CEC 2006a). Emissions of CO_2 are byproducts of fossil fuel combustion. CH_4, a highly potent GHG, results from off-gassing (the release of chemicals from nonmetallic substances under ambient or greater pressure conditions) is largely associated with agricultural practices and landfills. CO_2 sinks, or reservoirs, include vegetation and the ocean, which absorb CO_2 through sequestration and dissolution, respectively, two of the most common processes of CO_2 sequestration.

California is the 12th to 16th largest emitter of CO_2 in the world (CEC 2006a). California produced 499 million gross metric tons of CO_2 equivalent (CO_2e) in 2004 (ARB 2007a). CO_2e is a measurement used to account for the

fact that different GHGs have different potential to retain infrared radiation in the atmosphere and contribute to the Greenhouse Effect. This potential, known as the global warming potential (GWP) of a GHG, is dependent on the lifetime, or persistence, of the gas molecule in the atmosphere. For example, as described in Appendix C, "Calculation References," of the General Reporting Protocol of the California Climate Action Registry (CCAR 2007), 1 ton of CH_4 has the same contribution to the Greenhouse Effect as approximately 23 tons of CO_2. Therefore, CH_4 is a much more potent GHG than CO_2. Expressing emissions in CO_2e takes the contributions of all GHG emissions to the Greenhouse Effect and converts them to a single unit equivalent to the effect that would occur if only CO_2 were being emitted.

Combustion of fossil fuel in the transportation sector was the single largest source of California's GHG emissions in 2004, accounting for 40.7% of total GHG emissions in the state (CEC 2006a). This sector was followed by the electric power sector (including both in-state and out-of-state sources) (22.2%) and the industrial sector (20.5%) (CEC 2006a).

ADAPTATION TO CLIMATE CHANGE

According to the IPCC, which was established in 1988 by the World Meteorological Organization and the United Nations Environment Programme, global average temperature is expected to increase by 3–7°F by the end of the century, depending on future GHG emission scenarios (IPCC 2007). Resource areas other than air quality and atmospheric temperature could be indirectly affected by the accumulation of GHG emissions. For example, an increase in the global average temperature is expected to result in a decreased volume of precipitation falling as snow in California and an overall reduction in snowpack in the Sierra Nevada. Snowpack in the Sierra Nevada provides both water supply (runoff) and storage (within the snowpack before melting), which is a major source of supply for the state (including the project site). According to the California Energy Commission (2006b), the snowpack portion of the water supply could potentially decline by 30–90% by the end of the 21st century. A study cited in a report by the California Department of Water Resources (DWR) projects that approximately 50% of the statewide snowpack will be lost by the end of the century (Knowles and Cayan 2002). Although current forecasts are uncertain, it is evident that this phenomenon could lead to significant challenges in securing an adequate water supply for a growing population. An increase in precipitation falling as rain rather than snow also could lead to increased potential for floods because water that would normally be held in the Sierra Nevada until spring could flow into the Central Valley concurrently with winter storm events. This scenario would place more pressure on California's levee/flood control system (DWR 2006).

Another outcome of global climate change is sea level rise. Sea level rose approximately 7 inches during the last century (CEC 2006b), and it is predicted to rise an additional 7–22 inches by 2100, depending on the future levels of GHG emissions (IPCC 2007). If this occurs, resultant effects could include increased coastal flooding, saltwater intrusion (especially a concern in the low-lying Sacramento–San Joaquin River Delta, where pumps delivering potable water could be threatened), and disruption of wetlands (CEC 2006b). As the existing climate throughout California changes over time, the ranges of various plant and wildlife species could shift or be reduced, depending on the favored temperature and moisture regimes of each species. In the worst cases, some species would become extinct or be extirpated from the state if suitable conditions are no longer available.

The project site is situated approximately 100 to 150 feet above mean sea level and, thus, would not be directly affected by the potential sea level rise predicted to occur over the next 100 years. However, the project area could experience increased flooding and associated displacement of residents and businesses due to rising sea levels.

4.6.2 REGULATORY SETTING

Air quality within Butte County is regulated by EPA, ARB, and BCAQMD. Each of these agencies develops rules, regulations, policies, and/or goals to comply with applicable legislation. Although EPA regulations may not be superseded, both state and local regulations may be more stringent.

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

U.S. Environmental Protection Agency

At the federal level, EPA has been charged with implementing national air quality programs. EPA's air quality mandates are drawn primarily from the federal Clean Air Act (CAA), which was enacted in 1970. The most recent major amendments made by Congress were in 1990.

The CAA required EPA to establish national ambient air quality standards (NAAQS). As shown in Table 4.6-2, EPA has established primary and secondary NAAQS for the following criteria air pollutants: ozone, CO, NO_2, SO2, PM_{10}, $PM_{2.5}$ and lead. The primary standards protect the public health and the secondary standards protect public welfare. The CAA also required each state to prepare an air quality control plan referred to as a State Implementation Plan (SIP). The federal Clean Air Act Amendments of 1990 (CAAA) added requirements for states with nonattainment areas to revise their SIPs to incorporate additional control measures to reduce air pollution. The SIP is periodically modified to reflect the latest emissions inventories, planning documents, and rules and regulations of the air basins as reported by their jurisdictional agencies. EPA has responsibility to review all state SIPs to determine conformation to the mandates of the CAA, and the amendments thereof, and determine if implementation will achieve air quality goals. If EPA determines a SIP to be inadequate, a Federal Implementation Plan may be prepared for the nonattainment area that imposes additional control measures. Failure to submit an approvable SIP or to implement the plan within the mandated timeframe may result in sanctions being applied to transportation funding and stationary air pollution sources in the air basin.

In April 2007 the Supreme Court of the United States ruled that CO_2 is an air pollutant as defined under the CAA, and that EPA has the authority to regulate emissions of GHGs. However, there are no federal regulations or policies regarding GHG emissions applicable to the proposed project.

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

California Air Resources Board

ARB is the agency responsible for coordination and oversight of state and local air pollution control programs in California and for implementing the California Clean Air Act (CCAA). The CCAA, which was adopted in 1988, required ARB to establish California ambient air quality standards (CAAQS) (Table 4.6-2). ARB has established CAAQS for sulfates, hydrogen sulfide, vinyl chloride, visibility-reducing particulate matter, and the above mentioned criteria air pollutants. In most cases the CAAQS are more stringent than the NAAQS. Differences in the standards are generally explained by the health effects studies considered during the standard setting process and the interpretation of the studies. In addition, the CAAQS incorporate a margin of safety to protect sensitive individuals.

The CCAA requires that all local air districts in the state endeavor to achieve and maintain the CAAQS by the earliest practical date. The act specifies that local air districts should focus particular attention on reducing the emissions from transportation and areawide emission sources, and provides districts with the authority to regulate indirect sources.

Other ARB responsibilities include, but are not limited to, overseeing local air district compliance with California and federal laws, approving local air quality plans, submitting SIPs to EPA, monitoring air quality, determining and updating area designations and maps, and setting emissions standards for new mobile sources, consumer products, small utility engines, off-road vehicles, and fuels. There are 15 nonattainment areas for the national ozone standard and two nonattainment areas for the $PM_{2.5}$ standard. The Ozone SIP and $PM_{2.5}$ SIP must be adopted and sent to EPA by June 2007 and April 2008, respectively. The SIP must show how each area will attain the federal standards. To do this, the SIP will identify the amount of pollution emissions that must be reduced in each area to meet the standard and the emission controls needed to reduce the necessary emissions.

ARB and local air pollution control districts are currently developing plans for meeting new national air quality standards for ozone and $PM_{2.5}$. The Draft Statewide Air Quality Plan was released in April 2007 (ARB 2007).

Airborne Toxic Control Measures (ATCM) to Limit Diesel-Fueled Commercial Motor Vehicle Idling

As part of its diesel risk reduction plan, ARB has developed an air toxic control measure that limits stationary idling by diesel-fueled commercial trucks to 5 minutes (13 CCR Chapter 10 Section 2485).

Assembly Bill 1493

In 2002, then-Governor Gray Davis signed Assembly Bill (AB) 1493. AB 1493 requires that ARB develop and adopt, by January 1, 2005, regulations that achieve "the maximum feasible reduction of GHGs emitted by passenger vehicles and light-duty trucks and other vehicles determined by ARB to be vehicles whose primary use is noncommercial personal transportation in the state."

To meet the requirements of AB 1493, in 2004 ARB approved amendments to the California Code of Regulations (CCR) adding GHG emissions standards to California's existing standards for motor vehicle emissions. Amendments to CCR Title 13, Sections 1900 and 1961 (13 CCR 1900, 1961), and adoption of Section 1961.1 (13 CCR 1961.1) require automobile manufacturers to meet fleet-average GHG emissions limits for all passenger cars, light-duty trucks within various weight criteria, and medium-duty passenger vehicle weight classes (i.e., any medium-duty vehicle with a gross vehicle weight rating less than 10,000 pounds that is designed primarily for the transportation of persons), beginning with the 2009 model year. Emissions limits are reduced further in each model year through 2016. Emissions requirements adopted as part of 13 CCR 1961.1 are shown in Table 4.6-3. For passenger cars and light-duty trucks with a loaded vehicle weight (LVW) of 3,750 pounds or less, the GHG emission limits for the 2016 model year are approximately 37% lower than the limits for the first year of the regulations, the 2009 model year. For light-duty trucks with LVW of 3,751 pounds to gross vehicle weight (GVW) of 8,500 pounds, as well as medium-duty passenger vehicles, GHG emissions are reduced approximately 24% between 2009 and 2016.

Table 4.6-3
Fleet-Average Greenhouse Gas Exhaust Emission Limits Included in CCR 13 1961.1

Vehicle Model Year	Fleet-Average Greenhouse Gas Emissions (carbon dioxide equivalents in grams per mile)	
	Light-Duty Trucks 0–3,750 Pounds LVW and Passenger Cars	Light-Duty Trucks 3,751 Pounds LVW to 8,500 Pounds GVW and Medium-Duty Passenger Vehicles*
2009	323	439
2010	301	420
2011	267	390
2012	233	361
2013	227	355
2014	222	350
2015	213	341
2016	205	332

Notes:
GVW = gross vehicle weight.
LVW = loaded vehicle weight.
* Specific characteristics of passenger cars, light-duty trucks, and medium-duty passenger vehicles are provided in Title 13, Section 1900 of the California Code of Regulations as amended to comply with Assembly Bill 1493.
Source: California Code of Regulations, Title 13, Section 1961.1

In December 2004, a group of car dealerships, automobile manufacturers, and trade groups representing automobile manufacturers filed suit against ARB to prevent enforcement of 13 CCR Sections 1900 and 1961 as amended by AB 1493 and 13 CCR 1961.1 (*Central Valley Chrysler-Jeep et al. v. Catherine E. Witherspoon, in Her Official Capacity as Executive Director of the California Air Resources Board, et al.*). The suit, still in process in the U.S. District Court for the Eastern District of California, contends that California's implementation of regulations that, in effect, regulate vehicle fuel economy violates various federal laws, regulations, and policies. To date, the suit has not been settled, and the judge has issued an injunction stating that ARB cannot enforce the regulations in question before receiving appropriate authorization from EPA.

In January 2007, the judge hearing the case accepted a request from the State Attorney General's office that the trial be postponed until a decision is reached by the U.S. Supreme Court on a separate case addressing GHGs. In the Supreme Court case, *Massachusetts, et al., v. Environmental Protection Agency, et al.*, the primary issue in question was whether the federal Clean Air Act (CAA) provides authority for EPA to regulate CO_2 emissions. EPA contended that the CAA does not authorize regulation of CO_2 emissions, whereas Massachusetts and 10 other states, including California, sued EPA to begin regulating CO_2. The U.S. Supreme Court ruled on April 2, 2007, that GHGs are "air pollutants" as defined under the federal Clean Air Act and EPA is granted authority to regulate CO_2 (*Massachusetts v. U.S. Environmental Protection Agency* [2007] 549 U.S. 05-1120). After this decision, the U.S. District Court for the Eastern District of California was then willing to hear arguments by automobile manufacturers about the legality of AB 1493. On December 12, 2007, the Court rejected the automakers claim and ruled that if California receives appropriate authorization from EPA (the last remaining factor in enforcing the standard), these regulations would not be consistent with federal law.

Since the request was made in 2005, EPA has failed to act on granting California authorization to implement the standards. EPA rejected the California's request for a waiver in December 2007 and Governor Schwarzenegger and Attorney General Brown have filed suit against the EPA for this decision.

Executive Order S-3-05

Executive Order S-3-05, which was signed by Governor Schwarzenegger in 2005, proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra's snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the Executive Order established total GHG emission targets. Specifically, emissions are to be reduced to the 2000 level by 2010, the 1990 level by 2020, and to 80% below the 1990 level by 2050.

The Executive Order directed the Secretary of the California Environmental Protection Agency (CalEPA) to coordinate a multi-agency effort to reduce GHG emissions to the target levels. The Secretary will also submit biannual reports to the governor and state legislature describing: (1) progress made toward reaching the emission targets; (2) impacts of global warming on California's resources; and (3) mitigation and adaptation plans to combat these impacts. To comply with the Executive Order, the Secretary of the CalEPA created the California Climate Action Team (CCAT) made up of members from various state agencies and commission. CAT released its first report in March 2006. The report proposed to achieve the targets by building on voluntary actions of California businesses, local government and community actions, as well as through state incentive and regulatory programs.

Assembly Bill 32, the California Climate Solutions Act of 2006

In September 2006, Governor Arnold Schwarzenegger signed AB 32, the California Climate Solutions Act of 2006. AB 32 establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and a cap on statewide GHG emissions. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by 2020. This reduction will be accomplished through an enforceable statewide cap on GHG emissions that will be phased in starting in 2012. To effectively implement the cap, AB 32 directs ARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies

that regulations adopted in response to AB 1493 should be used to address GHG emissions from vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then ARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

AB 32 requires that ARB adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrives at the cap; institute a schedule to meet the emissions cap; and develop tracking, reporting, and enforcement mechanisms to ensure that the state achieves the reductions in GHG emissions necessary to meet the cap. AB 32 also includes guidance to institute emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affected by the reductions.

AB 32 does not explicitly apply to emissions from land development, though emissions associated with land development projects are closely connected to the utilities, transportation, and commercial end-use sectors. Further, because AB 32 imposes a statewide emissions cap, land development-related emissions will ultimately factor in to considerations of GHG emissions in the state.

Senate Bills 1771 and 527 and the California Climate Action Registry

The California Climate Action Registry (CCAR) was established in 2001 by Senate Bills 1771 and 527 as a nonprofit voluntary registry for GHG emissions. The purpose of CCAR is to help companies and organizations with operations in the state to establish GHG emissions baselines against which any future GHG emissions reduction requirements may be applied. CCAR has developed a general protocol and additional industry-specific protocols that provide guidance on how to inventory GHG emissions for participation in the registry.

Senate Bill 1368

SB 1368 is the companion bill of AB 32 and was signed by Governor Schwarzenegger in September 2006. SB 1368 requires the California Public Utilities Commission (PUC) to establish a GHG emission performance standard for baseload generation from investor owned utilities by February 1, 2007. The California Energy Commission (CEC) must establish a similar standard for local publicly owned utilities by June 30, 2007. These standards cannot exceed the GHG emission rate from a baseload combined-cycle natural gas fired plant. The legislation further requires that all electricity provided to California, including imported electricity, must be generated from plants that meet the standards set by the PUC and CEC.

Senate Bill 97

Senate Bill (SB) 97, signed August 2007, acknowledges that climate change is a prominent environmental issue that requires analysis under CEQA. This bill directs the State Office of Planning and Research (OPR) to prepare, develop, and transmit to the Resources Agency guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions, as required by CEQA by July 1, 2009. The Resources Agency is required to certify or adopt those guidelines by January 1, 2010. This bill also removes inadequate CEQA analysis of effects of GHG emissions from projects (retroactive and future) funded by the Highway Safety, Traffic Reduction, Air Quality and Port Security Bond Act of 2006, or the Disaster Preparedness and Flood Protection Bond Act of 2006 (Proposition 1B or 1E) as a legitimate cause of action. This provision will be repealed on January 1, 2010, wherein inadequate CEQA analysis for those projects could then become a legitimate cause of action. This bill would only protect a handful of public agencies from CEQA challenges on certain types of projects for a few years time.

LOCAL PLANS, POLICIES, REGULATIONS, AND ORDINANCES

Butte County Air Quality Management District

BCAQMD is the primary local agency responsible for protecting the people and the environment of Butte County from the effects of air pollution. BCAQMD is responsible for adopting rules that limit pollution, issuing permits

to ensure compliance, and inspecting pollution sources. BCAQMD also monitors air quality in the county and prepares plans to demonstrate how compliance with state and federal standards would be attained and maintained.

Air Quality Plans

Federal and State air quality laws also require regions designated as nonattainment to prepare plans that demonstrate how the region will attain the pollutant standard. Air quality planning in the Northern Sacramento Valley Air Basin has been undertaken on a joint basis by the air districts in seven counties, including Butte County. The current plan, the 2003 Air Quality Attainment Plan, is an update of plans prepared in 1994, 1997, and 2000. The purpose of the plan is to achieve and maintain healthful air quality throughout the air basin. The 2003 Air Quality Attainment Plan addresses the progress made in implementing the 2000 plan and proposes modifications to the strategies necessary to attain the California ambient air quality standard for the 1-hour ozone standard at the earliest practicable date. BCAQMD has current air quality plans for ozone and PM_{10}.

Fugitive Dust Mitigation Measures

For all dust-generating activities, BCAQMD requires implementation of all applicable fugitive dust control measures, as listed in its Compliance Advisory Bulletin (BCAQMD 2007b), for projects that emit fugitive dust during land development activities.

General Prohibitions and Exemptions on Open Burning (Rule 300)

BCAQMD Rule 300 prohibits the use of outdoor open fires. Part 2.10 of the rule exempts open outdoor fires used for cooking food for human beings from the burn prohibition rule.

"Don't Light Tonight" Program

"Don't Light Tonight" is a voluntary program during the fall and winter in which BCAQMD asks residents not to use their woodstoves and fireplaces when air pollution approaches unhealthy levels (BCAQMD 2007c). The program is aimed at keeping pollution levels of particulate matter below the health-based standards. The season begins in mid-November and extends through February.

Butte County Fire Rescue/California Department of Forestry and Fire Protection

The responsible fire protection agency for the unincorporated areas of Butte County is Butte County Fire Rescue/California Department of Forestry and Fire Protection (~~Cal Fire~~CAL FIRE) (Butte County Fire Rescue 2007). ~~Cal Fire~~CAL FIRE imposes a burn ban during the wildfire season, which typically begins around July 1 and extends through October 31. Burn-ban periods established by ~~Cal Fire~~CAL FIRE apply to all vegetative and wood burning, including campfires and other burning activities on state land inside Butte County, with no exceptions made by on BCAQMD Rule 300, part 2.10 (Williams, pers. comm., 2007). Information about burn bans imposed by ~~Cal Fire~~CAL FIRE is posted on BCAQMD's web site as a public service.

Butte County General Plan

There is no air quality element in the existing Butte County General Plan. Butte County is currently developing a draft Air Quality Element for its ongoing update of the County General Plan; however, the draft Air Quality Element has not yet been approved by the County Board of Supervisors and, therefore, is not available to the public.

4.6.3 ENVIRONMENTAL IMPACTS

METHOD OF ANALYSIS

Emissions of short-term construction-related and long-term operation-related (i.e., regional and local) criteria air pollutants and precursors, odors, and TACs were assessed in accordance with the *Indirect Source Review Guidelines* published by BCAQMD (BCAQMD 1997) and consultation with BCAQMD staff.

Project-generated, restoration- and construction-related emissions of criteria air pollutants (e.g., PM_{10}) and precursors (i.e., ROG and NO_X) were assessed in accordance with BCAQMD-recommended methods. Where quantification was required, emissions were modeled using the URBEMIS 2007 Version 9.2.2 computer model (ARB 2007e). Modeled restoration- and construction-related emissions were compared with applicable BCAQMD action levels to determine whether mitigation would be required.

Project-generated, operation-related (i.e., regional) emissions of criteria air pollutants and precursors (e.g., mobile- and area-sources) were also quantified using the URBEMIS 2007 Version 9.2.2 computer model (ARB 2007e). Modeling was based on project-specific data (e.g., size and type of proposed uses) and assumptions about vehicle trips associated with the proposed project, as outlined in Appendix F.

At this time, BCAQMD has not adopted a methodology for analyzing short-term construction-related emissions of TACs. Therefore, restoration- and construction-related emissions of TACs were assessed in a qualitative manner.

To date, BCAQMD has not adopted a method for evaluating impacts associated with emissions of $PM_{2.5}$. However, because project-generated, construction- and operation-related emissions of $PM_{2.5}$, by definition, would be a subset of PM_{10} emissions, BCAQMD-recommended methodologies and mitigation measures for PM_{10} would also be relevant to emissions of $PM_{2.5}$.

Project-generated emissions of GHGs would predominantly be in the form of CO_2. While emissions of other GHGs, such as methane, are important with respect to global climate change, the project is not expected to emit significant quantities of GHGs other than CO_2. The reason for this conclusion is that most emissions from the project are associated with campfire burning and vehicular emissions. Though vehicles also emit small quantities of N_20 and CH_4, the primary GHG emitted during fuel combustion is CO_2. Thus, project-generated emissions of CO_2 were used as a proxy for total emissions GHGs. Operational CO_2 emissions were quantified using the URBEMIS 2007 Version 9.2.2 computer model (ARB 2007e). Indirect emissions of CO_2 associated with electricity consumption were addressed in a qualitative manner.

THRESHOLDS OF SIGNIFICANCE

Based on Appendix G of the State CEQA Guidelines, an air quality impact is considered significant if implementation of the proposed project would do any of the following:

- conflict with or obstruct implementation of the applicable air quality plan,
- violate any air quality standard or contribute substantially to an existing or projected air quality violation,
- result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable NAAQS or CAAQS (including releasing emissions which exceed quantitative thresholds for ozone precursors),
- expose sensitive receptors to substantial pollutant concentrations, or
- create objectionable odors affecting a substantial number or people.

As stated in Appendix G, the significance of criteria established by the applicable air quality management or air pollution control district may be relied upon to make the above determinations. BCAQMD's *Indirect Source Review Guidelines* (BCAQMD 1997) include tiered "action-levels" for recommending whether standard and/or best available mitigation measures should be implemented. The action-level thresholds are consistent with the New Source Review requirements for permitting stationary sources that have been adopted by BCAQMD, as well as other air quality management districts in the NSVAB. The action-level thresholds illustrate the extent of indirect source impacts resulting from projects, and are a basis for determining the need to apply mitigation. They are intended for use as a guide rather than strict, absolute values. The three action levels and associated mitigation measures are summarized below:

- Level A: Indirect sources which have the potential to emit less than 25 pounds per day (lb/day) of ROG or NO_X, or less than 80 lb/day of PM_{10}, would be subject to the recommended list of standard mitigation measure.

- Level B: Indirect sources which have the potential to emit 25 lb/day of ROG or NO_X, or 80 lb/day of PM_{10}, or any nonattainment criteria pollutant would select as many supplemental mitigation measures as are feasible, in addition to the recommended list of standard mitigation measures.

- Level C: Indirect sources which have the potential to emit 137 lb/day or greater (25 tons per year) of ROG or NO_X, PM_{10}, or any nonattainment criteria pollutant would select as many supplemental mitigation measures as are feasible, in addition to the recommended list of standard mitigation measures. Depending on factors specific to the project, an environmental impact report may also be necessary under CEQA.

Thus, a project would have a significant impact on air quality if it would generate emissions that exceed any of the above action levels and does not incorporate all applicable BCAQMD-recommended mitigation, or if a project generates emissions that exceed the Level C action levels despite implementation of all feasible mitigation. In all cases, developers would be required to coordinate with the Planning Agencies to identify feasible mitigation measures.

In addition, the following thresholds of significance have been used to determine whether implementation of the proposed project would result in significant impacts with respect to global climate change. A global climate change impact is considered significant if implementation of the proposed project under consideration would do any of the following:

- Conflict with or obstruct state or local policies or ordinances established for the purpose of reducing GHG emissions, or

- Result in a considerable net increase in GHGs.

With regard to emissions of GHGs, no air district in California, including the BCAQMD, has identified a significance threshold for analyzing project-generated emissions or a methodology for analyzing air quality impacts related to global warming. Nonetheless, by adoption of AB 32, California has identified that global climate change is a serious environmental issue, and has identified GHG reduction goals.

To meet AB 32 goals, California as a whole will ultimately need to generate substantially less GHG than current levels. It is recognized, however, that for most projects there is no simple metric available to determine if a single project would substantially increase or decrease overall emission levels of GHGs.

While AB 32 focuses on stationary sources of emissions, the primary objective of AB 32 is to reduce California's contribution to global warming by reducing California's total annual production emissions. The impact that emissions of GHGs have on global climate change is not dependent on whether they were generated by stationary, mobile, or area sources; or whether they were generated in one region or another. Thus, the net change in total

levels of GHGs generated by a project or activity is the best metric for determining whether the proposed project would contribute to global warming.

The effect of GHG emissions as they relate to global climate change is inherently a cumulative impact issue. While the emissions of one single project will not cause global climate change, GHG emissions from multiple projects throughout the world could result in a cumulative impact with respect to global climate change. In the case of the proposed project, if the size of the increase in emissions from the project is considered to be substantial, then the impact of the project would be cumulatively considerable.

4.6.4 IMPACT ANALYSIS

IMPACT 4.6-a **Generation of Short-Term Restoration- and Construction-Related Emissions of Criteria Air Pollutants and Precursors.** *Project-generated, restoration-related emissions levels of criteria air pollutants and precursors would not be substantially different from those currently generated by existing on-site orchard operations. However, emissions of ROG and PM_{10} associated with the construction of the campground and ~~new~~ relocation of the park headquarters would exceed associated BCAQMD trigger levels for incorporating applicable recommended emission reduction measures. Because applicable BCAQMD-recommended mitigation measures are not currently incorporated into the project description, this impact would be significant.*

The proposed project would include the restoration of approximately ~~150~~ 156 acres of agricultural land to native riparian habitat, new campgrounds, day use facilities, and conversion of existing farm buildings on the Nicolaus parcel to the new headquarters of BSRSP. Habitat restoration would occur over an approximate 4-year period and include the removal of orchard trees with heavy equipment, discing of soils, irrigation system maintenance, spraying of herbicides for weed control, hauling of supplies to the site, and commute trips by restoration workers. Project-generated, restoration-related activities, and their associated emissions levels, would be not be substantially different from those that currently occur from existing on-site operations of walnut and almond orchards. For example, discing of soils performed before the planting of native species during restoration would generate levels of fugitive PM_{10} dust emissions similar to those from the activity of "clean-tilling" the orchard floor (i.e., discing, dragging, and rolling) before mechanical harvesting of the orchard trees. In addition, because restoration activities would involve equipment similar to those used under existing orchard maintenance, project-generated exhaust emissions of ozone precursors, ROG and NO_X, would not substantially differ from those that currently occur on-site.

However, short-term emissions would also be generated by construction of the campground and conversion of the existing farm buildings on the Nicolaus parcel to the new park headquarters. Construction of the proposed project would temporarily generate emissions of ROG, NO_X, and PM_{10} from site grading and excavation; motor vehicle exhaust associated with construction equipment, employee commute trips, and material transport; application of architectural coatings; paving; and other construction operations. Site grading would generally occur in the first phase of construction before other activities begin. Other construction activities, such as paving, building construction, and application of architectural coatings, would then follow. No soil would be imported or removed from the site, though removed orchard trees may be hauled to an off-site location. New emissions associated with these construction activities were estimated using the ARB-approved URBEMIS 2007 Version 9.2.2 computer program (ARB 2007e). URBEMIS is designed to model construction emissions for land use development projects and allows for the input of specific project information. ~~It is~~The model assumed that construction would begin in the spring of 2008 and would be completed in approximately three months. The estimation of daily construction emissions is presented in Table 4.6-4.

The BCAQMD has established tiered "action-levels" for recommending whether standard and/or best available mitigation measures should be implemented. Various mitigation measures are recommended for proposed projects based whether they exceed Level A, Level B, or Level C Action Triggers. As shown in Table 4.6-4, the maximum daily ROG emissions during project construction would not exceed BCAQMD's Level B trigger level for ROG of

Table 4.6-4
Summary of Modeled Project-Generated, Construction-Related Emissions of Criteria Air Pollutants and Precursors

Source	Emissions (lb/day) [1]			
	ROG	NO_X	PM_{10}	$PM_{2.5}$ [2]
Phase 1: Grading3				
Fugitive Dust	—	—	120.0	25.1
Off-Road Diesel Exhaust	4.6	37.7	2.0	1.9
Worker Trips	0.1	0.1	0.0	0.0
Subtotal Unmitigated	4.7	37.9	122.0	26.9
Phase 2: Paving				
Off-Gas Emissions	2.1	0.0	0.0	0.0
Off-Road Diesel Exhaust	2.8	16.4	1.4	1.3
On-Road Diesel Exhaust	0.5	7.4	0.3	0.3
Worker Trips	0.1	0.2	0.0	0.0
Subtotal Unmitigated	5.5	24.0	1.8	1.6
Phase 3: Building Construction				
Off-Road Diesel Exhaust	4.1	18.2	1.3	1.2
Vendor Trips	0.0	0.1	0.0	0.0
Worker Trips	3.0	5.8	0.7	0.4
Subtotal Unmitigated	7.1	24.2	2.0	1.6
Phase 4: Architectural Coatings				
Off-Gas Emissions	9.7	0.0	0.0	0.0
Worker Trips	0.0	0.0	0.0	0.0
Subtotal Unmitigated	9.7	0.0	0.0	0.0
Maximum Daily Emissions, Unmitigated	**9.7**	**37.9**	**122.0**	**26.9**

Notes: See Appendix F for detailed assumptions, input parameters, and modeling results.

[1] All emission estimates assume a worst-case scenario in which ~~that~~ construction of the campgrounds and ~~new~~ relocation of the park headquarters would occur simultaneously. However, it is expected that these construction activities would occur at separate times.

[2] Estimated $PM_{2.5}$ emissions are shown for informational purposes only. BCAQMD has not identified mass emissions thresholds for emissions of $PM_{2.5}$.

[3] Additional emissions would be generated if removed orchard trees are hauled to an off-site location such as the wood waste-to-energy power facility operated by Pacific Oroville Power, Inc. in conjunction with NorCal Waste Systems in Oroville, CA. These emissions would not be substantial because the hauling would be performed by on-road haul trucks and the site is relatively close proximity to the Oroville facility.

Sources: Modeling performed by EDAW 2007.

25 lb/day. However, the maximum daily NO_X emissions of 37.9 lb/day, which would occur during site grading, would exceed the Level B trigger level for NO_X of 25 lb/day. Due to this exceedance, BCAQMD recommends implementation of all standard and best available mitigation measures applicable to the project. Additionally, grading activities associated with building construction would emit approximately 122.0 lb/day of PM_{10}, which exceeds BCAQMD's Level B trigger level for PM_{10} of 25 lb/day, as shown in Table 4.6-4, and additional PM_{10} fugitive dust would also be generated by earth disturbance during restoration activities. For all dust-generating activities, BCAQMD requires implementation of all applicable fugitive dust control measures, as listed in its Compliance Advisory Bulletin (BCAQMD 2007b), for projects that emit fugitive dust during land development

activities. Without implementation of all applicable BCAQMD-recommended mitigation measures during site restoration and construction of the campgrounds and ~~new~~ relocation of the park headquarters, project emissions would be considered a **significant** impact.

IMPACT 4.6-b **Generation of Long-Term Operation-Related (Regional) Emissions of Criteria Air Pollutants and Precursor Emissions.** *Operation of the proposed campgrounds, relocated headquarters, and ~~new~~ day-use facilities would result in project-generated emissions of PM_{10} that exceed BCAQMD's "Level B" trigger level of 80 lb/day and emissions of ROG that exceed BCAQMD's "Level C" action-level threshold of 137 lb/day (refer to Table 4.6-5). Thus, project-generated, operation-related emissions of criteria air pollutants and precursors could violate or contribute substantially to an existing or projected air quality violation, and/or expose sensitive receptors to substantial pollutant concentrations, especially considering the nonattainment status of Butte County. In addition, project-generated emissions could also conflict with air quality planning efforts. As a result, this would be a* ***significant*** *impact.*

Table 4.6-5
Summary of Modeled Project-Generated, Operation-Related Emissions of Criteria Air Pollutants and Precursors

Source	Emissions (lb/day)[1]			
	ROG	NO_X	PM_{10}	$PM_{2.5}$[8]
Area Source[2]				
Campfires[3]	440.5	5.0	66.6	64.1
Natural Gas[4]	0.0	0.2	0.0	0.0
Landscaping	1.0	0.1	0.0	0.0
Architectural Coatings	0.1	0.0	0.0	0.0
Mobile Source[5]				
Campgrounds[6]	10.7	14.0	13.6	2.6
Headquarters and Day Uses[7]	2.2	2.7	2.5	0.5
Total Net Unmitigated	**454.4**	**22.0**	**82.6**	**67.2**

[1] Emissions were modeled using the URBEMIS 2007 Version 9.2.2 computer model (ARB 2007e).

[2] Area-source emission estimated do not include emissions from consumer products (e.g., air fresheners, household cleaners, personal care products) because new emissions from with these sources are primarily associated with increased population related to residential development (ARB 1990). In addition, area-source emission estimates do not include emissions from the potential use of charcoal lighter fluid and camping fuel at the campgrounds, which would be expected to be nominal relative to overall operational emissions.

[3] A conservative estimate of maximum daily campfire emissions was generated using the default emission rates in the open hearth module of URBEMIS and assumptions about the amount of wood burned per day in each of 55 fire rings at the proposed campsites (see Appendix F for assumptions). It is unknown whether the campfires would represent a net increase compared to emissions from biomass burning that is currently part of the existing orchard operations.

[4] Emissions from natural gas consumption would be associated with water heating for the restroom and shower buildings at the campgrounds, and space and water heating at the ~~new~~ relocated park headquarters.

[5] Worst-case m~~M~~aximum daily mobile-source emissions were estimated assuming the campgrounds, ~~new~~ relocated headquarters, and day use facilities would be operating at full capacity during a summer day, using default trip lengths for rural trips. The default fleet mix was adjusted to account for RV use at each RV camp site and limited trips by commercial-sized trucks. However, it should be noted that the RV campgrounds have been removed from the recreation facilities plans.

[6] A trip generation rate of 4.0 trips per day was assumed for each campsite.

[7] Assumptions regarding peak operations of the ~~new~~ relocated park headquarters, campgrounds, and day use facilities generated an estimation that these facilities would generate a combined 210 trips per day.

[8] The BCAQMD has not identified mass emissions thresholds for operational emissions of $PM_{2.5}$.

See Appendix F for detailed assumptions, input parameters, and modeling results.

Sources: Modeling performed by EDAW 2007

Project-generated, regional area- and mobile-source emissions of ROG, NO_X, PM_{10}, and $PM_{2.5}$ were also estimated using URBEMIS 2007 Version 9.2.2 computer program (ARB 2007e), which is designed to model operational emissions for land use development projects. URBEMIS allows land use selections that include project location and vehicle trip parameters (e.g., trip generation rates, fleet mix). URBEMIS accounts for area-source emissions from the usage of natural gas, wood burning, and landscape maintenance equipment, and mobile-source emissions associated with vehicle trips. Regional area- and mobile-source emissions were estimated based on the proposed land uses type identified in Chapter 3, "Project Description," the estimated increase in vehicle trips generated by the proposed project (presented in Appendix F) and default model settings for conditions in the NSVAB in the earliest year when the project would become completely operational, 2009. Results of the URBEMIS modeling are shown in Table 4.6-5. Refer to Appendix F for detailed assumptions, modeling input parameters, and modeling results.

During the peak camping season, unmitigated long-term regional emissions would reach 454.4 lb/day of ROG, 22.0 lb/day of NO_X, and 82.6 lb/day of PM_{10}, and 67.2 lb/day of $PM_{2.5}$. As shown in Table 4.6-5, campfires would generate most of the emissions of ROG, PM_{10}, and $PM_{2.5}$ while most of the NO_X emissions would be generated by vehicle travel associated with park operations.

Based on the modeling conducted, operation-related activities would result in project-generated emissions of PM_{10} that exceed BCAQMD's "Level B" action-level threshold of 80 lb/day. In addition, project-generated emissions of ROG would exceed BCAQMD's "Level C" action-level threshold of 137 lb/day. While wood burning activities at the campgrounds would be the predominant source of operational emissions (as shown in Table 4.6-5), it is uncertain whether the project would result in a net increase in ROG and PM_{10} emissions because biomass burning is practiced under the existing operations at the walnut and almond orchards. Vegetative debris is typically piled and burned on site after regular pruning of orchard trees. Thus, the net change in burning-related emissions would depend on the amount of burning that currently takes place at the project site orchards and the actual amount of burning that would take place in the approximately 55 campfire rings. Nonetheless, campfire emissions along with other project-generated, operation-related emissions of criteria air pollutants and precursors could violate or contribute substantially to an existing or projected air quality violation, and/or expose sensitive receptors to substantial pollutant concentrations, especially considering the nonattainment status of Butte County for PM_{10}. Also, project-generated emissions could potentially conflict with current air quality planning efforts. As a result, this would be a **significant** impact.

It should be noted that, in response to comments on the Draft EIR, the RV campgrounds were removed from the recreation facilities plans (Appendix D). This EIR analysis of long-term operation-related emissions of criteria air pollutants and precursor emissions included RV trips, making the analysis very conservative. With removal of the RV campground, the number of vehicle trips on River Road would be reduced, which would in-turn reduce long-term operation-related emissions. However, because project-generated emissions could still potentially conflict with current air quality planning (due to other vehicle trips and burning activities at the campgrounds), this impact is still considered to be significant.

It is also important to note that project implementation would ~~also~~ result in emissions of CO due to mobile-sources (vehicles). However, because CO disperses rapidly with increased distance from the source, emissions of CO are considered localized pollutants of concern rather than of regional concern and are discussed separately, below.

IMPACT 4.6-c — Local Mobile-Source Carbon Monoxide Emissions. *The proposed project would not result in, or contribute to, congestion on nearby roadways or at nearby intersections and, as such, would not result in or contribute to CO concentrations that exceed the California 1-hour CO ambient air quality standard of 20 parts per million (ppm) or the 8-hour CO ambient air quality standard of 9 ppm. As a result, this would be considered a* ***less-than-significant*** *impact.*

The proposed project would not result in, or contribute to, congestion on nearby roadways or at nearby intersections and, as such, would not result in or contribute to CO concentrations that exceed the California 1-hour CO ambient air quality standard of 20 ppm or the 8-hour CO ambient air quality standard of 9 ppm. CO emissions are a direct function of vehicle idling time and, thus, traffic flow conditions. Under specific meteorological conditions, the concentration of CO emissions near congested roadways and/or intersections may reach unhealthy levels with respect to local sensitive land uses such as residential areas, schools, and hospitals. A detailed traffic analysis was not prepared for this study. However, high levels of traffic congestion do not currently occur on nearby roads or at intersections in the project area, which is rural in nature. Additionally, vehicle trips generated by the proposed project are not expected to be concentrated during any particular time of day such that they would result in congested roadways or intersections during peak periods. Furthermore, in response to comments on the Draft EIR, the RV campgrounds were removed from the recreation facilities plans (Appendix D), which would reduce the number of vehicle trips on River Road. Thus, the proposed project would not be expected to result in or contribute to CO concentrations that exceed the California 1-hour CO ambient air quality standard of 20 ppm or the 8-hour CO ambient air quality standard of 9 ppm.

IMPACT 4.6-d Odor Emissions. *Odorous diesel exhaust emissions from on-site construction and restoration equipment would be temporary and intermittent in nature and dissipate rapidly from the source. Also, the proposed project would not include the long-term operation of an odorous emission source. Odorous emissions may occur when the ~~RV dump station is~~vault toilets are serviced (i.e., biosolids removed); however, pumping of the ~~RV dump station~~vault toilets would be performed on an infrequent basis and the ~~dump station~~vault toilets would not be located in close proximity to off-site sensitive receptors. Thus, the project would not create objectionable odors affecting a substantial number of people. This impact would be* ***less than significant****.*

The project site currently consists of undeveloped orchards with no buildings or sensitive receptors on-site. The nearest off-site sensitive receptors to the project site is the farmhouse located 400 feet north of the Nicolaus property's northern boundary and 1,200 feet east of the Singh property. The exposure of sensitive receptors to odors from project construction and operation are discussed separately below.

Short-Term Construction-Related Odor Emissions

The predominant source of power for construction equipment is diesel engines. Exhaust odors from diesel engines, as well as emissions associated with paving and the application of architectural coatings may be considered offensive to some individuals. However, because odors would be temporary and would disperse rapidly with distance from the source, construction-generated odors would not result in the frequent exposure of area receptors to objectionable odor emissions. This would particularly be the case because the closest off-site sensitive receptor is the farm house located 400 feet from the Nicolaus property.

Long-Term Operation-Related Odor Emissions

The daily operations of campgrounds and state park recreational uses are typically not considered a major odor source. ~~Exhaust fumes associated with the use of individual generators at the RV campsite would not be generated because every RV site would have its own electrical pedestal.~~ Emissions of odorous compounds may be released during the pumping of the ~~RV dump station~~vault toilets. ~~near the RV campground.~~ However, this maintenance activity would occur infrequently and the ~~dump station~~vault toilets would be located near the relocated BSRSP headquarters (the Nicolaus farm complex) and campsites, which ~~is~~ are approximately 1,800 feet from the nearest off-site sensitive receptor. As a result, this impact would be ***less than significant***.

IMPACT 4.6-e Toxic Air Contaminant Emissions. *The proposed project would not be a source of TAC emissions, and there are no sources of TAC emissions near the project site; therefore, the project would not result in the exposure of sensitive receptors to TAC emissions that exceed recommended thresholds. This would be considered a* ***less-than-significant*** *impact.*

The potential for exposure of sensitive receptors to toxic air emissions from the use of equipment during short-term restoration and construction activities, stationary sources, and on- and off-site mobile sources are discussed separately below.

Short-Term Mobile-Source TAC Emissions during Restoration and Construction

Restoration and construction activities proposed by the project would result in diesel exhaust emissions from on-site heavy-duty equipment. Particulate exhaust emissions from diesel-fueled engines (diesel PM) were identified as a TAC by ARB in 1998. Proposed restoration and construction activities would generate diesel PM emissions from the use of off-road diesel equipment required for site grading and earth movement, paving, and other construction activities. The dose to which receptors are exposed is the primary factor used to determine health risk. Dose is a function of the concentration of a substance or substances in the environment and the extent of exposure that person has with the substance. Dose is positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for the maximally exposed individual. Thus, the risks estimated for a maximally exposed individual are higher if a fixed exposure occurs over a longer period of time. According to the Office of Environmental Health Hazard Assessment, health risk assessments, which determine the exposure of sensitive receptors to toxic emissions, should be based on a 70-year exposure period; however, such assessments should be limited to the period/duration of activities associated with the project (Salinas, pers. comm., 2004). Thus, the estimated 4-year duration of proposed restoration and construction activities would only constitute approximately 6% of the total exposure period. Because the use of mobilized equipment would be temporary and there are no sensitive receptors located in close proximity to the project site, diesel PM from restoration and construction activities would not be anticipated to result in the exposure of sensitive receptors to levels that exceed the applicable standards.

Long-Term Operational TAC Emissions

The proposed project consists of the expansion of an existing state park for the restoration of orchards to native habitat and the long-term operation of a new campground. Campgrounds and state parks do not typically draw a considerable number of diesel-fueled vehicles and are not considered a source of TACs. In addition, there are no sensitive receptors located in close proximity to the project site.

Furthermore, there are no major stationary sources of TACs (e.g., industry) or mobile sources of TACs (e.g., freeways, railyards) in the vicinity of the project site. Pursuant to BCAQMD Rule 400, all stationary sources having the potential to emit TACs are required to obtain permits. Permits may be granted to these operations if they are constructed and operated in accordance with applicable regulations, including BCAQMD Rule 401. Given that compliance with applicable standards is required for the development and operation of facilities that may emit TACs, the TAC emissions at the project site are expected to be within established standards. Therefore, this would be considered a ***less-than-significant*** impact.

IMPACT 4.6-f Greenhouse Gas Emissions. *While the project could potentially result in a net increase or decrease in GHG emissions, the size of the change would be considered nominal. Nonetheless, if the project contributed a net increase in GHG emissions, the amount would be less than considerable. This impact would be* ***less than significant****.*

No air district or other regulatory agency in California has identified a significance threshold for (GHG emissions generated by a proposed project, or a methodology for analyzing impacts related to GHG emissions or global climate change. By adoption of AB 32 and SB 97; however, the State of California has established GHG reduction targets and has determined that GHG emissions as they relate to global climate change are a source of adverse environmental impacts in California. AB 32, California Climate Solutions Act of 2006 (See Statutes 2006, Chapter 488, enacting Health & Safety Code, Sections 38500–38599), establishes regulatory, reporting, and market mechanisms to achieve quantifiable reductions in GHG emissions and a cap on statewide GHG emissions. Although AB 32 did not amend CEQA, the legislation does include language identifying the various

environmental problems in California caused by global warming (Health & Safety Code, Section 38501[a]). SB 97, however, acknowledges that climate change is a prominent environmental issue that requires analysis under CEQA and requires the Governor's Office of Planning and Research to prepare State CEQA Guidelines revisions addressing the mitigation of GHGs or their consequences (Statutes 2007, Chapter 185 enacting Public Resources Code Sections 21083.05 and 21097).

The proper context for addressing the issue in a CEQA document is the discussion of cumulative impacts, since while the emissions of one single project would not cause global climate change, GHG emissions from multiple projects throughout the world could result in a cumulative impact concerning global climate change. To meet GHG emission targets of AB 32, California would need to generate less GHG emissions than current levels. It is recognized, however, that for most projects no simple metric is available to determine if a single project would substantially increase or decrease overall GHG emission levels or conflict with the goals of AB 32.

The text of AB 32 strongly suggests that when ARB interprets and applies the definition of "Greenhouse gas emission source," the regulations issued under the legislation will apply primarily, if not exclusively, to stationary sources of GHG emissions (see Health & Safety Code, Section 38505[i]). However, this mandate demonstrates California's commitment to reducing the rate of GHG emissions and the state's associated contribution to climate change. It does not intend to limit economic or population growth. While the text of AB 32 focuses on major stationary and area sources of GHG emissions, the primary objective of AB 32 is to reduce California's contribution to global climate change by reducing California's total annual production of GHG emissions. The impact that GHG emissions have on global climate change does not depend on whether the emissions were generated by stationary, mobile, or area sources, or whether they were generated in one region or another. Thus, consistency with the state's requirements for GHG emissions reductions is the best metric for determining whether the proposed project would contribute to global warming. In the case of the proposed project, if the project substantially impairs the state's ability to conform with the mandate to reduce GHG emissions to 1990 levels by the year 2020, then the impact of the project would be cumulatively considerable (i.e., significant).

GHG emissions generated during construction and operation of the proposed project would predominantly be in the form of CO_2. In comparison to criteria air pollutants, such as ozone and PM_{10}, CO_2 and other GHG emissions persist in the atmosphere for a much longer period of time. GHG sources associated with restoration and construction activities of the project would include the operation of off-road construction equipment, worker vehicle trips, and trips by haul trucks bringing materials to the sites. While GHG emissions generated by these restoration and construction activities may be considered new, they would be temporary in nature and would not be considered substantial given the project's small size. Also, it would be speculative to determine whether GHG emissions associated with the restoration of ~~170~~ 156 acres of orchard to native habitat would be lesser or greater than the GHG emissions generated by continued operation of the existing walnut and almond orchards. In addition, while removal of the orchards would result in a reduction in carbon-sequestering trees, new plantings would be cultivated that would also provide the benefit of carbon sequestration.

New long-term operational-GHG emissions associated with operation of the expanded Bidwell-Sacramento River State Park would be generated by vehicle trips by park visitors and campfires at the new park campground. No stationary sources of GHG emissions would be associated with the project. Based on the same URBEMIS modeling used to estimate criteria air pollutant and precursor emissions (as summarized in Table 4.6-2) and additional assumptions about projected seasonal use patterns of the park, vehicle trips and campfires would generate approximately 670 and 470 tons of CO_2 per year, respectively. Additional, indirect-source GHG emissions would also be generated from the consumption of electricity at the campgrounds and ~~new~~ relocated park headquarters. (It should be noted that, in response to comments on the Draft EIR, the RV campgrounds were removed from the recreation facilities plans [Appendix D]. This EIR analysis of long-term operational-GHG emissions included RV trips, making the analysis of mobile source emissions very conservative. With removal of the RV campground, the number of vehicle trips on River Road would be reduced, which would in-turn reduce long-term operation-related emissions.)

For a number of reasons, it would be too speculative to determine whether the total operational GHG emissions generated by the proposed project would be new emissions. For example, if the new campground and expanded park were not developed, it is unknown whether visitors using the park's new facilities would have otherwise sought similar recreational opportunities at other existing parks in the region. Also, if the same individuals would be using other parks, it is unknown whether they would be traveling to more-distant recreation areas, resulting in increased vehicle-miles traveled and associated GHG emissions. It is conceivable that the expansion of Bidwell-Sacramento River State Park could reduce recreational-related vehicle-miles traveled given that it is less than 8 miles from Chico, a major population center in the region. Presently the closest recreational areas to Chico are at Woodson Bridge State Recreation Area, located 22 miles away, and around Lake Oroville, which is more than 25 miles away. Furthermore, it is unknown whether long-term GHG emissions associated with the proposed campground and ~~expanded~~ day-use facilities would be substantially different than the level of GHG emissions that would be generated by the continued cultivation of the existing walnut and almond orchards. Thus, it is indeterminate whether the long-term net change in GHG emissions associated with the proposed project would be an increase or decrease. Nonetheless, the quantity of the net change would be considered nominal because the project would not directly represent an increase in the state's population by providing additional permanent residences, or represent an expansion of the state's economy by providing a substantial amount of commercial activity or a considerable number of new jobs (i.e., only one additional park ~~ranger~~ staff position would be created if funding is made available). In addition, the measures required by Mitigation Measure 4.6-b to reduce or offset regional criteria air pollutant emissions would also act to reduce project-related GHG emissions. Therefore, any potential contribution by the project to a net increase in GHG emissions would be less than considerable. This cumulative impact would be ***less than significant***.

4.6.5 MITIGATION MEASURES

Mitigation Measure 4.6-a: Implement Measures to Reduce Short-Term Restoration- and Construction Emissions of ROG, NO_X, and PM_{10}

In accordance with BCAQMD recommendations, State Parks shall require restoration and construction contractors to implement the following measures to reduce emissions generated by restoration and construction activities:

- No open burning shall be performed on the project site. Use alternatives to open burning of vegetative material such as reuse of biomass material for habitat restoration; chipping; or mulching. Alternatively, vegetative material could be hauled/provided to a biomass power facility. The closest biomass power facility is operated jointly by Pacific Oroville Power, Inc. in conjunction with NorCal Waste Systems.

- On-site vehicles shall be limited to a speed of 15 mph on unpaved roads and surfaces.

- A publicly visible sign shall be posted at the site with the telephone number and person to contact regarding dust complaints. This person shall respond and take corrective action within 24 hours. BCAQMD's telephone number shall also be visible to ensure compliance with BCAQMD Rule 200 & 205 (Nuisance and Fugitive Dust Emissions).

- Vehicles entering or exiting the project site shall travel at a speed which minimizes dust emissions and trackout.

- Restoration and construction workers shall park in designated parking areas(s) to help reduce dust emissions. Soil pile surfaces shall be moistened if dust is being emitted from the pile(s). Adequately secured tarps, plastic or other material may be required to further reduce dust emissions.

- Dust suppression measures shall be applied to disturbed areas that are unused for at least four consecutive days. Measures may include the following: frequent watering (a minimum of 2 times per day); covering with weed-free straw mulch; or application of chemical stabilizers.

- Vegetative ground cover shall be planted in disturbed areas as soon as possible.

- Land clearing, grading, earth moving, or excavation activities shall be suspended when winds exceed 20 miles per hour.

- Paved streets adjacent to the restoration and construction sites shall be swept or washed at the end of each day as necessary to remove excessive accumulations of silt and/or mud which may have accumulated as a result of activities on the project sites.

- When not in use, idling of on-site equipment shall be minimized. Under no conditions shall on-site equipment shall be left idling for more than 5 minutes.

Implementation of Mitigation Measure 4.6-a would incorporate all applicable BCAQMD-recommended measures to reduce emissions generated by restoration and construction activities. For this reason, short-term construction emissions would be reduced to a ***less-than-significant*** level.

Mitigation Measure 4.6-b: Prohibit campfires during burn bans established by ~~Cal-Fire~~CAL FIRE and/or BCAQMD's "Don't Light Tonight" Advisory Program.

Pursuant to Park Plan Guideline AO-3.3-2, which states that State Parks shall establish appropriate campfire restrictions, through coordination with the local air district in conjunction with the development of an overnight campground at the Park, State Parks shall notify park users of all burn-ban periods determined by the California Department of Forestry and Fire Protection. Burn-ban periods established by the California Department of Forestry and Fire Protection apply to all vegetative and wood burning, including campfires and other burning activities on state land inside Butte County, with no exceptions made by BCAQMD Rule 300, part 2.10 (Williams, pers. comm., 2007). BCAQMD Rule 300, part 2.10 exempts campfires and some other types of burning from burn prohibitions established by other BCAQMD rules. Typically, the California Department of Forestry and Fire Protection begins the burn ban season around July 1 and it extends through October. In addition, the campgrounds at BSRSP shall also participate in BCAQMD's "Don't Light Tonight" program, in which BCAQMD requests that County residents not use woodstoves and fireplaces when air pollution approaches unhealthy levels (BCAQMD 2007c). These advisories are typically in effect for 24-hour periods. State Parks shall keep campground users informed of burn bans by posting notices on kiosks at the park headquarters, self-pay kiosks, and campground restroom and shower facilities. State Parks shall also inform campground users of burn bans upon check-in to the campground.

Implementation of Mitigation Measure 4.6-b would eliminate all campfire emissions during times of the year when the NSVAB experiences minimal atmospheric dispersion. Because campfire burning would be limited to times of the year when wood smoke would be adequately dispersed and therefore not expose sensitive receptors to substantial pollutant concentrations or cause or contribute to the County's nonattainment status with respect to ozone or PM_{10}, this measure would reduce long-term operation-related emissions to a ***less-than-significant*** level.