SAN LUIS RESERVOIR SRA

2. Existing Conditions

2. Existing Conditions

2.1 PROJECT AREA CONDITIONS AND RESOURCES

The following section summarizes the existing land uses, significant resource values, existing facilities, and local and regional plans, socioeconomic setting and visitor uses that will influence the management, operations, and visitor experiences at the project area. The information will provide the baseline data for developing the goals and guidelines for the management policies of the Plan and will serve as the affected environment and environmental setting for environmental review. A geographic information systems (GIS) data file of existing resources has been created in conjunction with this report to be used by the U.S. Bureau of Reclamation (Reclamation) and the California Department of Parks and Recreation (Department) during the planning process and beyond.

Existing Land Use

Surrounding Land Uses / Regional Context

The project area is surrounded by a variety of land uses. Residential and commercial uses exist in nearby Santa Nella to the northeast of O'Neill Forebay. Lands to the southeast of the project area between San Luis Reservoir and Los Banos Reservoir include large, privately owned ranchlands, agricultural lands, an electrical substation, and scattered nonresidential uses. A national cemetery exists to the northeast of O'Neill Forebay, and immediately west of San Luis Reservoir is Pacheco State Park, owned by the Department. California Department of Fish and Game (DFG) properties are located north of the San Luis Reservoir and east and west of the O'Neill Forebay.

The nearest incorporated cities are Los Banos approximately 13 miles to the east, Gustine approximately 10 miles to the north, and Gilroy approximately 38 miles to the west. The unincorporated town of Santa Nella lies two miles to the northeast. Other nearby communities include Volta, Trent, and Hollister.

According to the Merced County General Plan, lands surrounding the project area are designated as "Foothill Pasture." This designation generally applies to lands on the east and west sides of the County, which are the Sierra Nevada foothills and the Diablo Range, respectively. Foothill Pasture areas typically are used for noncultivated agricultural practices as well as livestock facilities, wastewater lagoons, and agricultural commercial facilities. Certain nonagricultural uses may also be found, including mineral resource extraction and processing, institutional facilities, and outdoor public and private recreational facilities. The zoning classification considered most compatible for Foothill Pasture designated areas is A-2 (Exclusive Agricultural), which applies to the lands around the project area (Merced County 2000 General Plan).

Project Area Land Uses

Many areas of the project area are open and undeveloped. There are several developed areas to support the water and recreation operations. The project area is part of the water storage and delivery system for the California State Water Project (SWP) and Reclamation's Central Valley Project (CVP). Excess winter and spring flows from the Sacramento-San Joaquin Delta (Delta) are conveyed through the California Aqueduct and Delta Mendota Canal (DMC) to O'Neill Forebay and subsequently pumped to

the reservoir. San Luis Reservoir currently provides water to the Santa Clara Valley Water District (SCVWD) and San Benito County Water District. SCVWD, a CVP contractor, receives water from San Luis Reservoir via the Pacheco Pumping Plant and the Santa Clara Conduit. Nearby Los Banos Reservoir prevents storm runoff from flooding the California Aqueduct and Delta Mendota Canal and nearby communities.

The operations and maintenance facilities for the Department of Water Resources (DWR) and the Four Rivers Sector within the Central Valley District of the Department are at Gonzaga Road, off State Route (SR) 152 at the base of San Luis Reservoir dam. This area is developed with the Gianelli Pumping Plant (operated by DWR) administrative offices, maintenance garages, and work areas. Other developed areas include the Basalt Use Area to the south of the Gonzaga Road entrance, which contains camping, a picnic area, boat ramp, and parking. Nearby is the boat launching area for San Luis Reservoir. A quarry, used for gravel extraction during the construction of the dam, is located at the southeast corner of San Luis Reservoir. The quarry is used by DWR for any facilities (e.g., dam and canal) repairs on DWR's systems. The California Department of Forestry and Fire Protection (CDF) operates a fire protection station east of the SRA Administrative Offices, south of Gonzaga Road.

The Dinosaur Point Use Area at the west edge of San Luis Reservoir contains a boat launch, parking and picnic area. The long, sloping road leading to the water has been used periodically for street luge on a permit basis. The adjacent Pacheco State Park is not part of the project area. The Romero Visitor Center, operated by DWR, is along SR 152 west of the Gonzaga Road entrance. San Luis Wildlife Area, managed by the California Department of Fish and Game (DFG), is at the western edge of San Luis Reservoir, north of Pacheco State Park. This area, designated for hiking, bird watching, and hunting only, contains trails but no developed facilities. Similarly, O'Neill Forebay Wildlife Area to the northeast of the forebay is used for organized hunts and passive recreation. Portions of the O'Neill Forebay Wildlife Area are cultivated to provide forage and habitat for various game species. Crops grown consist of safflower, wheat or vetch, and turkey mullen.

The San Luis Creek Use Area is on the north side of SR 152, west of O'Neill Forebay, and is the most developed within the project area containing group and RV camping, a swimming beach, boat launch site, and picnic areas. Other day use areas exist at the northeast corner of the forebay where boat-access picnicking takes place, and at the Medeiros Use Area on the south side of the forebay and north of SR 152, which is predominantly used for windsurfing and informal camping. Los Banos Creek Use Area contains flood management facilities, hiking trails, an equestrian camp, and two day use areas along the north shore, with camping, picnicking and a boat launch.

Significant Resource Values

Physical Resources

Climate

San Luis Reservoir is located on the western side of the San Joaquin Valley, which experiences a hot, dry climate. Wind in the region has a strong influence on climate, with prevailing winds generally coming from the west. However, wind direction changes frequently because of temperature differences between coastal air and valley air. The strongest winds in the region occur from April through August and velocities can reach 30 to 40 miles per hour.

Hot, dry winds result in a relatively high evaporation rate in the San Joaquin Valley. While in mid-winter the rate may be less than 2 inches per month, the rate in July and August often reaches a high of 18 to 20 inches per month. Rainfall in the area occurs mostly in the winter months and averages only 10.53 inches per year at San Luis Dam. This low rainfall and high evaporation rate combine to create a very dry soil that typically supports grassland and scrub-type vegetation with other vegetation types present such as riparian woodlands along stream corridors.

Winter temperatures in the valley are mild, seldom dipping below freezing. Summers are hot, with the average daily temperature ranging in the 80s and 90s °F. The frost free season is 300 to 363 days a year, making for an almost uninterrupted growing season. Table 2-1 presents a monthly climate summary for San Luis Dam, averaged from the period of record of January 1963 through December 2001.

Table 2-1
San Luis Dam Monthly Climate Summary (January 1963 - December 2001)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Average Maximum Temperature (F)	54.0	60.3	65.3	71.1	78.4	85.2	91.6	90.9	86.6	77.9	64.2	54.4	73.3
Average Minimum Temperature (F)	37.9	41.9	45.8	49.1	54.0	58.8	63.6	63.7	60.3	53.6	45.1	37.6	50.9
Average Total Precipitation (in)	2.18	1.95	1.57	0.68	0.41	0.06	0.03	0.08	0.22	0.54	1.40	1.42	10.53
Average Total Snow Fall (in)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Average Snow Depth (in)	0	0	0	0	0	0	0	0	0	0	0	0	0

Source: Desert Research Institute (DRI)

Topography

San Luis Reservoir is bordered to the west by the eastern foothills of the Diablo Range, which are marked by minor drainages. These drainages spread out to form several relatively flat valleys opening eastward into the San Joaquin Valley. The San Luis Flat is one such valley, formed in part by the fanning of San Luis and Cottonwood creeks. The flooding of the San Luis Flat created San Luis Reservoir.

The reservoir's north and south shores consist of mostly rugged, undulating terrain. Grades in these areas range between 0% and 20%. Northeast of the San Luis Reservoir and below the dam lies O'Neill Forebay. The majority of the area surrounding the forebay is relatively flat and less rugged than that of the main reservoir. Although grades in the forebay area also range between 0% and 20%, they are less undulating. Map 3 illustrates the elevation ranges in the project area and surrounding vicinity.

Geology and Soils

The geology of the unit is the result of several major changes over geologic time. During the late Jurassic and Upper Cretaceous periods, an open sea extended inland over what is now Merced County. During

the late Pliocene and early Pleistocene eras, major folding, faulting, and uplift took place in the Coast and Sierra Nevada ranges.

The project area includes portions of four geologic formations. The entire western side and the southern tip of the shoreline of San Luis Reservoir lie within the Franciscan formation. This formation is the oldest rock formation found in western Merced County. It is a thick assemblage of sedimentary, igneous, and metamorphic rocks. The sedimentary rocks consist of sandstone, shale, chert, and minor amounts of conglomerate.

The Panoche formation makes up most of the eastern shore of San Luis Reservoir and is broken only by the intrusion of the Plio-Pleistocene nonmarine and fan deposits of the Great Central Valley. The Panoche formation consists of arenaceous shale and thinly bedded sandstone, approximately 25,000 feet thick. Buff-colored, cavernous exposures are the result of weathering of limy, concretionary, gray, biotitic sandstones. The sedimentary sequence of the Panoche formation contains lenses of coarse-grained conglomerate consisting of boulders, cobbles, and pebbles of porphyritic and granitic rock.

The Tulare formation occurs mostly on the shore of O'Neill Forebay and in the area adjacent to O'Neill Forebay Dam. This formation, which varies in depth from 100 to 500 inches, overlies all the older formations. The Tulare material is composed of nonmarine gravel, sand, and silt and has its origin from rocks derived from the Franciscan formation. Stream terraces also are found in the Tulare formation. They are the sedimentary deposits of streams when they were at other levels.

The Tertiary Volcanic formation appears in small scattered deposits along the eastern and western shores of San Luis Reservoir. Among the volcanic rocks are pink and gray andesite and white to gray rhyolite, dark gray to black basalt, and limonite. A remnant basalt flow occurs at Basalt Hill just south of the Basalt Use Area. This hill appears to have been the vent from which the basalt was extruded. Lastly, fan deposits are limited to the shore of O'Neill Forebay and occur principally on the eastern side. Recent alluvium masks all older formations along the western side of the San Joaquin Valley.

Soil Associations

Of the soil associations that occur within the boundaries of the project area, the Denverton, Kettleman, and Altamont clays occupy 2,650 acres of project area lands surrounding San Luis Reservoir. Rough Stony Land is the second most common soil type in the reservoir area. It occupies roughly 2,000 acres confined mostly to the western side of the reservoir. There are several other minor soil associations, including the Rincon-Pleasanton association composed of Pleasanton gravelly sandy loam, Los Banos clay loams, Rincon clay, and Rincon loam; Altamont-Kettleman loam to the northeast shore of O'Neill Forebay; Sobrante, Vallecitos, and Contra Costa loams; Herdlyn clay loam and Solano silt loam; Herdlyn clay loam on the southern and eastern shores of O'Neill Forebay; and Sorrento, Mocho, and Esparto loams in small scattered areas at the reservoir site.

Source: USGS DLG / USGS 30m DEM / EDAW, 2004

1 0.5 0 1 2 Miles

Scale 1 : 79,200
1" = 1.25 miles

N

4/18/05

EDAW

Elevation Ranges

- Less than 200 feet
- 200 to 600 feet
- 600 to 1000 feet
- 1000 to 1400 feet
- 1400 to 1800 feet
- 1800 to 2200 feet
- 2200 to 2600 feet
- over 2600 feet

San Luis Reservoir State Recreation Area

MAP 3
Elevation Ranges

P:\2002\2s035.01\gis\arcmap\sanluis_m3_elev_17x11.mxd

Soil Series

The following is a description of the soil series occurring in the use areas surrounding San Luis Reservoir and O'Neill Forebay. Altamont clay, the predominant soil in the San Luis Creek Use Area, occupies a combined area of 160 acres. Other soils that occur here are Altamont clay in the steep phase, Denverton clay (adobe), and Contra Costa gravelly loam. The predominant soil in the Basalt Use Area is Kettleman silty clay loam. Altamont clay is the next most important soil with a small portion of the rolling phase, and Altamont loam in the rolling phase exists also. Rincon clay loam is a major soil type at Basalt. The Medeiros Use Area is composed of a combination of soil types scattered at random. The only soil type found in the Dinosaur Point Use Area is Vallecitos stony clay loam.

Seismicity

San Luis Reservoir is in a seismically active area and is close to three geologic faults. The Ortigalita fault passes under the reservoir, and the Calaveras and the San Andreas faults are 23 and 28 miles away, respectively. These faults and their segments can cause earthquakes at or near the reservoir. From May 1984 to December 1999, three earthquakes with magnitudes of three to four occurred within 10 miles of the reservoir. One was in the reservoir itself, and another in the O'Neill Forebay.

Hydrology and Floodplain

The major drainage of the San Luis Reservoir area is San Luis Creek. The hydrology and floodplain of the watershed have been significantly altered by the development of the reservoirs. The project area lies in the Panoche-San Luis Reservoir watershed, part of the San Joaquin River Basin, which drains into San Luis Creek. Historically, San Luis Creek flowed into the San Joaquin River, which then emptied into San Francisco Bay. Since completion of San Luis Dam, runoff from San Luis Creek has been captured in San Luis Reservoir and diverted for SWP and CVP purposes.

Panoche-San Luis Reservoir watershed encompasses a total area of approximately 1,213 square miles (776,781 acres). The project area includes four tributaries to San Luis Creek as well as over 35 tributaries to San Luis Reservoir, as shown on the U.S. Geological Survey (USGS) Pacheco Pass, Volta, Crevison Peak, Ingomar, Howard Ranch, San Luis Dam, Mariposa Peak, Ortigalita Peak, and Los Banos Valley quadrangles.

The project area includes San Luis Reservoir as well as two smaller reservoirs, O'Neill Forebay and Los Banos Reservoir. San Luis Reservoir has a capacity of 2,040,600 acre-feet (af), used primarily to supplement water supply to approximately 20 million residents and approximately 660,000 acres of irrigated farmland. O'Neill Forebay and Los Banos Reservoir have capacities of 56,400 af and 34,560 af, respectively, and are used primarily for water supply and flood control, respectively.

Surface water quality in Panoche-San Luis Reservoir watershed falls under the management of the California State Water Resources Control Board (SWRCB). The watershed is a part of the Central Valley Region (Central Section) and is classified as a category I (impaired) priority watershed. Major water quality issues identified throughout the basin include pesticide contamination, high nutrient concentrations in smaller tributaries, native fish habitat disruption, poor water chemistry, and high agricultural runoff. The SWRCB has set a goal of zero toxicity throughout the basin and has designated the Panoche-San Luis

Reservoir watershed as a target area for habitat restoration; the U.S. Environmental Protection Agency (USEPA) has set standards for allowable maximum pollutant and nutrient concentrations.

Groundwater is recharged in the project area by percolation of runoff into underground aquifers. Groundwater supports many of the springs throughout the area, and supplies 93% of the public water supply in the Panoche-San Luis Reservoir watershed. The Federal Emergency Management Agency (FEMA) has mapped the project area as Zone D, an area of undetermined but possible flood hazard. The potential for flooding exists primarily in the low-lying areas along San Luis Creek, Cottonwood Creek, and Los Banos Creek, and along the banks of San Luis and Los Banos reservoirs. Because water is pumped into O'Neill Forebay, flood potential in the forebay is extremely low. The USGS formerly maintained one flow gauge within the project area at the Wolf Creek station located in the vicinity of Dinosaur Point. Peak flow data are available from 1959 through 1969, during which flood events occurred early in 1963 and early in 1967.

Water Quality

This section discusses the water quality characteristics of San Luis Reservoir, O'Neill Forebay, and Los Banos Reservoir. Information in this section is obtained from the *Central Valley Region Water Quality Control Plan* (Basin Plan) (California Regional Water Quality Control Board 1998), *California State Water Project Watershed 2001 Sanitary Survey Update Report* (DWR 2001), DWR's compilation of water quality data, discussions with DWR staff, and the *Los Banos Grandes Facilities Draft EIR* (DWR 1990).

San Luis Reservoir is a major offstream reservoir that stores excess winter and spring flows from Sacramento-San Joaquin Delta and supplies water to service areas for both the SWP and the CVP. SWP water (conveyed through the California Aqueduct) and CVP water (pumped from the DMC via the O'Neill Pumping-Generating Plant) mix in O'Neill Forebay. During the fall and winter months, water is pumped into San Luis Reservoir through the Gianelli Pumping-Generating Plant.

San Luis Reservoir water is delivered to the San Joaquin Valley, the Santa Clara Valley, and Southern California when water supply in the California Aqueduct and the DMC is insufficient. The Santa Clara Valley Water District (SCVWD), a CVP contractor, receives water from San Luis Reservoir through the Pacheco Intake. Because of constant pumping and mixing of its water, San Luis Reservoir does not typically develop a thermocline[1] (Borba 2003). Similarly, O'Neill Forebay does not develop a thermocline because of the highly regulated pumping-generating plants that require constant exchange of water in the forebay (Borba 2003).

Los Banos Reservoir, located southwest of the town of Los Banos, was constructed to protect San Luis Canal portion of the California Aqueduct from flood damage, by controlling flows of the streams crossing the canal. Los Banos Reservoir thermally stratifies during the summer months with an anoxic hypolimnion. The reservoir destratifies in the autumn and remains oxygenated and at a uniform temperature throughout the winter and spring.

[1] Thermocline is a region of a lake where the temperature changes rapidly with depth. For temperate lakes, the thermocline can be defined as the region where temperature changes are greater than 1 degree Celsius per meter of depth.

Central Valley Region Water Quality Control Plan (Basin Plan)

Water in San Luis Reservoir and O'Neill Forebay is used for agricultural, industrial, municipal, and recreational uses as well as for fish and wildlife enhancement. Los Banos Reservoir provides flood control management as well as recreational opportunities.

The Central Valley Regional Water Quality Control Board (RWQCB) Basin Plan identifies beneficial uses for surface water bodies in the Sacramento and San Joaquin river basins that are critical to management of water quality in California. Protection and enhancement of existing and potential beneficial uses are primary goals of water quality planning. San Luis Reservoir, O'Neill Forebay, and Los Banos Reservoir are located within the jurisdiction of the Central Valley RWQCB. Beneficial uses for these water bodies are shown in Table 2-2. This table has been modified to reflect actual uses at these facilities.

Table 2-2
Water Uses of San Luis Reservoir and O'Neill Forebay

BENEFICIAL USES	DESCRIPTION OF BENEFICIAL USES	SAN LUIS	O'NEILL	LOS BANOS[1]
Municipal and Domestic Supply	Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.	×	×	
Agricultural Supply – Irrigation	Uses of water for farming, horticulture, or ranching, including, but not limited to, irrigation (including leaching of salts) and stock watering.	×	×	
Agricultural Supply – Stock Watering		×	×	
Industrial Supply – Service	Uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well repressurization.	×		
Industrial Supply – Power		×	×	
Water Contact Recreation	Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, wind surfing or fishing.	×	×	×
Noncontact Water Recreation	Uses of water for recreational activities involving proximity to water, but where there is generally no body contact with water, nor any likelihood of ingestion of water. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.	×	×	×
Warm Freshwater Habitat	Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.	×	×	×
Cold Freshwater Habitat	Uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.	×	×	×
Spawning, Reproduction and/or Early Development (Salmon and Steelhead)	Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish. (Currently, Los Banos Reservoir supports an active warmwater largemouth bass and white crappie fishery. The DFG actively stocks rainbow trout, a coldwater species,)			×
Wildlife Habitat	Uses of water that support terrestrial or wetland ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats or wetlands, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.	×	×	×

Note:

[1] The beneficial uses of Los Banos Reservoir are not provided specifically for the reservoir. Rather it is identified under the category of "Other Lakes and Reservoirs in San Joaquin R. Basin (Excluding Hydro Unit Nos. 531-533, 543, 544)"

Source: California Regional Water Quality Control Board, The Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board, Central Valley Region 1998.

Water Quality Objectives

To protect and maintain beneficial uses of surface water bodies, quantitative and qualitative water quality objectives are defined in the Basin Plan. The water quality objectives that apply to the protection of the above beneficial uses are described below, followed by a summary of the existing water quality at San Luis Reservoir and O'Neill Forebay.

Bacteria

The Basin Plan states that "in waters designated for contact recreation, the fecal coliform concentration based on a minimum of not less than five samples for any 30-day period shall not exceed a geometric mean of 200/100 ml, nor shall more than ten percent of the total number of samples taken during any 30-day period exceed 400/100 ml."

Chemical Constituents

The Basin Plan states that "[w]aters shall not contain chemical constituents in concentrations that adversely affect beneficial uses… At a minimum, water designated for use as a domestic or municipal supply shall not contain concentrations of chemical constituents in excess of the maximum contaminant levels (MCLs) specified in the provisions of Title 22 of the California Code of Regulation."

Dissolved Oxygen

The Basin Plan states that "monthly median of the mean daily dissolved oxygen (DO) concentration shall not fall below 85 percent of saturation in the main water mass, and the 95 percentile concentration shall not fall below 75 percent of saturation." The dissolved oxygen concentrations shall not be reduced below the following minimum levels at any time:

- Warm Freshwater Habitat (WARM) 5.0 mg/L
- Cold Freshwater Habitat (COLD) 7.0 mg/L
- Spawning, Reproduction, and /or Early Development (SPWN) 7.0 mg/L

Oil and Grease

The Basin Plan states that "waters shall not contain oils, greases, waxes or other materials in concentrations that cause nuisance, result in a visible film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses."

pH

The Basin Plan states that "the pH shall not be depressed below 6.5 nor raised above 8.5. Changes in normal ambient pH levels shall not exceed 0.5 in fresh waters with designated COLD [cold freshwater habitat] or WARM [warm freshwater habitat] beneficial uses." Averaging periods may be applied to determine compliance with the water quality objective for pH, provided that beneficial uses will be fully protected.

Pesticides

The Basin Plan indicates that "no individual pesticide or combination of pesticides shall be present in concentrations that adversely affect beneficial uses," and specifically highlights waters designated for use as domestic or municipal supply in excess of MCLs.

Sediment

The Basin Plan states that "the suspended sediment and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses."

Suspended Material

The Basin Plan states that "waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses."

Tastes and Odors

The Basin Plan states that "water shall not contain taste- or odor-producing substances in concentrations that impart undesirable tastes or odors to domestic or municipal water supplies or…otherwise affect beneficial uses."

Temperature

The Basin Plan states that "[a]t no time or place shall the temperature of COLD or WARM intrastate waters be increased more than 5°F above natural receiving water temperature."

Turbidity

The Basin Plan states that "[w]aters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses." Limitations on the increases in turbidity are identified for specific ranges of existing turbidity measurements.

Existing Water Quality Data

DWR Operations and Maintenance began a SWP water quality monitoring program in 1968. The program was initiated to monitor eutrophication in the project facilities and salinity for agricultural users. Over time, the SWP monitoring program expanded to emphasize parameters of concern for drinking water, recreation, and fish and wildlife purposes. DWR conducts water quality monitoring throughout its facilities as noted below, and consists of both discrete (grab) samples and continuous automated station data. DWR maintains two monitoring stations at and near San Luis Reservoir, as follows:

- Check 13, located at the outlet of O'Neill Forebay; and
- Pacheco Pumping Plant, located on the west side of San Luis Reservoir.

Water quality data for Check 13 consists of both grab and automated data for a variety of water quality parameters. Monthly grab samples at this location are available from January 1995 through August 2003 and include data for minerals, minor elements, and nutrients. Other conventional parameters (i.e., conductivity, temperature, pH, and turbidity) are reflected in the hourly automated data that has been collected since 1990. Archived water quality data dates back to 1988. At the Pacheco Pumping Plant, automated hourly data for conductivity, temperature, and turbidity have been gathered since July 1989. Grab samples for nonconventional constituents are conducted by SCVWD, and therefore the data are

not available in the DWR database (Erickson 2003). Of the quantitative water quality data established in the Basin Plan, dissolved oxygen is not available at San Luis Reservoir and O'Neill Forebay. In addition, only qualitative coliform data are available for the forebay.

The data for both sites are summarized in DWR's biennial water quality assessment of its SWP facilities. The most recent *Water Quality Assessment of the State Water Project* was completed in July 2000 for the 1998-1999 period. In addition to the biennial report, the *Sanitary Survey Update Report 2001* (December 2001) includes an analysis of specific water quality parameters between January 1996 and December 1999 as it relates to potential contaminant sources and activities at SWP facilities. The water quality data described in this section are based on the *Sanitary Survey Update Report 2001.*

DWR does not conduct regular water quality monitoring at Los Banos Reservoir. Water quality data are based on discrete samples taken in the investigation of the Los Banos Grandes facilities and are summarized following discussion of the water quality at San Luis Reservoir and O'Neill Forebay (as summarized in DWR's 2001 Sanitary Survey Update).

2001 Sanitary Survey Update

In accordance with Department of Health Services (DHS) California Surface Water Treatment regulations, all water purveyors are required to conduct a sanitary survey of their watersheds and update it every five years. DWR conducted its first Sanitary Survey in 1990 and has since updated it in 1996 and most recently, in 2001. The purpose of the survey is to describe and control management practices, describe potential contaminant sources (PCS) or activities and their effect on drinking water source quality, determine if appropriate treatment is provided, and identify appropriate actions and recommendations to improve or control contaminant sources (DWR 2001). The survey includes all major SWP features, including O'Neill Forebay and San Luis Reservoir.

The water quality data in the *Sanitary Survey Update Report 2001* are evaluated against MCLs[2] as established in Title 22 of the California Code of Regulations, Domestic Water Quality, and Monitoring Regulation. MCLs are usually applied to finished water, but they are useful as a conservative indicator of source water contaminants. If source water concentrations are below MCLs, then contaminants are not as likely to be of concern to the finished water supplies. In addition, if MCLs are not exceeded, beneficial uses as established by the Basin Plan would also be protected.

San Luis Reservoir

Chapter 6 of the *Sanitary Survey Update Report 2001* identifies the PCS in the 85-square-mile San Luis Reservoir Watershed. The PCS, the type of contaminants resulting from these sources, and likelihood for such contamination are described in Table 2-3, below. As described in the *Sanitary Survey Update Report 2001*, significant contaminant sources and water quality problems at the reservoir are associated with watershed activities and source water from the aqueduct and the DMC.

[2] MCL is the highest level of a contaminant that is allowed in drinking water. The federal Safe Drinking Water Act of 1974 authorizes USEPA to set enforceable health standards (MCLs). The state of California implements the federal SDWA on behalf of the USEPA, and has developed and implemented its own drinking water standards that must be at least as stringent as federal standards.

Table 2-3
Potential Contaminant Sources for San Luis Reservoir

POTENTIAL CONTAMINANT SOURCES (PCS)	TYPE OF CONTAMINANTS RESULTING FROM PCS	POTENTIAL FOR CONTAMINATION FROM PCS
Recreation (body contact and non-body contact activities)	Turbidity and pathogens in runoff; diesel fuels, gasoline, hydrocarbon, and MTBE from boating activities	Recreation presents the greatest potential threat to water quality in the reservoir; body contact recreation may be a major source of pathogens. MTBE did not appear to be a serious water quality concern in the reservoir according to a 1997 study.
Wastewater Treatment Facilities	Pathogens	The potential for contamination to water from these facilities is unknown.
Animal Populations (livestock grazing, wild animal populations)	Nutrients, turbidity, and pathogens in runoff and erosion	Droppings from large populations of migrating waterfowl may be a water quality concern during winter months. Contribution of contaminants from animal populations is unknown.
Algal Blooms	Nutrients	Algal Blooms are likely if other enrichment conditions are met. Nutrients in the reservoir were high during 1996 to 1999. Taste and odors in the reservoir is more serious water quality concern during drought years. Historical data suggest that algal blooms cause taste and odor problems for SCVWD during the drought years from 1992-1993. During the survey period from 1996 to 1999, SCVWD did not report any serious algal blooms or taste and odor issues.[1]
Agricultural Activities	Pesticides and agricultural drainage in runoff	Agricultural activities are considered a minor threat to water quality.
Traffic Accidents / Spills	Oil, grease, other hydrocarbons in runoff, hazardous wastes from truck spills	There have been no documented spills or accidents reported in the watershed from 1996 to 2000. However, there is a potential for contamination associated with truck accidents of hazardous waste on SR 152.
Geologic Hazards	Turbidity from landslide / erosion caused by wave actions of seismic and boating activities	Landslides and erosion are considered moderate threats to water quality.
Fires	Nutrients, turbidity, and sediment loads	The indirect effect of runoff from burned areas on the reservoir's water quality has not been determined.

Note:

1 SCVWD reported in the 2001 Low Point Improvement Study that during the summer, as San Luis Reservoir is drawn down, a thick layer of algae grows on the surface. When the amount of water drops to the beginning of the low point (300,000 af), algae begins to enter the San Felipe Division intake, degrading water quality and making the water harder to treat. In response, operations of the reservoir have been changed such that water levels are maintained above the low-point elevation.

Source: Sanitary Survey Update Report 2001, December 2001

Table 2-4 summarizes the water quality data for the period of 1996 to 1999. The water quality parameters were below established MCLs for most constituents; levels of total organic carbon (TOC) and bromide exceeded the target drinking water protection standards (DWR 2001). The major sources of TOC and bromide are the California Aqueduct and the DMC. Turbidity spikes can occur during the heavy rain and in the summer, when recreational use is heavy. However, supporting information is not available.

Table 2-4
San Luis Reservoir Water Quality Summary, January 1996 to December 1999 [a]

PARAMETER (MG/L)	MEAN [b]	MEDIAN [b]	LOW [b]	HIGH [b]
Minerals				
Calcium	19.9	19.8	18.0	26.0
Chloride	65	64	48	78
Total Dissolved Solids	248	245	194	295
Hardness (as $CaCO_3$)	100	99	90	123
Alkalinity (as $CaCO_3$)	78	78	71	89
Conductivity (umhos/cm)	448	446	363	501
Magnesium	12.1	12.0	11.0	14.0
Sulfate*	36	35	27	45
Turbidity (NTU)	3	2	1	12
Minor Elements				
Aluminum	0.013	0.013	0.011	0.014
Arsenic	0.002	0.002	0.002	0.004
Boron	0.2	0.2	0.1	0.2
Chromium	0.006	0.006	0.005	0.007
Copper	0.004	0.002	0.002	0.014
Iron	0.011	0.009	0.006	0.021
Manganese	0.048	0.012	0.005	0.312
Selenium	0.001	-	0.001	0.001
Zinc	0.015	0.012	0.006	0.042
Nutrients				
Total Nitrogen [c]	1.0	1.1	0.7	1.4
Nitrate (as N)	0.6	0.6	0.1	0.9
Ammonia (dissolved)	0.03	0.02	0.01	0.10
Total Phosphorus	0.11	0.11	0.05	0.18
Orthophosphate	0.08	0.98	0.02	0.13
Miscellaneous				
Bromide	0.20	0.20	0.18	0.22
Total Organic Carbon [d]	2.7	2.7	2.0	4.1
pH	7.7	7.7	7.2	8.6

[a] *Data were derived from DWR Operations and Maintenance Database, May 2000.*

[b] *Nondetects were not used for computation of these statistics.*

[c] *Total nitrogen was the sum of Kjeldahl nitrogen and nitrate.*

[d] *TOC data provided by Jeffrey Janik, DWR O&M, Feb 2001.*

Source: Sanitary Survey Update Report 2001, December 2001

Many organic compounds such as pesticides and petroleum byproducts were also sampled in San Luis Reservoir but were not found above their reporting limits. Pathogen data were collected at the Santa Teresa Water Treatment Intake by the SCVWD; Table 2-5 presents the microbiological data of the raw water (100% from the reservoir) for the period of January 1996 through December 1999. According to the *Sanitary Survey Update Report 2001*, among the samples that tested positive for coliform, their levels were all below the state regulatory numerical values for freshwater beaches (DWR 2001).

Table 2-5
Pathogens in Source Water at Santa Teresa Water Treatment Plant, 1996 to 1999 [a]

	Mean	Median	Low	High
Total Coliform	15	6	2	500
Fecal Coliform	9	4	2	50
E. Coli	8	4	2	50
Cryptosporidium	ND [b]	-	-	-
Giardia	ND [b]	-	-	-

[a] *Data provided by SCVWD. Raw water was 100% from San Luis Reservoir. Nondetects were not used for computation of statistics.*

[b] *Sampled results below their respective detection limits.*

Source: Sanitary Survey Update Report 2001, December 2001.

Although water quality levels generally meet drinking water standards, land use and source water information suggested the possibility of several water quality concerns:

- High turbidity and total dissolved solids (TDS) levels in the reservoir,
- Algal blooms and taste and odor problems (during a drought year);
- High TOC and bromide concentration from the source water; and
- Pathogen contamination through recreation and livestock grazing.

To address potential water quality concerns, the *Sanitary Survey Update Report 2001* identifies specific recommendations to address the potential threat of drinking water quality degradation from the priority PCS. The conclusions and recommendations are summarized in Table 2-6.

Table 2-6
Conclusions and Recommendations of the *Sanitary Survey Update 2001,* San Luis Reservoir

CONCLUSION	RECOMMENDATION
Body contact recreation and boating are potential sources of microbial pathogens; wind and boating activities increase turbidity. Motorized boats did not appear to contribute significant MTBE.	Coordination between DWR and the Department to improve public awareness of water quality and provide more restrooms. If future recreational use increases, investigate the need to restrict swimming and reduce the number and speed of boats.
Runoff from campgrounds, parking grounds, and boat ramps contributes to contaminates such as turbidity and TOC.	The number of visitors to the watershed will likely increase because of the lowered use fees that were enacted [prior to publication of the survey][1]. Consider conducting studies to estimate total runoff in the watershed and quantify contaminants that enter the reservoir.
Seasonal animal grazing, wild animals, and large numbers of migrating waterfowl are considered significant contributors of turbidity, nutrients, TOC, and pathogens. Animals were found in direct contact with water in the reservoir. The number of seasonal grazing animals and the species and number of wild animals are not known.	Build fences as needed to confine grazing animals and wildlife; provide alternative water supplies for animals; conduct studies on the effects of animal populations on water contamination; review existing grazing leases; divert runoff immediately downstream of wildlife areas.
SWP source water contains high concentrations of nutrients that support algal growth.	Review existing flavor profile and investigate need to control algae during drought years.
Approximately 10 miles of SR 152 parallel the reservoir. Potential hazardous chemical spills from truck accidents.	DWR coordinate with other agencies to identify emergency action plans.
Fires contribute turbidity, TOC, and TDS	Evaluate level of public education on fire dangers.
Source water from the DMC and the California Aqueduct can contribute to TOC, turbidity, and TDS	Determine the relative contributions of these constituents from each source and operational scenarios to reduce concentrations

Note: [1] The lowered fees are no longer applicable.
Source: Sanitary Survey Update Report 2001, December 2001.

O'Neill Forebay

Delta exports enter O'Neill Forebay from the California Aqueduct and the DMC. Increased outflow from O'Neill Forebay to the California Aqueduct generally coincides with San Luis Reservoir releases during spring and summer. Water from the forebay is pumped into San Luis Reservoir largely during fall and winter when SWP demands are low and excess water can be stored. The combined operation of these facilities determines the quality of water in the forebay. The potential contaminant sources, the type of contaminants resulting from these sources, and likelihood for such contamination are described in Table 2-7, below.

Coliform samples were collected from the north and south swimming beaches in O'Neill Forebay during the nonpeak workweek, when there was little or no swimming activity. Coliform and Escherichia Coliform (E. coli) were recorded as either present or absent; quantitative values were not determined (DWR 2001). Total coliforms were presented in all samples at both beach locations, and E. coli was present in 13 of the 17 samples collected from the north beach and 6 of the 17 samples from the south beach. Although quantitative data are not available, the available information suggests that occurrence of coliforms may be more frequent and concentrations may be higher during the high-use periods (weekends and holidays).

DWR routinely collects water quality samples in the DMC upstream of the connection with O'Neill Forebay, including minerals, minor elements, nutrients, and other constituents (i.e., total carbon, bromide, UVA). All data were below the primary and secondary MCLs for the 1996 to 1999 period. However, as indicated in the *Sanitary Survey Update Report 2001*, of the PCS identified for O'Neill Forebay shown in Table 2-7, none would likely be large enough to overshadow the effects of state and federal inflows (DWR 2001).

Table 2-7
Potential Contaminant Sources for O'Neill Forebay

POTENTIAL CONTAMINANT SOURCES (PCS)	TYPE OF CONTAMINANTS RESULTING FROM PCS	POTENTIAL FOR CONTAMINATION FROM PCS
Delta Mendota Canal (DMC)	Salt, carbon loads, agricultural drainage, and other unspecified water quality constituents	Inflows from the DMC, California Aqueduct, and San Luis Reservoir largely control water quality in O'Neill Forebay. The DMC generally has higher salinity than the California Aqueduct upstream of O'Neill Forebay, as evidenced by data in 1995, which showed the DMC loads for TDS, TOC, and bromide were higher than those of the California Aqueduct. The high number of bridge and railroad crossings above the DMC as well as drain inlets into the DMC may contribute to contaminants.
Recreation[1]	Turbidity and pathogens in runoff; diesel fuels, gasoline, hydrocarbon, and MTBE from boating activities	There have been no reports of spills or leaks from wastewater facilities (also unlikely to pose a threat because of sufficient capacity, distance from the forebay, and features that would alert of potential spills). Portable and permanent pit toilets pose a potential source of fecal contamination, but they are monitored and emptied as needed. With respect to hydrocarbons and MTBE, samples collected at the outlet from 1996 to 1999 contained no volatile organics and on one occasion, only 0.5 mg/L of MTBE. It is possible that the large inflow volumes to the forebay quickly dilute any MTBE released by boating activity. Total coliforms were presented in all samples at the north and south swimming beach locations, and E. coli was present in 13 of the 17 samples collected from the north beach and 6 of the 17 samples from the south beach.
Animal Populations (livestock grazing)	Nutrients, turbidity, and pathogens in runoff and erosion	Runoff from adjacent rangeland would likely be minimal due to the lack of major drainage channels and the flat topography.
Traffic Accidents / Spills	Oil, grease, other hydrocarbons in runoff, hazardous wastes from truck spills	No documented vehicle incidents during 1996 to 1999. However, SR 33 and 152 cross portions of O'Neill Forebay.
Fire	Nutrients, turbidity, and sediment loads	Minor threat to water quality.

Note:

1 Because the drawdown of San Luis Reservoir sometime affects its recreation potential, a proportionately greater investment was made toward recreation amenities at O'Neill Forebay.

Source: Sanitary Survey Update Report 2001, December 2001.

Table 2-8 identifies the conclusions and recommendations described in the *Sanitary Survey Update Report 2001* that would reduce the potential threat of drinking water quality degradation in O'Neill Forebay.

Table 2-8
Conclusions and Recommendations of the
***Sanitary Survey Update 2001,* O'Neill Forebay**

CONCLUSION	RECOMMENDATION
The DMC generally has higher salinity than the California Aqueduct upstream of O'Neill Forebay. In the future, more operational flexibility may be required at O'Neill Forebay to respond to variable water quality conditions.	Develop capability to forecast salinity and identify joint-use operations that could reduce the salinity of the SWP.
Fecal coliform bacteria are routinely detected in the north and south swim beaches during low-use periods. Reduction of project area fees that were enacted [prior to publication of the survey] [1] may result in increased recreational use	MTBE and pathogen monitoring data should continue to be collected in O'Neill Forebay.

Note: [1] The lowered fees are no longer applicable.

Source: Sanitary Survey Update Report 2001, December 2001

Los Banos Reservoir

DWR conducted discrete water quality sampling at and near Los Banos Reservoir between 1984 and 1990 as part of the study considering use of Los Banos Grandes Facilities as an offstream storage reservoir (DWR 1990). Water quality analyses of these data consisted of mineral, minor elements, nutrients, and asbestos. Routine samples were collected from Los Banos Creek at the confluence with Los Banos Reservoir, Los Banos Reservoir, and Salt Springs. Salt Springs is located about 1.5 miles west of Los Banos Dam and 0.25 mile north of the reservoir. Water quality data are provided in Table 2-9, below.

With the exception of Salt Springs, which is not a freshwater supply, the majority of surface water samples collected met state and federal drinking water standards (DWR 1990). No pesticides, herbicides, or synthetic organic compounds were detected.

Table 2-9
Summary of Surface Water Quality – Los Banos Reservoir

ELEMENT	LOS BANOS CREEK (NEAR RESERVOIR DAM)	LOS BANOS RESERVOIR	SALT SPRINGS
Sodium	86	50	6,310
Hardness	284	206	6,450
Calcium	52	37	436
Magnesium	37	27	1,302
Potassium	2.7	3.3	11.2
Alkalinity	268	178	357
Sulfate	79	74	14,012
Chloride	81	39	3,580
Fluoride	0.4	0.2	2.1
Boron	1.9	0.6	17
Dissolved solids	569	372	27,986
pH	8.2	8.3	7.9
Arsenic	0.01	0.01	0.00
Barium	<0.5	<0.5	<0.5
Cadmium	<0.005	<0.005	<0.005
Chromium	<0.005	<0.005	<0.005
Cooper	<0.005	0.01	0.02
Iron	0.04	0.027	0.02
Lead	<0.005	<0.005	<0.005
Manganese	0.03	0.09	0.37
Mercury	<0.001	<0.001	<0.001
Selenium	<0.001	0.002	0.052
Zinc	0.01	0.01	0.043
Asbestos	28.5	85	55
Turbidity (NTU)	6	3	6
Total ammonia + organic nitrogen	0.5	0.8	1.9
Dissolved nitrate + nitrite	.07	0.03	0.92
Dissolved ammonia	.01	0.08	0.06
Dissolved orthophosphate	0.03	0.05	0.02
Total phosphorus	0.05	0.07	0.06

Air Quality

The project area is located on the western edge of the San Joaquin Valley Air Basin (SJVAB), which includes Fresno, Kings, Madera, Merced, San Joaquin, Stanislaus, and Tulare counties, and portions of Kern County. The project area is located entirely within Merced County and falls in the San Joaquin Valley

Unified Air Pollution Control District (SJVUAPCD). The Basin and the District are in the San Joaquin Valley, an inter-mountain valley bounded to the east by the Sierra Nevada, to the west by the Coastal Mountain Range, and to the south by the Tehachapi Mountains. The Basin is predominately agriculturally oriented, with some industrial activities in the cities of Bakersfield, Lathrop, Kingsburg, Madera, Riverbank, Corcoran, Stockton, Fresno, Tracy, Elk Hills, and Avenal. Of the land, 31% is publicly owned; 29% is controlled by the federal government, and 2% is controlled by the state. The District is required by state law to achieve and maintain the federal and state ambient air quality standards. Ambient air quality standards are levels of air pollutants that are considered unhealthy if exceeded.

Airflow patterns within the SJVAB change throughout the year. Summer conditions in the Basin are hot and dry, with airflow dominated by a semi-permanent sub-tropical high-pressure zone causing winds to be light and variable. Summer inversion layers are also common, further decreasing dispersion throughout the basin during summer months. Winds in some portions of the project area are known to be much stronger, even to the point of creating hazards. High winds are a constant impediment to project area use, requiring the installation of warning lights for boater safety as well as extensive tree planting to shelter camping and picnic areas. Between April and August, wind velocities in portions of the project area are 10 miles per hour or above over 65% of the time. No data are available regarding the effects of local winds on air quality in the immediate vicinity of the project area.

The SJVAB experiences mild winters dominated by frontal systems and troughs originating in the northern Pacific Ocean. Winter rains are followed by atmospheric instabilities and increased vertical mixing of the atmosphere, which leads to increased air quality during winter months. Fronts and troughs are frequently pushed north by high-pressure systems, which causes decreased winds and poorer dispersion. Airflow and dispersion are greatest during spring and fall months with increased winds. Spring and fall temperature differences between coastal and valley air cause wind direction to change frequently while also increasing wind velocity. The strongest winds in the region occur from April through August, with velocities as high as 30 to 40 miles per hour.

The concentration of air pollutants in the SJVAB varies from day to day depending on the ability of the atmosphere to disperse pollutants. Dispersion is largely influenced by seasonal changes in airflow and by the surrounding topography, namely the mountain ranges surrounding the SJVAB. Air quality in Merced County exceeds the standards for ozone and particulate matter with a diameter of 10 micrometers or less (PM_{10}) (both of which are designated criteria pollutants) several days each year. Despite the area's extremely low emissions, it is subject to pollutants transported from areas of higher population density, higher vehicle traffic, and industrial activity. Major sources of PM_{10}, carbon monoxide, nitrogen oxides, reactive organic gasses, and other air pollutants exist in the metro areas of Stockton, Modesto, Merced, Fresno, Visalia, and Bakersfield. Northerly winds also transport pollutants from the greater Sacramento Area and the San Francisco Bay Area. Poor dispersion and mixing allow some accumulation of pollutants in the vicinity of the project area. However, air quality in Merced County has been increasing over the past decade as shown by decreased concentrations of ozone, PM_{10}, carbon monoxide, and nitrogen dioxide. Nonattainment of standards usually occurs during summer months when airflow and dispersion are lowest.

Noise

By definition, noise is human-caused sound that is considered unpleasant and unwanted. Whether a sound is considered unpleasant depends on the individual who hears the sound and the setting and

circumstance under which the sound is heard (e.g., while at work or while relaxing). Sounds found desirable during times of rest, relaxation, and outdoor activity, as provided in some portions of the project area, are referred to as natural quiet and include natural, outdoor ambient sounds without the intrusion of human-caused sounds. The enjoyment of natural sounds contributes to visitors' experience, and natural quiet can be essential for some individuals to achieve a feeling of peace and solitude. In contrast, noise within the project area results from human-made and mechanical sources, including motor vehicles, motorboats, aircraft overflight, and human activities such as talking and shouting.

The noise environment throughout project area is highly variable. Noise levels in primary use areas are primarily influenced by visitor activities, motor vehicles, and motorboats. In areas that receive less use, the ambient noise environment is dominated by natural quiet intermixed with noise generated by visitor uses. The majority of the existing recreational uses, including hiking, wind surfing, swimming, fishing, camping, and picnicking, constitute a minor noise source throughout the project area. However, noise from motor vehicles and motorized watercraft, including private automobiles and trucks, recreational vehicles, maintenance vehicles, motorboats, and personal watercraft, is noticeable throughout the primary use areas. In addition, project area operations and maintenance activities occasionally generate noise in some portions of the unit. Currently, noise-intensive operations and maintenance activities, such as the use of motor-driven equipment, do not contribute significantly to the noise environment although noise has never been measured at the project area.

Some land uses are considered more sensitive to ambient noise levels than others due to their associated activities and degree of noise exposure, including both exposure duration and insulation from noise. Residences, hotels and motels, schools, libraries, churches, hospitals, and parks and other outdoor recreation areas are generally more sensitive to noise than commercial and industrial land uses. Sensitive receptors in the project area include staff residences and visitors engaging in uses such as hiking, nature study, wildlife viewing, or fishing on quieter areas of the reservoir.

Biotic Resources

Introduction

Significant biotic resources at the project area were determined through the following: a review of existing documentation; consultation with biologists familiar with the local biological resources; consultation with Department employees; and data collected by EDAW biologists during reconnaissance-level surveys in September and October 2002, and June 2003. Significant biotic resources are defined as those that are important to the essential character of the unit, significant regionally or statewide; or documented as significant on recognized protection or preservation lists (DPR 2002). Copies of the filed surveys can be found in Appendix B. Sources of information reviewed by EDAW biologists include the California Natural Diversity Database (DFG 2002) and the California Native Plant Society's Inventory of Rare and Endangered Vascular Plants (CNPS 2002).

Regulatory Background

State and some federal regulatory compliance issues that may need to be addressed prior to implementation of the Plan are discussed below with additional federal regulations noted in Chapter 4.

Federal Regulatory Issues

Federal Endangered Species Act. Pursuant to the federal Endangered Species Act (ESA), U.S. Fish and Wildlife Service (USFWS) has regulatory 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 of such species. 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 and participation in the conservation and recovery of federally listed species and designated critical habitat. Section 7(a) (2) requires federal agencies to consult with other federal agencies with regulatory authority to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat. Critical habitat identifies specific areas that have the physical and biological features that are essential to the conservation of a listed species, and that may require special management considerations or protection.

For projects where a federal nexus is not involved and take of a listed species may occur, the project proponent may seek to obtain an incidental take permit 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.

Clean Water Act. The U.S. Army Corps of Engineers (USACE) regulates the placement of fill into Waters of the U.S. under Section 404 of the Clean Water Act. Waters of the U.S. include lakes, rivers, streams, and their tributaries and wetlands. Wetlands are defined under Section 404 as areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions. Activities that require a permit under Section 404 include, but are not limited to, placing fill or riprap, grading, mechanized land clearing, and dredging. Any activity that results in the deposit of dredge or fill material within the "Ordinary High Water Mark" of Waters of the U.S. usually requires a permit from USACE, even if the area is dry at the time the activity takes place. A variety of processes are available for obtaining Section 404 authorization from USACE, ranging from the Nationwide Permit Process to the Individual Permit Process.

State Regulatory Issues

California Endangered Species Act. Pursuant to the California Endangered Species Act (CESA), a permit from California Department of Fish and Game (DFG) is required for projects that could result in take of state-listed Threatened or Endangered species. Section 2080 of CESA prohibits take of state-listed species. The take of state-listed species incidental to otherwise lawful activities requires a permit, pursuant to Section 2081(b) of CESA. The state has the authority to issue an incidental take permit under Section 2081 of the Fish and Game Code, or to coordinate with USFWS during the Section 10(a) process to make the federal permit also apply to state-listed species.

Section 1600 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 Section 1601 of the California Fish and Game Code. Section 1601 makes it unlawful for any governmental agency, state or local, and 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 without first notifying DFG of such activity. The regulatory definition of a stream is a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation. The DFG's jurisdiction within altered or artificial waterways is based on the value of those waterways to fish and wildlife. A DFG Streambed Alteration Agreement must be obtained for any project that would result in an impact to a river, lake, or stream that would adversely affect any fish or wildlife resource.

Section 3503 of the California Fish and Game Code. Section 3503.5 of the California Fish and Game Code states that it is "unlawful to take, possess, or destroy any birds-of-prey in the Orders Falconiformes or Strigiformes." These Orders include hawks, owls, eagles, and falcons. The loss of an active nest is considered a violation of this code by DFG. This statute does not provide for the issuance of any type of incidental take permit. Section 3503 prohibits unlawful take, possession or needless destruction of the nest or eggs of any bird.

Special-Status Species

Special-status species include plants and animals in the following categories:

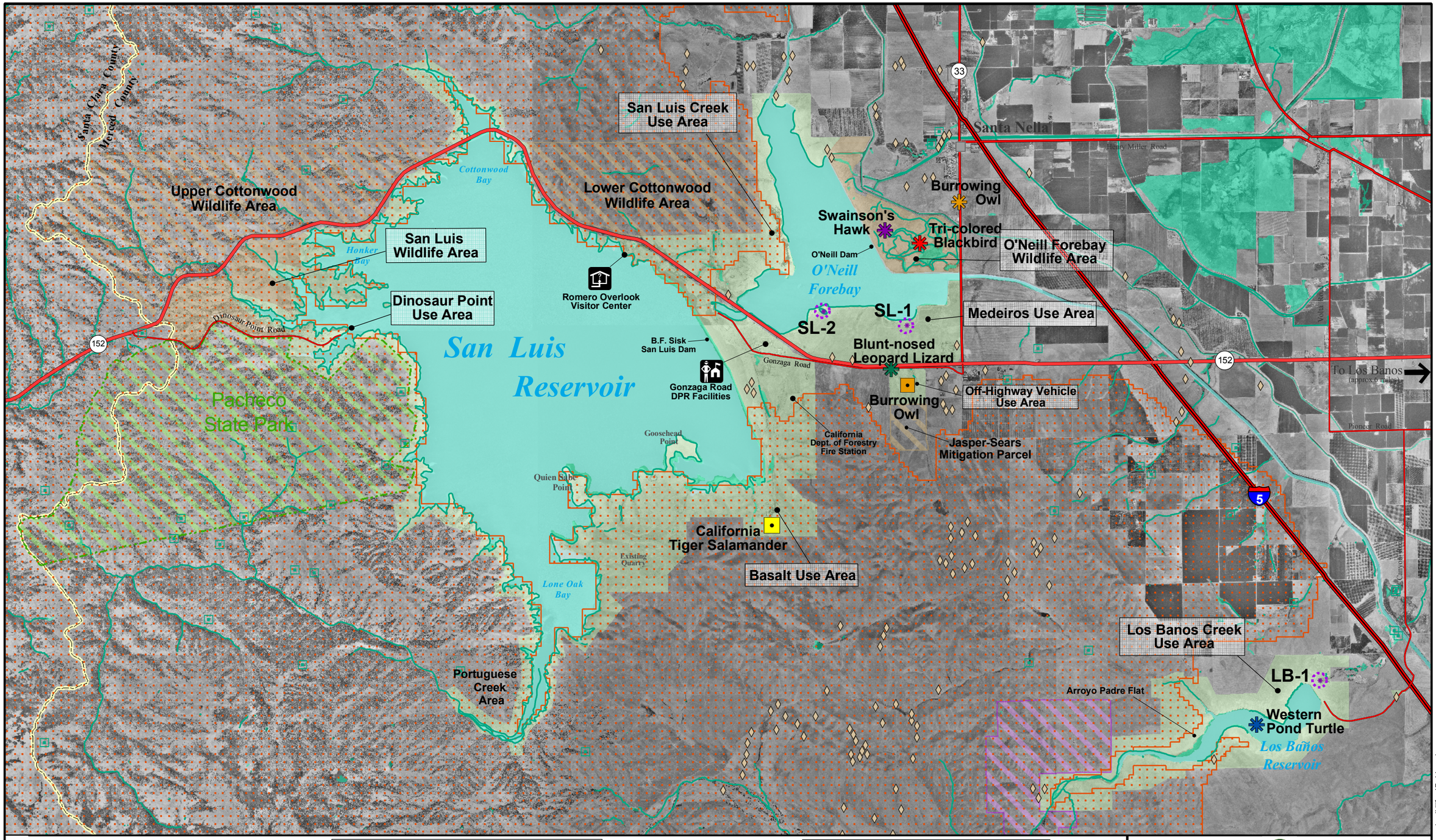
- Species listed or proposed for listing as Threatened or Endangered under ESA or CESA;
- Species considered as candidates for listing as Threatened or Endangered under ESA or CESA;
- Wildlife species identified by DFG as Species of Special Concern (an administrative designation used to try to prevent these animals from becoming threatened or endangered by addressing issues of concern early enough to secure long-term viability of the species);
- Animals fully protected under the California Fish and Game Code; and
- Plants on the California Native Plant Society's (CNPS) 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).

Significant Wildlife

A list of special-status wildlife species known to occur, or that could occur, in the project area is presented in Table 2-10. A thorough biological inventory has not yet been completed at the project area. However, based on information compiled for this report, it has been determined that the unit provides important habitat for the following special-status wildlife species and that these species should be considered significant resources: San Joaquin kit fox (*Vulpes macrotis mutica*), California red-legged frog (*Rana aurora draytonii*), valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), California tiger salamander (*Ambystoma californiense*), tricolored blackbird (*Agelaius tricolor*), and western pond turtle (*Clemmys marmorata*). In addition, nesting and wintering habitat for special-status raptors should be considered as a significant resource value at the project area. Map 4 illustrates the locations of

selected wildlife species in the project area. Future biological studies and additions to the state and federal lists of threatened and endangered species could result in additional species meeting significant resource values criteria. The special-status wildlife species that could potentially occur within the project area are described in detail below.

San Joaquin kit fox. The San Joaquin kit fox is a state-listed Threatened and a federally listed Endangered species and, therefore, receives protection under both CESA and ESA. Prior to 1930, kit foxes inhabited most of the San Joaquin Valley from southern Kern County to northern San Joaquin County. The current range is thought to cover less than half of the original area, with the largest portion of the range remaining in the southern and western parts of the San Joaquin Valley (USFWS 1998). The decline of the kit fox has been attributed to the conversion of natural habitat to agricultural and urban uses, and by oil development. The loss of native upland habitat has resulted in much of the kit fox range becoming fragmented, which is considered a serious threat to their survival (USFWS 1998). Other factors that have been identified as threats to remaining kit fox populations include the use of rodenticides, disease, competition with larger canids, and factors related to California's increasing human population (e.g., vehicular mortality).



Source: USGS DOQQ / NWI Wetlands / CNDDB, 2002 / DPR 2002 / EDAW, 2002

1 0.5 0 1 2 Miles

Scale 1 : 79,200
1" = 1.25 miles

N

4/18/05

EDAW

Land Management and Ownership Status

- DPR and DWR managed (USBR owned)
- DFG managed (USBR owned)
- Pacheco State Park
- DFG owned and managed
- DWR owned

Wetlands
(USFWS National Wetlands Inventory)

- Polygon
- Line
- Point

Sensitive Species Data
Approximate / Reported Locations of Species Occurrence

- CNDDB (selected points) 2002
- DPR (reported by J. Karlton 1998-2002)
- San Joaquin Kit Fox (KFPACT)
- Red-Legged Frog Critical Habitat (USFWS 2001)
- LB-1 Wildlife Survey Location w/ Map ID# (EDAW 2002)

San Luis Reservoir State Recreation Area

MAP 4
Selected Wildlife Species

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Table 2-10
Special-status Species at San Luis Reservoir State Recreation Area

SPECIES	HABITAT	POTENTIAL FOR OCCURRENCE	CNPS	DFG	USFWS
INVERTEBRATES					
Valley Elderberry Longhorn Beetle *Desmocerus californicus dimorphus*	Elderberry shrubs	Status unknown but may be present. No elderberry shrubs found during 2002 field surveys.	--	--	FT
FISHES					
San Joaquin Roach *Lavinia symmetricus*	Small, warm intermittent streams	Status unknown but not expected due to the absence of suitable habitat.	--	CSC	--
AMPHIBIANS AND REPTILES					
California Tiger Salamander *Ambystoma californiense*	Vernal pools and stock ponds in grasslands	Status unknown but may be present. Undocumented reports from Basalt Use Area. Potential breeding habitat also present near the campground and may be present elsewhere in the project area.	--	CSC	FT
Western Spadefoot *Scaphiopus hammondii*	Vernal pools and other seasonal ponds	Status unknown but may be present.	--	CSC	--
California Red-legged Frog *Rana aurora draytonii*	Stock ponds and other natural and artificial permanent and seasonal aquatic habitats	The frog was observed in 2000 in the southern end of the San Luis Reservoir and filed with CNDDB. (J. Karlton, pers comm.. 2004) Status unknown but may be present. Not expected to breed in the project area due to the absence of stock ponds and other permanent water free of predatory fish. Additional surveys needed to confirm breeding status.	--	CSC	FT
Foothill Yellow-legged Frog *Rana boylei*	Generally restricted to shallow, flowing streams with some cobble-sized substrate	Not expected due to the absence of suitable habitat. Reported to the CNDDB as occurring upstream from Los Banos Reservoir in Los Banos Creek.	--	CSC	--
Western Pond Turtle *Clemmys marmorata*	Ponds, marshes, streams, and irrigation ditches	30 turtles were observed in the Portuguese Creek Area of San Luis Reservoir on 18 May 2004 (J. Karlton, pers. comm. 2004). Reported to the CNDDB from Los Banos Reservoir and dam in 1985. O'Neill Forebay also appears to be suitable habitat.	--	CSC	--

Table 2-10
Special-status Species at San Luis Reservoir State Recreation Area

SPECIES	HABITAT	POTENTIAL FOR OCCURRENCE	CNPS	DFG	USFWS
Blunt-nosed Leopard Lizard *Gambelia sila*	Sparsely vegetated plains, alkali flats, low foothills, washes, and arroyos	Not expected. Current range is restricted to areas farther south. The CNDDB includes a 1931 occurrence from the vicinity of the San Luis Dam.	--	CE, FP	FE
San Joaquin Whipsnake *Masticophis flagellum ruddocki*	grasslands	Status unknown but expected to occur. The CNDDB includes numerous occurrences from the Los Banos Valley.	--	CSC	--
alkali milk-vetch Astragalus tener var. tener	playas, grassland - adobe clay soils, vernal pools – alkaline soils; Mar-Jun; Elev. 1 - 60 meters	No potential habitat is present unless vernal pools or depressions are found in grasslands. Nearest occurrences in San Joaquin Valley.			1B
heartscale Atriplex cordulata	chenopod scrub, meadows and seeps, grassland – sandy, saline or alkaline soils; Apr-Oct; Elev. 1 - 375 meters	Potential habitat is present in iodine bush scrub along Salt Spring. Nearest known occurrences are located in San Joaquin Valley.			1B
brittlescale Atriplex depressa	chenopod scrub, meadows and seeps, playas, grassland, vernal pools - alkaline, clay soils; May-Oct; Elev. 1 - 320 meters	Potential habitat is present in iodine bush scrub. Nearest known occurrences are located in San Joaquin Valley.			1B
San Joaquin saltbush Atriplex joaquiniana	chenopod scrub, meadows and seeps, playas, grassland – alkaline soils; Apr-Oct; Elev. 1 - 320 meters	Potential habitat is present in iodine bush. Nearest known occurrences are located in San Joaquin Valley.			1B
vernal pool smallscale Atriplex persistens	vernal pools – alkaline soils; Jun-Oct?; Elev. 10 - 115 meters	No potential habitat is present unless alkali depressions are found in iodine bush scrub. Nearest known occurrences in San Joaquin Valley.			1B
Lost Hills crownscale *Atriplex vallicola*	chenopod scrub, grassland, vernal pools - alkaline soils; Apr-Aug; Elev. 50 - 635 meters.	No potential habitat is present unless alkali depressions are found in iodine bush scrub. Nearest known occurrence ca. 5 miles south of Los Banos Reservoir.			1B
big-scale balsamroot *Balsamorhiza macrolepis* var. *macrolepis*	chaparral, cismontane woodland, grassland – sometimes on serpentinite and basalt rock outcrops. Mar-Jun; Elev. 90 - 1400 meters	Potential habitat is present in on basalt rock outcrops within study area. Nearest known occurrence in Pacheco State Park on slopes above San Luis Reservoir.			1B

Table 2-10
Special-status Species at San Luis Reservoir State Recreation Area

SPECIES	HABITAT	POTENTIAL FOR OCCURRENCE	CNPS	DFG	USFWS
hispid bird's-beak *Cordylanthus mollis* ssp. *hispidus*	meadows and seeps, playas, grassland – alkaline soils; Jun-Sep; Elev. 1 - 155 meters	Potential habitat is present in iodine bush scrub along Salt Spring. Nearest known occurrences ca. 5 miles south of Los Banos Reservoir.			1B
Hospital Canyon larkspur *Delphinium californicum* ssp. *interius*	chaparral – openings, cismontane woodland, (mesic); Apr-Jun; Elev. 230 - 1095 meters	Potential habitat is present in oak woodland. Nearest known occurrence ca. 4 miles north of San Luis Reservoir.			1B
recurved larkspur *Delphinium recurvatum*	chenopod scrub, cismontane woodland, grassland – alkaline soils; Mar-May; Elev. 3 - 750 meters	Potential habitat is present in iodine bush scrub along Salt Spring. Nearest known occurrences at Salt Creek 3 miles south of Los Banos Reservoir.			2
Santa Clara liveforever *Dudleya setchelii*	cismontane woodland, grassland - serpentinite, rocky; Apr-Jun; Elev. 60 - 455 meters	No potential habitat is present. Species is present on serpentine substrates possibly in western portion of Pacheco State Park.		CE	1B
four-angled spikerush *Eleocharis quadrangulata*	marshes and swamps freshwater habitats; May-Sep; Elev. 30 - 500 meters	Potential habitat is present in wetland and marsh habitats including reservoir. Nearest known occurrence is in San Joaquin Valley.			2
round-leaved filaree *Erodium macrophyllum*	cismontane woodland, grassland – clay soils; Mar-May; Elev. 15 - 1200 meters	Potential habitat is present in the grasslands. Nearest known occurrence is in Pacheco State Park.			1B
Delta button-celery *Eryngium racemosum*	drainages and depressions with vernally mesic clay soils; Jun-Sep; Elev. 3 - 30 meters	No potential habitat is present. Nearest occurrences in San Joaquin Valley to east.			1B
Congdon's tarplant *Hemizonia parryi* ssp. *congdonii*	grassland – alkaline; May-(Nov) Elev. 1 - 230 meters	Potential habitat is present. Nearest known occurrence is in Pacheco State Park.			1B
Napa western flax *Hesperolinon* sp. nov. *"serpentinum"*	chaparral - serpentinite; May-Jul; Elev. 50 - 800 meters	No potential habitat is present. Nearest known occurrence serpentine substrates ca. 6 miles northwest of San Luis Reservoir.			1B
Hall's bush mallow *Malacothamnus hallii*	chaparral, coastal scrub, grassland; May-Sep; Elev. 10 - 760 meters	Potential habitat is present in sage scrub and mesic grassland. Nearest known occurrence is near Pacheco Pass and ca. 6 miles w-sw of Los Banos Reservoir			1B

Table 2-10
Special-status Species at San Luis Reservoir State Recreation Area

SPECIES	HABITAT	POTENTIAL FOR OCCURRENCE	CNPS	DFG	USFWS
marsh microseris *Microseris paludosa*	closed-cone coniferous forest, cismontane woodland, coastal scrub, grassland; Apr-Jun; Elev. 5 - 300 meters	Potential habitat is present in oak woodland, sage scrub and grassland. Nearest known is ca. 13 miles SW in vicinity of Little Quien Sabe Valley.			1B
shining navarretia *Navarretia nigelliformis* ssp. *radians*	cismontane woodland, grassland, vernal pools; May-Jul; Elev. 90 - 1000 meters	Potential habitat not present – no vernal pools observed in study area. Nearest known occurrence is in Los Banos Valley in vicinity of Billy Wright Rd.			1B
prostrate navarretia *Navarretia prostrata*	coastal scrub, grassland - alkaline soils, vernal pools – mesic habitats; Apr-Jul; Elev. 15 - 700 meters	Potential habitat not present unless vernal pools or depression are found in sage scrub and grassland. Nearest known occurrences is in San Joaquin Valley.			1B
slender-leaved pondweed *Potamogeton filiformis*	marshes and swamps - assorted shallow freshwater habitats; May-Jul; Elev. 300 - 2150 meters	Potential habit in reservoirs and ponds. Nearest known occurrence is in San Joaquin Valley north of Volta, CA.			2
Sanford's arrowhead *Sagittaria sanfordii*	marshes and swamps - shallow freshwater habitats; May-Oct; Elev. 0 - 610 meters	Potential habit in reservoirs and ponds. Nearest known occurrence is in San Joaquin Valley.			1B
rayless ragwort *Senecio aphanactis*	chaparral, cismontane woodland, coastal scrub – drying alkaline flats; Jan-Apr; Elev. 15 - 800 meters	Potential habitat in sage scrub and oak woodland. Nearest known occurrence is ca. 10 miles SE of Los Banos Reservoir in "hills."			2
Arburua Ranch jewel-flower *Streptanthus insignis* ssp. *lyonii*	coastal scrub, sometimes on serpentinite; Mar-May; Elev. 230 - 855 meters	Potential habitat in sage scrub and possibly adjacent oak woodlands. Nearest known occurrence is in Los Banos Valley on slops along South Fork Los Banos Creek.			1B
Wright's trichocoronis *Trichocoronis wrightii* var. *wrightii*	meadows and seeps, marshes and swamps, riparian forest, vernal pools – alkaline soil; drying mud; May-Sep; Elev. 5 - 435 meters	Potentially in drying mud at edges of wet areas including reservoirs. Nearest known occurrences is in San Joaquin Valley near Los Banos.			2

Table 2-10
Special-status Species at San Luis Reservoir State Recreation Area

SPECIES	HABITAT	POTENTIAL FOR OCCURRENCE	CNPS	DFG	USFWS
BIRDS					
Swainson's Hawk *Buteo swainsoni*	Grasslands, riparian woodland, and agricultural fields	Known to occur at project area (observed during 2003 field surveys). Known to nest in the area including recent CNDDB records from O'Neill Forebay Wildlife Area (2001) and Los Banos Valley (1985).	--	CT	--
Golden Eagle *Aquila chrysaetos*	Grasslands, open woodlands	Status unknown but known to occur. Suitable nesting habitat present.	--	CSC	--
Bald Eagle *Haliaeetus leucocephalus*	Usually found in grasslands and open woodlands near large bodies of water	May winter in small numbers at Los Banos Reservoir, San Luis Reservoir, and O'Neill Forebay. Not expected to nest in the project area.	--	CE	PD
Prairie Falcon *Falco mexicanus*	Grasslands and other open habitats with nearby cliff for nesting sites	Known to occur at Los Banos Reservoir (observed during 2002 field surveys). Suitable nesting located on cliff upstream and above Los Banos Reservoir.	--	CSC	--
Northern Harrier *Circus cyaneus*	Grasslands, marshes, and agricultural fields	Observed during 2002 field surveys. Nesting status not determined but suitable nesting habitat is present.	--	CSC	--
Ferruginous Hawk *Buteo regalis*	Grasslands and agricultural fields	Status unknown but likely a regular winter visitor.	--	CSC	--
Mountain Plover *Charadrius montanus*	Grasslands and agricultural fields on flat terrain	Status unknown but may be an uncommon winter visitor.	--	CSC	PT
Burrowing Owl *Athene cunicularia*	Grasslands and agricultural fields	Road kill on Basalt Road on 10 January 2004. Observed at OHV area by staff conducting surveys at site in 2003 (J. Karlton, pers. comm. 2004). Status unknown but likely to occur in small numbers during winter and the nesting season. Burrowing owls were also recently observed on the DWR parcel (fall 2004), just west of the SRA boundary.[1]	--	CSC	--
California Horned Lark *Eremophila alpestris actia*	Grasslands and agricultural fields	Observed during 2002 surveys. Nesting status unknown but suitable habitat is present.	--	CSC	--

Table 2-10
Special-status Species at San Luis Reservoir State Recreation Area

SPECIES	HABITAT	POTENTIAL FOR OCCURRENCE	CNPS	DFG	USFWS
Loggerhead Shrike *Lanius ludovicianus*	Grasslands and agricultural fields	Observed during 2002 surveys. Nesting status unknown but suitable habitat is present	--	CSC	--
Tricolored Blackbird *Agelaius tricolor*	Freshwater marsh, riparian habitat, and agricultural fields	Known to nest and forage at project area (observed during 2003 field surveys). Emergent marsh habitat at Los Banos Reservoir may be suitable nesting habitat. Known to nest at O'Neill Forebay Wildlife Area.	--	CSC	--
White-tailed Kite *Elanus leucurus*	Grasslands and agricultural fields	Observed in family groups (and likely nests in the area) in the riparian trees at the base of San Luis Dam over multiple years (2000-2004).[1]	--	FP	--
MAMMALS					
San Joaquin Kit Fox *Vulpes macrotis mutica*	Grasslands and open scrub	Known to occur in small numbers. Road kill on upper road of Los Banos Creek Area on 9 September 1999 (J. Karlton, pers. comm.. 2004). Observed crossing Basalt Road beyond Goosehead Point Road on 7 September 2003 (J. Karlton, pers. comm.. 2004). Few documented occurrences in recent years suggest an unstable and possibly declining population.	--	CE	FE

California Native Plant Society (CNPS)
List1A – species considered extinct in California
List 1B - rare and endangered in California and elsewhere
List 2 - species considered rare and endangered in California but more common elsewhere

California Department of Fish and Game (DFG)
CE - State-listed, Endangered
CT - State-listed, Threatened
CSC - California Species of Special Concern
FP - Fully Protected

USFWS
FE - Federal Endangered
FT - Federal Threatened
FC - Federal Candidate
PT - Proposed for listing as Threatened
PD – Proposed for delisting

Source: CNDDB 2004; EDAW 2004 (USGS Quad Maps: Crevison Peak, Pacheco Pass, Mariposa Peak, Howard Ranch, San Luis Dam, Los Banos Valley, Ingomar, Volta, Ortigalita Peak NW.)
[1] *Source: Letter from DFG, January 18, 2005*

The current status of the kit fox in the project area is not known. However, kit foxes were documented in the vicinity of the unit on numerous occasions during the 1990s and were observed once in 2003 (J. Karlton, pers. comm. 2004). Therefore, it is presumed that small numbers of kit foxes are likely present, at least for short durations, in the project area. There are several factors contributing to the uncertainty of the status of the kit fox. Kit foxes are nocturnal and seldom detected without intensive surveys; focused kit fox surveys have not been conducted at the project area. Also, most recent kit fox detections have

been limited to single individuals identified during spotlighting surveys or by other survey methods (e.g., track stations). No natal (i.e., breeding) dens have been documented in the unit. Therefore, it is not known if a reproducing kit fox population exists on the unit or if their presence is limited to individuals occasionally using the unit as a travel corridor.

A recovery plan for the kit fox and other upland species of the San Joaquin Valley was issued by USFWS in 1998. The USFWS defines recovery as the process by which the decline of an endangered or threatened species is arrested or reversed and threats to its survival are neutralized, so that its long-term survival in nature can be ensured (USFWS 1998). Recovery plans delineate, justify, and schedule the research and management actions necessary to support recovery of a species. The USFWS recovery plan includes development of a conservation strategy so that various agencies can work collectively to positively impact declining populations of the kit fox and other threatened or endangered species in the valley.

A recovery action specified by USFWS that is particularly applicable to the project area is to "protect existing kit fox habitat in the northern, northeastern segments of their geographic range and existing connections between habitat in those areas and habitat farther south." The USFWS considers the Santa Nella area, including portions of the unit, as crucial to the continued existence of the San Joaquin kit fox because this area has provided a narrow corridor connecting the northern and southern kit fox populations (KFPACT 2002). The Kit Fox Planning and Conservation Team (KFPACT), which consists primarily of biologists representing state and federal agencies, has recently identified the range of the kit fox in this region. In the vicinity of the project area, the kit fox range is confined between San Luis Reservoir on the west, and agricultural lands and wetlands to the east. Future urban development in the vicinity of Santa Nella threatens to increase fragmentation in this region and potentially isolate the northern kit fox range population from their southern counterparts (KFPACT 2002). Additionally, the proposed Los Banos Grandes Reservoir, which would be located just upstream from Los Banos Reservoir, would significantly impact a large portion of existing kit fox habitat (KFPACT 2002). Los Banos Grandes Reservoir has been in the planning stages since the late 1970s as a potential water storage facility for the Sacramento-San Joaquin Delta but implementation has been delayed by environmental and cultural concerns (KFPACT 2002). The KFPACT is currently drafting a strategy to preserve kit fox habitat and protect kit foxes in this region. As part of this effort, the KFPACT has developed a conceptual map of potential kit fox corridors. One of the corridors under consideration by the KFPACT includes the narrow band of upland habitat between San Luis Reservoir and O'Neill Forebay. Another potential corridor has been identified along the eastern edge of San Luis Reservoir.

California Red-legged Frog. The California red-legged frog (*Rana aurora draytonii*) is federally listed as Threatened and a California Species of Special Concern. This subspecies of red-legged frog occurs from sea level to elevations near 5,000 feet. It has been extirpated from 70% of its former range and now is found primarily in coastal drainages of central California, from Marin County south to northern Baja California. Potential threats to the species include elimination or degradation of habitat from land development and land use activities and habitat invasion by non-native aquatic species (USFWS 2002).

The California red-legged frog requires a variety of habitat elements with aquatic breeding areas typically located within a matrix of riparian and upland dispersal habitats. Breeding sites of the California red-legged frog include freshwater habitats such as pools and backwaters within streams and creeks, ponds, marshes, springs, and lagoons. Additionally, California red-legged frogs frequently breed in artificial impoundments such as stock ponds (USFWS 2002) both permanent and seasonal (DFG 2005).

Since focused surveys and a thorough habitat evaluation have not been completed, the status of this species within the unit cannot be described. Based on the scarcity of suitable habitat and the limited records reported to the California Natural Diversity Database (CNDDB), this species is currently not expected to breed within the unit. Los Banos Reservoir, San Luis Reservoir, and O'Neill Forebay are all considered unsuitable breeding habitat due to abundant populations of non-native, predatory fish. Although suitable breeding habitat is limited to nonexistent at the project area, California red-legged frogs probably do occur on the unit since significant breeding populations have been found nearby. California red-legged frogs are abundant in many of the stock ponds at Pacheco State Park (Fitzpatrick, pers. comm., 2002). Red-legged frogs have also been found in 12 of the 13 large stock ponds at Upper Cottonwood Creek Wildlife Area; the only pond where they were absent supported a large population of non-native, predatory crayfish (Allen, pers. comm., 2002). California red-legged frogs were also reported to the CNDDB from the vicinity of Los Banos Creek in 1985. Therefore, despite the lack of suitable breeding ponds, red-legged frogs are expected to occur at least occasionally in both the upland and aquatic environments of the project area.

The project area is within the area designated as critical habitat for the red-legged frog (USFWS 2002). By definition, only aquatic and upland areas where suitable breeding and nonbreeding habitats are interspersed throughout the landscape and are interconnected by unfragmented dispersal habitat qualify as critical habitat for the red-legged frog. The critical habitat designation has been challenged in court and the status of the case has not been resolved. However, the designation remains in effect pending the outcome of the decision.

Valley Elderberry Longhorn Beetle. The valley elderberry longhorn beetle was listed as Threatened on August 8, 1980 (USFWS 1980). The beetle is dependent on its host plant, elderberry (*Sambucus* ssp.), which is a common component of the remaining riparian forest of the Central Valley. The amount and distribution of suitable habitat for the valley elderberry longhorn beetle has been reduced by the extensive destruction of California's Central Valley riparian forest that has occurred during the last 150 years due to agricultural and urban development (USFWS 1980). Loss of nonriparian habitat where elderberry occurs (e.g., savanna and grassland adjacent to riparian habitat, oak woodland, mixed chaparral-woodland), and where the beetle has been recorded, suggests further reduction of the beetle's range and increased fragmentation of its upland habitat (Barr 1991).

The status of the valley elderberry longhorn beetle at the project area is unknown. Elderberry shrubs were not found in the unit during 2002 surveys but these surveys were not conducted at a level of intensity to determine if they are absent. In fact, it is known that elderberry shrubs do exist within the boundaries of the unit. The CNDDB includes one occurrence from the vicinity of the unit; in 1987 two valley elderberry longhorn beetles were collected along Los Banos Creek, approximately 6 miles southeast of San Luis Reservoir. If elderberry shrubs are found at the project area, it is possible that they could support valley elderberry longhorn beetles.

California Tiger Salamander. The California tiger salamander is considered a candidate for listing as Threatened or Endangered by USFWS and a California Species of Special Concern by DFG. This large terrestrial salamander is generally restricted to grasslands below 2,000 feet. California tiger salamanders move from subterranean refuge sites (e.g., small mammal burrows) to breeding sites (e.g., vernal pools, seasonal ponds, etc.) following relatively warm winter and spring rains (October through May). Tiger salamanders can successfully breed in artificial impoundments (e.g., stock ponds) if they don't contain fish.

Because tiger salamanders have been known to travel long distances to reach suitable breeding ponds, DFG considers upland habitat within one kilometer (0.62 mile) of potential breeding locations as potential habitat for California tiger salamanders (DFG 1997). A minimum of 10 weeks is required to complete development through metamorphosis (Jennings and Hayes 1994).

While breeding by tiger salamanders has been documented in permanent ponds, if predatory fish or bullfrogs occur in the pond breeding will mostly likely be unsuccessful (Jennings and Hayes 1994). The presence of western newts in ponds also indicates that the ponds may not be suitable sites for tiger salamander breeding. However, herpetologists attribute this to evidence that suggests that western newts and California tiger salamanders generally prefer different breeding and upland habitat, not that one species precludes the presence of the other (Barry, pers. comm., 2002). Tiger salamanders are restricted to valley and foothill grasslands; western newts tend to occupy creeks and ponds in open canyons with nearby wooded areas. California newts have not been reported at the project area but they are common in several of the permanent stock ponds at Pacheco State Park.

Surveys for tiger salamanders have not been conducted at the project area and no effort has been made to evaluate potential habitat within the unit during the winter or spring when vernal pools can be readily located. Tiger salamanders were documented at several locations in the vicinity of the unit in the 1980s and 1990 (CNDDB 2002). There are also undocumented occurrences of adult tiger salamanders from the Basalt Campground area (Karlton, pers. comm., 2002). Although it appears that suitable breeding habitat for the California tiger salamander is limited at the project area, the status of this species within the unit cannot be described with any degree of certainty until focused surveys and/or a thorough habitat evaluation is conducted.

Tricolored Blackbird. The tricolored blackbird is a California Species of Concern. Of the world population of tricolored blackbirds, 95% occurs in California (PRBO 2002). Surveys indicate that populations have been rapidly declining for decades. The main causes for the decline are loss of native wetland habitat for nest building, loss of associated foraging habitat, disturbance and mortality by predators and humans, destruction of colonies by agricultural practices, direct poisoning, and poisoning by selenium (Beedy *et al.* 1991).

For breeding, this highly gregarious species prefers freshwater marshes with dense stands of cattails and/or bulrushes, and occasionally willows, thistle, mustard, and blackberry tangles. Often nesting colonies contain only tricolored blackbirds, with perhaps a few red-winged or yellow-headed blackbirds on the periphery. These colonies are very dense and, due to the gregariousness of these blackbirds, have ranged in size from about 50 pairs to over 200,000 pairs (Small 1994). During fall and winter, nomadic flocks join feeding and roosting aggregations of other blackbirds at feed lots and in agricultural fields.

Approximately 1,000 tricolored blackbirds were observed at the Medeiros Use Area during the June 2003 field survey. The birds were found at numerous locations along the O'Neill Forebay shoreline. Smaller flocks were also seen foraging in the fields south of the use area. As many as 200 tricolored blackbirds were presumed to be nesting in a large depression adjacent to the forebay. The nesting site was located within a large area of emergent marsh vegetation surrounded by willows and other woody riparian vegetation. Numerous fledgings were observed being fed by adults, indicating that many of the nesting attempts were successful. It was not determined if tricolored blackbirds were using other riparian and emergent vegetation along the shoreline of the forebay to nest, but many of these areas appeared to

be suitable to support at least small number of nesting pairs. Suitable habitat was also noted at several other locations in the project area.

A few tricolored blackbirds were also observed at O'Neill Forebay Wildlife Area, which has been identified as one of the eight most important tricolored blackbird nesting locations for potential conservation action (PRBO 2001). O'Neill Forebay Wildlife Area colony included 7,500 birds in 1993 but was reduced to 130 nonbreeding birds by 2000. The reason for the decline has been attributed to a decline in the Himalayan blackberry that was used as the nesting substrate due to rising water (PRBO 2002).

Western Pond Turtle. The western pond turtle is a California Species of Special Concern as well as a Federal Species of Concern. This aquatic turtle is found in a variety of habitats, including lakes, rivers, streams, and stock ponds. They usually leave the aquatic site to reproduce and overwinter. Pond turtles nest in upland habitat, sometimes 400 meters or more from aquatic sites.

Western pond turtles were not found on the unit during 2002 field surveys. However, 30 turtles were observed in the Portuguese Creek and San Luis Creek in San Luis Reservoir and in the upper reaches of Los Banos Reservoir (J. Karlton, pers. comm.. 2004). They are also known to occur in O'Neill Forebay. They could also persist in some of the smaller permanent aquatic habitats present at the project are such as the pond located below the Los Banos Reservoir dam. The CNDDB includes a 1985 occurrence from Los Banos Reservoir and pond turtles were observed by an EDAW biologist in a stock pond immediately adjacent to San Luis Reservoir at Pacheco State Park in 2002.

Special-status Raptors. Special-status raptors known or expected to occur in the unit include bald eagle, golden eagle, Swainson's hawk, prairie falcon, ferruginous hawk, burrowing owl, northern harrier and white-tailed kite. Bald eagle is currently state and federally listed as endangered but has recently been proposed for federal delisting. Swainson's hawk is state listed as Threatened. The other species have been identified as California Species of Special Concern. With the exception of ferruginous hawk and bald eagle, which are only expected to occur in the unit during winter, all of these raptors could potentially use the unit as nesting habitat.

Prairie falcons are typically found in open, arid habitats near suitable cliffs for nesting. Prairie falcons were observed upstream from Los Banos Reservoir during 2002 field surveys. Prairie falcons are known to nest on the cliffs above Los Banos Creek at the upper end of the reservoir (Karlton, pers. comm., 2002). The CNDDB also includes several prairie falcon nesting occurrences in the region.

In the Central Valley of California, Swainson's hawk nest in riparian woodland and in isolated trees near suitable foraging habitat, which includes grasslands and field crops. In California, Swainson's hawks usually arrive at nesting sites in March and April. In the fall, they depart California for wintering locations in Mexico and South America. A Swainson's hawk was observed perched on a fencepost at Medeiros Use Area during the June 2003 field survey. A Swainson's hawk was also observed soaring above O'Neill Forebay Wildlife Area in June of 2003. Nesting was documented at the wildlife area 2001 and in Los Banos Valley in 1985 (CNDDB 2002). Suitable nesting habitat for Swainson's hawk is present at the project area.

In California, bald eagles are found in a variety of habitats in winter with the largest concentrations found in areas with large bodies of water that support abundant prey such as fish or waterfowl. Bald eagles

have occasionally been seen during winter at O'Neill Forebay (Milam, pers. comm., 2002). They could also occur in small numbers at San Luis and Los Banos reservoirs. Bald eagles are not currently known or expected to nest in the vicinity of the unit. The CNDDB does not include any reports of bald eagles from the unit.

Burrowing owl, golden eagle, ferruginous hawk, and northern harrier are all known, or expected, to occur within the unit. Northern harrier was observed during 2002 field surveys. Several burrowing owl occurrences from the vicinity of the unit have been reported to the CNDDB. Burrowing owls were also recently observed on the DWR parcel in fall 2004, just west of the DWR/SRA boundary (DFG 2005). Golden eagles were not observed during 2002 surveys but are known to occur regularly at Pacheco State Park and San Luis Reservoir (Milam, pers. comm., 2002). Ferruginous hawk is a regular winter visitor to the area. All four of these species favor grasslands and other open country for foraging. Suitable foraging habitat for all four species is abundant throughout the unit. The unit provides suitable nesting habitat for northern harrier and burrowing owl and marginally suitable nesting habitat for golden eagles, which require steep cliff or medium to tall trees for nesting sites.

Significant Plant Life (SRA Lands)

A variety of vegetation types occur in project area including the land around the reservoir, portions of the O'Neill Forebay area, and portions of Los Banos Reservoir. The vegetation of these areas consists of riparian woodland, California sagebrush scrub, grasslands, mesic herbaceous (wetland), iodine bush scrub (alkali sink scrub), and ruderal (non-native and weedy) plant communities. The grassland is the dominant vegetation of the project area. The riparian woodland and mesic herbaceous types occur at the edge of the reservoirs and along watercourses. The iodine bush scrub occurs at Salt Spring, a tributary to Los Banos Reservoir. Where appropriate, the naming system used in *A Manual of California Vegetation* (Sawyer and Keeler-Wolf 1995) was incorporated into the name of the vegetation type in this report.

All of these vegetation types are considered to represent important (or significant, as used in the *Planning Handbook* developed by California State Parks) resource values. The grasslands are important because they essentially define the project area. The black willow riparian woodland, mesic herbaceous, iodine bush scrub, and California sagebrush scrub types are important from a habitat diversity perspective but are limited in occurrence. They do not cover nearly so much area as the grassland but they are habitat for many of the project area's species that would not otherwise occur. In addition, areas within the riparian woodland, iodine bush scrub, and the mesic herbaceous vegetation would be considered wetlands and therefore fall under the jurisdiction of regulatory agencies. Ruderal vegetation is important because of the potential need for management.

Climatic and Topographic Influences on Vegetation. San Luis Reservoir, O'Neill Forebay, and Los Banos Reservoir are located at the western edge of the San Joaquin Valley and in low foothills of the Coast Range. The overall climatic influence on the vegetation is of summer drought due to high temperatures and absence of summer rainfall. The area is often windy, especially in the summer, which exacerbates water stress of the vegetation. Occasionally, the hot climate of the summers is ameliorated somewhat by the incursion of fog into the area.

Plant Succession. The natural vegetation of the San Luis Unit consists of grassland except in wet areas where riparian and mesic herbaceous vegetation occurs. The overall droughty nature of the climate probably maintains the vast majority of the area in grassland vegetation. There is no evidence of

colonization of the grassland areas by shrubs or trees that would indicate that the vegetation will change to a more woody vegetation in the near future. The California sagebrush scrub, likewise, does not appear to be colonized by propagules of trees. As long as the slopes above Los Banos Reservoir and Los Banos Creek do not erode, the vegetation will probably remain as a mosaic of grassland and scrub.

Areas at the edges of O'Neill Forebay and Los Banos Reservoir appear to be slowly changing to riparian vegetation. Sandbar willow and mulefat, two early successional species, form large clumps at the edges of certain areas of the shore of O'Neill Forebay. Other species, such as red willow (*Salix laevigata*), black willow, Fremont cottonwood, and western sycamore (*Platanus racemosa*) are expected to increase in number through continued colonization of the shore. Los Banos Reservoir supports a thin and sparse band of young riparian trees along the shore. This band will probably increase in density as Fremont cottonwood and black willow continue to colonize the shore. At the shore of San Luis Reservoir, riparian vegetation will always be in an early successional stage because the extreme fluctuation of the water level either inundates the vegetation for too long a period or the vegetation does not receive enough water during the dry season.

Sensitive Vegetation. Sensitive vegetation types include those types that have experienced a precipitous decline since the arrival of the European descendants to California. These types have been lost to conversion of the land to agricultural, commercial, or residential uses. In some cases, poor management and invasive species have affected the occurrence and value of sensitive vegetation types. The sensitive vegetation types that occur at the SRA, including black willow riparian woodland, iodine bush scrub, mesic herbaceous vegetation, and grasslands are dominated by native species.

The black willow riparian woodland occurs within watercourses that are subject to the jurisdiction of USACE and DFG. Mesic herbaceous vegetation often occurs in areas that are jurisdictional wetlands according to the wetland definition of USACE and is important for that reason. Riparian woodlands are important wildlife habitat and are used by a suite of bird species for foraging and nesting.

The iodine bush scrub represents a declining vegetation type that is adapted to very salty and/or alkaline soils. This vegetation is dramatically different from the surrounding vegetation due to the harsh conditions. Often a number of rare plants that are also adapted to these salty conditions occur in iodine bush scrub. As such, this vegetation is interesting botanically.

Native grasslands also represent a declining vegetation type in part, due to severe competition from non-native species of grass. Patches of purple needlegrass (*Nassella pulchra*) and pine bluegrass (*Poa secunda*) occur on relatively small areas of the project area. Creeping wildrye (*Leymus triticoides*) occurs on relatively deep moist soils, often near wetlands.

Special-status Plant Species. Special-status plant species are those species that are endangered, threatened, or otherwise rare or uncommon in California. These species are those that are on either the federal or State lists of endangered or threatened species, are candidates for such listing, or are on a variety of informal lists. These informal lists include the Special Plants list developed by the DFG and lists developed by the California Native Plant Society (CNPS). The CNPS lists include those species that are considered rare and endangered in California and elsewhere (List 1B), those species considered extinct (List 1A), and those species considered rare and endangered in California but more common elsewhere (List 2). Table 2-10 presents a list of the potentially occurring special-status species that could occur at the project area.

A search of the DFG and CNPS databases (2004) for 21 USGS 7.5 minute quadrangle maps including and surrounding the San Luis Recreation Area resulted in 22 plant species being included on the target species list (Table 2-10). Three additional species were added to the target list for the project area based on Robert Linneman's plant species list for nearby Pacheco State Park; these species include big-scale balsamroot (*Balsamorhiza macrolepis* var. *macrolepis*), Santa Clara liveforever, (*Dudleya setchelii*) and Congdon's tarplant (*Hemizonia parryi* ssp*. congdonii*). Other plant species known to occur in the project area (Edminster 1996) include large-flowered linanthus (*Linanthus grandiflorus*), serpentine linanthus (*Linanthus ambiguus*), Parry's larkspur (*Delphinium parryi*), lance-leaved dudleya (*Dudleya lanceolata*), and canyon liveforever (*Dudleya cymosa*).

The potential for the 25 target special-status species to occur within the study area was assessed based on reconnaissance-level field surveys of habitat or vegetation types conducted in 2003. (Vegetation types observed within the study area are described in Appendix C.) Some of the target species are currently considered to have no potential to occur within the project area but are nevertheless included on the target list until a focused survey for potential habitat can be completed. Currently, no special-status species that meet the criteria discussed above are known to occur in the project area.

Only gypsum-loving larkspur (*Delphinium gypsophilum* ssp. *gypsophilum*), a CNPS List 4 species, occurs within the study area, found in grassland habitats at O'Neill Forebay. List 4 species are those species that are not currently rare, threatened, or endangered but are sufficiently rare or uncommon that their status may change in the future. No special-status species that meet the criteria listed above are known to occur in the project area.

Invasive Non-native Species. Non-native (exotic, alien, nonindigenous) species are those that have not evolved in a particular area and have been introduced through human activities, either accidentally or deliberately. Most non-native species are not invasive and do not have adverse effects on natural plant and animal communities. Nevertheless, some non-native species have resulted in the conversion of native habitats to a non-native vegetation type with resultant reduction of native plants and degradation of wildlife habitat.

Species at the project area with the potential to convert native habitats to areas of non-native vegetation are broad-leaved pepper-grass, also known as broad-leaved pepperweed or perennial pepperweed, (*Lepidium latifolium*), Himalayan blackberry (*Rubus discolor*), yellow starthistle (*Centaurea solstitialis*), red brome (*Bromus madritensis* ssp. *rubens*), fennel (*Foeniculum vulgare*), salt cedar (*Tamarix* spp.), artichoke thistle (*Cynara cardunculus*), and pampas grass (*Cortaderia selloana*). These species are all on the *Most Invasive Wildland Pest Plant* list developed by the California Exotic Pest Plant Council.

Non-native plants that occur at San Luis Reservoir SRA and are classified as *Wildland Plants of Lesser Importance* by the California Exotic Plant Protection Council are bull thistle (*Cirsium vulgare*), tall fescue (*Festuca arundinacea*), yellow flag iris (*Iris pseudacorus*), bassia (*Bassia hyssopifolia*), poison hemlock (*Conium maculatum*), Italian thistle (*Carduus pycnocephalus*), red starthistle (*Centaurea melitensis*) and black mustard *(Brasica nigra).* Some of the species listed above are on the California Department of Food and Agriculture's list of *Noxious Weeds*. These species are yellow star-thistle, Italian thistle, and broad-leaved pepper-grass.

Significant Plants (DFG Lands)

A variety of vegetation types occur at San Luis Wildlife Area, O'Neill Forebay Wildlife Area, and Jasper - Sears mitigation parcel. These types include riparian and oak woodland types, savanna, scrub, grasslands, mesic herbaceous (wetland) and ruderal (non-native and weedy) plant communities. The woodlands tend to occur in the canyons and slopes, while the scrub types occur on the mid and upper slopes. The riparian woodland occurs along watercourses and the mesic herbaceous types occur at seeps, stock ponds, and watercourses. Where appropriate, the naming system used in *A Manual of California Vegetation* (Sawyer and Keeler-Wolf 1995) was incorporated into the name of the vegetation type. A detailed description of project area vegetation is located in Appendix C.

All of these vegetation types are considered to represent important resource values (or significant, as used in the *Planning Handbook* developed by the Department). The grassland and savanna are important because they are the dominant vegetation of San Luis Wildlife Area. The riparian woodland, mesic herbaceous vegetation, coast live oak woodland, and scrub types are important from a habitat diversity perspective. They do not cover as much area as grassland and savanna but they are habitat for many of the area's species that would not otherwise occur there. Jasper-Sears mitigation parcel is defined by grassland and O'Neill Forebay Wildlife Area consists of freshwater marsh, riparian woodland, and grassland/ruderal vegetation. In addition, areas within the riparian woodland and the mesic herbaceous vegetation would be considered jurisdictional wetlands and therefore fall under the jurisdiction of regulatory agencies. Ruderal vegetation is important because of the potential need for management.

Climatic and Topographic Influences on Vegetation. San Luis Wildlife Area is located on the eastern slope of the Diablo Range and therefore is influenced by the weather patterns of the San Joaquin Valley. O'Neill Forebay Wildlife Area and Jasper-Sears mitigation parcel are located at the western edge of the San Joaquin Valley and in low foothills of the Coast Range. The overall climatic influence is the same as described for the project area, above.

Steep canyons and north-facing slopes also provide habitats for species that grow in the moister areas of San Luis Wildlife Area. Jasper-Sears mitigation parcel and O'Neill Forebay are relatively flat with little topographic influence over the vegetation.

Plant Succession. The natural vegetation of San Luis Wildlife Area consists largely of savanna and grassland. Areas of coast live oak woodland occur in the moister areas of the project area. Relatively small areas are vegetated by scrub and riparian woodland. The rate of change, if any, of the savanna and of grassland to blue oak savanna is difficult to determine based on our field work. The scrub vegetation grows on steep west-facing slopes and appears relatively stable (no conversion to a different type was observed). The ecological processes that determine the occurrence of the scrub types are not well known but it is likely that the scrub types will eventually become a type of oak woodland, absent fire.

Sensitive Vegetation. Sensitive vegetation types include those types that have experienced a precipitous decline since the arrival of the European descendants to California. These types have been lost to conversion of the land to agricultural, commercial, and residential uses. In some cases, poor management and the invasive species have affected the occurrence and value of sensitive vegetation types.

The sensitive vegetation types that occur at San Luis Wildlife Area are California sycamore riparian woodland, mesic herbaceous vegetation, grasslands dominated by native species, oak woodland, and large

trees. The sensitive vegetation types that occur at O'Neill Forebay Wildlife Area are riparian woodland and mesic herbaceous vegetation. Sensitive vegetation is absent from Jasper-Sears mitigation parcel.

The California sycamore riparian woodland occurs within watercourses that are subject to the jurisdiction of USACE and DFG. Mesic herbaceous vegetation often occurs in areas that are jurisdictional wetlands according to the wetland definition of USACE and is important for that reason. Riparian woodlands are important wildlife habitat and are used by a suite of bird species for foraging and nesting.

The oak woodland and savanna types are important because they provide habitat for a variety of wildlife species that would not ordinarily occur at the project area. Acorns are an important food source for a number of animal species. Large trees, greater than 24 inches in diameter, have often lived for more than a century. Dead trees (snags) and older trees with decayed branches are important for wildlife species because of their relative scarcity in woodland areas. Decomposer organisms colonize these snags and dead branches and wildlife consume the decomposer organisms as well as use snags and dead branches to form nest cavities.

Native grasslands also represent a declining vegetation type in part, due to severe competition from non-native species of grass. Patches of purple needlegrass (*Nassella pulchra*) and pine bluegrass (*Poa secunda*) occur on relatively small areas of San Luis Wildlife Area. Creeping wildrye (*Leymus triticoides*) occurs on relatively deep moist soils, often near wetlands and was observed in one location of O'Neill Forebay Wildlife Area.

Special Status Plant Species. Special-status plant species are those species that are endangered, threatened, or otherwise rare or uncommon in California. These species are described under the Project Area discussion, above.

Habitat occurs for special-status plant species at San Luis Wildlife Area and Jasper-Sears mitigation parcel. O'Neill Forebay Wildlife Area was formerly farmland and was entirely cultivated (Bob Allen, pers. comm.). This cultivation would have eliminated any special-status plant species occurring there. No special-status species that meet the criteria listed above are known from the project area

Invasive Non-native Species. Non-native (exotic, alien, nonindigenous) species are those that have not evolved in a particular area, and have been introduced through human activities, either accidentally or deliberately.

Species at these wildlife areas with the potential to convert native habitats to areas of non-native vegetation are Himalayan blackberry (*Rubus discolor*), yellow starthistle (*Centaurea solstitialis*), and red brome (*Bromus madritensis* ssp. *rubens*). Other species that were not observed in these areas but may be present are perennial pepperweed (*Lepidium latifolium*), fennel (*Foeniculum vulgare*), and medusahead (*Taeniatherum caput-medusae*). These species are all on the *Most Invasive Wildland Pest Plant* list developed by the California Exotic Pest Plant Council.

Non-native plants that occur at these wildlife areas and are classified as *Wildland Plants of Lesser Importance* by the California Exotic Plant Protection Council are bull thistle (*Cirsium vulgare*) and poison hemlock (*Conium maculatum*). Other species that are potentially present include tall fescue (*Festuca arundinacea*), Italian thistle (*Carduus pycnocephalus*), and red starthistle (*Centaurea melitensis*).

Some of the species listed above are on the California Department of Food and Agriculture's list of *Noxious Weeds*. These species are yellow starthistle, Italian thistle, and perennial pepperweed.

At O'Neill Forebay Wildlife Area, some non-native species may provide valuable nesting habitat and are not likely to threaten native species. The grassland and cultivated areas of O'Neill Forebay Wildlife Area consist almost entirely of non-native species. Some of these species have been planted, such as a species of *Elgaria*, a non-native bunch grass, while others have colonized this area after farming ceased. The Himalayan blackberry may provide valuable nesting and roosting habitat for blackbirds. Poison hemlock may also provide nesting habitat for birds.

Fisheries Resources

This section is intended to describe the fisheries resources at the project area, which includes San Luis Reservoir, O'Neill Forebay, and Los Banos Reservoir. The report was compiled from a review of existing documentation on the project area and vicinity, and from consultation with biologists and others familiar with the local fisheries resources.

San Luis Reservoir is an off-stream storage facility, not originally part of a river or stream system, however there were small drainages in this area. Native fish species may have been present in the drainages that were flooded as a result of the construction of San Luis Reservoir and O'Neill Forebay, however no documentation was found. Water is pumped directly from either the DMC and/or the California Aqueduct. As a result, fish species found within the San Joaquin Delta have been transported into San Luis Reservoir either through water pumped from the DMC or Aqueduct or by direct introduction. O'Neill Forebay acts as an equalizing basin for the dual purpose pumping-generating plant. The California Aqueduct flows directly into O'Neill Forebay, and pumps located at the base of O'Neill Dam take water from the DMC and deliver it to the forebay. The pump and generating unit then pumps the water from O'Neill Forebay into the main reservoir.

Los Banos Reservoir was constructed to provide flood protection for the city of Los Baños and adjacent areas, and to protect the San Luis Canal portion of the California Aqueduct by controlling the flow of streams crossing the canal. There are no records on aquatic species in Los Baños Creek prior to dam construction. The first water works in the area were constructed in 1871 when a canal brought water from Mendota Dam to Los Baños Creek for agricultural irrigation. Currently, Los Banos Reservoir supports an active warmwater largemouth bass and white crappie fishery. The DFG actively stocks rainbow trout, a coldwater species, in the reservoir from approximately November to April. The trout fishery is limited primarily to the winter months due to the warmer water temperatures in the summer months.

Potentially Occurring Fish Species

San Luis Reservoir and O'Neill Forebay support several species of fish that have become established within the system either by direct introduction or from the Sacramento-San Joaquin Delta System via pumping from the California Aqueduct and DMC (Olague, pers. comm.. 2003). These species include Sacramento blackfish (*Orthodon microlepidotus*), American shad (Alosa sapidissima), threadfin shad (*Dorosoma petenense*), largemouth bass (*Micropterus salmoides*), kokanee salmon (*Oncorhynchus nerka*), green sunfish (*Lepomis cyanellus*), blue gill (*Lepomis macrochiru*), white sturgeon (*Acipenser transmontanus*) and white crappie (*Pomoxis annularis*). During 2001 to 2003 an active striped bass

stocking program within San Luis Reservoir was funded by the California striped bass stamp program. This program has expired, and the Striped Bass Association is currently seeking additional funding to continue the stocking program (Poindexter 2003).

Special Status Species

No special status fish species occur naturally within San Luis Reservoir or Los Banos Reservoir. However, O'Neill Forebay is connected to the San Joaquin River system, and therefore has the potential to transport special status species from the California Aqueduct and DMC into San Luis Reservoir. Potentially occurring special status species include Chinook salmon (Oncorhynchus tshawytscha; federally threatened), Delta smelt (*Hypomesus transpacificus*; federally threatened, California threatened), hardhead (*Mylopharodon conocephalus*; California species of concern), and Sacramento splittail (*Pogonichthys macrolepidotus*; California species of concern).

Cultural Resources

The project area is rich in traces of its prehistoric and historic cultural heritage. Located in two valleys at the eastern base of the Diablo Range on the edge of the Central San Joaquin Valley, the landscape within and around the project area was important for Native Americans and, subsequently, Euro-American settlers and entrepreneurs. The varied natural setting and accessibility to the San Joaquin Valley and the coast provided a diversity of settings and resources that have attracted a wide range of native and immigrant cultural groups for thousands of years.

Although the evidence of prehistoric and historic patterns of land use in the project area have been documented in 20 studies dating from 1960 to 1994 (Table 2-11 below), the San Luis Reservoir area has never been subjected to a systematic archaeological survey. However, in response to the impending inundation of the area by San Luis Reservoir in the early 1960s, a number of cultural resource investigations were conducted within and in the vicinity of both San Luis Reservoir and Los Banos Dam.

Table 2-11
Cultural Resource Studies Conducted within the Project Area

RESERVOIR	DATE	AUTHORS	STUDY TITLE
O'Neill Forebay	4-1-83	Wm. Pritchard	Archaeological Testing of Three Kahwatchwah Yokuts Dwelling Structures at the San Luis Forebay Site (CA-Mer-119), Merced County, CA (in: *Papers on Merced County Prehistory, California Arch. Reports No. 2*) (DPR)
O'Neill Forebay	1-1-84	Betty Rivers	CA-Mer-119 Site Stabilization Project, San Luis Reservoir State Recreation Area (DPR)
San Luis Res.	1975	C. Nissley	Archaeological Investigations at CA-Mer-27: Phase II (DPR)
San Luis Res.	4-1-83	Wm. Olsen & Louis Payen	Excavations at CA-Mer-130: A Late Prehistoric Site in Pacheco Pass (in: *Papers on Merced County Prehistory, California Archaeological Reports No. 2*) (DPR)
San Luis Res.	7-1-77	Jeff Bingham & Peter Schulz	The Effects of Prolonged Freshwater Inundation on Cultural Resources – Preliminary Report and Recommendations (DPR)
San Luis Res.	5-1-69	Wm. Olsen & Louis Payen	Archaeology of the Grayson Site, Merced County, California *(Archaeological Report 12*) (DPR)
San Luis Res. & O'Neill Forebay	2-28-82	Dan Foster	An Archaeological Reconnaissance of the Gonzaga Conservation Camp, Merced County, California (CDF)
San Luis Res. Rec. Area	4-1-83	W.I. Follett	Fish Scales from the Los Banos Site (CA-Mer-14), Merced County, California. (in: *Papers on Merced County Prehistory, California Arch. Reports No. 2*) (DPR)
San Luis Res.	1960	A. Treganza	*Archaeological Investigations in the San Luis Reservoir Area, Merced County, California.* Report to the California Department of Parks and Recreation, Sacramento.
Los Banos Res.	1970	Frank Riddell	*A Symposium on the Culture Sequence of the Kawatchwa Yokuts Area: The Archaeology of the Western San Joaquin Valley* (7 articles) (DPR)
Los Banos Res.	3-1-94	David Scott	Archaeological Assessment of Site CA-Mer-68, Merced County, California. (CSU Bakersfield)
Los Banos Res.	1986	Chavez & Associates	Cultural and Paleontological Resources Evaluation for the Los Banos-Gates Transmission Project
Los Banos Res.	1-28-93	Helen McCarthy	Survey of Ethnographic Resources and Native American Consultation for the South of the Delta Res. Project (DPR).
Los Banos Res.	8-1-90	P. Mikkelson & William Hildebrandt	Archaeological Inventory and Evaluation for the Proposed Los Banos Grandes Reservoir, Merced County, California (Far Western Anthropological Group)
Los Banos Res.	8-1-90	Donald Wren	Los Banos Grandes Offstream Storage Project: An Archaeological Reconnaissance (CSU Fresno)
Los Banos Res.	10-15-79	M.I. Russo & K.C. McBride	A Phase I Cultural Resources Planning Summary and Preliminary Field Work Proposal for Three Reservoir Locations in Central California: Los Vaqueros, Los Banos and Glenn Complex (DWR).
Los Banos Res.	8-1-72	Anonymous	*Resources Inventory, Los Banos Reservoir*
Los Banos Res.	6-1-70	Wm. Pritchard	Archaeology of the Menjoulet Site, Merced County, California (DPR).
Los Banos Res.	8-1-66	Wm. Pritchard	The Archaeology of Lower Los Banos Creek, Merced County, California (DPR).

Topography, vegetation, water sources, and proximity of the project area to diverse ecosystems make it highly likely that the area was heavily utilized throughout prehistoric and historic times. Given such a landscape, it is almost certain that many undocumented archaeological sites, features, and artifacts are present within the project area. As such, encountering such resources during ongoing and future development and utilization of San Luis Reservoir needs to be addressed if these sites are to be preserved for future generations.

Cultural Setting

To place the prehistoric and historic sites of project area into a broader context, they need to be examined from within a larger cultural framework. The presence of a variety of natural resources, topography, and general locations made the area an important economic center and transportation corridor for centuries. Consequently, cultural traces on the landscape reflect an equally diverse range of peoples and activities.

Prehistoric Archaeological Context

The project area has benefited from extensive archaeological work conducted in the vicinity. During the 1960s, in anticipation of the construction of the nearby San Luis, Los Banos, and Little Panoche reservoirs, numerous early Native American sites were recorded. Sites documented at Little Panoche, while not included in this study, are important to reference as they are located near the San Luis and Los Banos study areas and contributed greatly to the archaeological record of the area. In several cases, the more substantial sites found in these areas were the focus of intensive subsurface investigations (Nissley 1975; Olsen and Payen 1968, 1969, 1983; Pritchard 1970, 1983; Romoli and Ruby 1963). Olsen and Payen (1969) and Moratto (1984), based on some of this research, have postulated estimated dates for the prehistoric cultural sequence of the area that includes the Positas, Pacheco and Gonzaga complexes. Varying occurrences of typologically and technologically distinct artifacts have provided archaeologists with a general sequence of cultural change over time. The causes of these changes tend to be varied, complex, and intricately interrelated and can include factors such as climate change and shifting degrees of external cultural contact.

Paleo-Indian (ca. 12,000-7,500 BP) Although humans may have been present in North America long before this time, the best available archaeological evidence indicates that the first inhabitants in the New World arrived sometime around 12,000 years ago or earlier. Although somewhat controversial, a recent redating (Johnson et al.) of the "Arlington Springs Woman," a Native American burial found on Santa Rosa Island (Orr 1962a,b), indicates that these remains may date as early as 13,000 BP, suggesting a much earlier occupation of California than previously supposed.

Paleo-Indian groups were probably small in size, consisting of extended families that ranged within large areas based on the seasonal availability of various plant and animal species. While sites or artifacts dating to this early period have yet to be found within or in the vicinity of the project area, they could be present in the area.

Positas Complex (ca. 5,300-4,600 BP) This cultural manifestation represents the earliest period for which extensive archaeological evidence has been noted in the area of San Luis Reservoir. In general, little is known of this period and its relationship to earlier and later manifestations is somewhat unclear (Olsen

and Payen 1969). However, by this time early Native Americans appear to have adopted a somewhat more settled lifeway. The lower cultural deposits from CA-Mer-94 at San Luis Reservoir (Olsen and Payen 1969) suggest that extensive trade networks had already been established by this time. Obsidian from distant sources and beads made from marine *Olivella* shells have been recovered from sites dating to this period. Other distinctive artifacts include small stone mortars, short cylindrical pestles, milling stones, and a wide range of flaked stone tools.

Pacheco Complex (ca. 4,600 BP-1,700 BP) This period, best represented at CA-Mer-94 (Olsen and Payen 1969), has been divided into two phases based primarily on tool and shell bead forms. Pacheco B (extending until about 3,600 BP) exhibits characteristic foliate-shaped bifaces, rectangular marine *Haliotis* ornaments, and thick rectangular *Olivella* beads. Pacheco A, occurring after ca. 3,600 BP, includes a much wider variety of *Olivella* and *Haliotis* bead and ornament forms, perforated canine teeth, bone tools and whistles, and large stemmed and side-notched points. Abundant milling stones, mortars, and pestles indicate an increased reliance on gathered seed and nut foodstuffs. Evidence for trade also increases during this time with the bone and shell industries bearing marked similarities with those noted in the Delta "Middle Horizon" and traits from western and southern assemblages (Moratto 1984:192; Olsen and Payen 1969).

Gonzaga Complex (ca. 1,700-1,000 BP) Noted from several sites in the project area (CA-Mer-3 and CA-Mer-94), this cultural manifestation has been noted throughout the west side of the Valley (Moratto 1984:192). Distinctive features include a mix of extended and flexed human burials, bowl mortars, squared and tapered-stem projectile points, grass saws, and characteristic *Haliotis* and *Olivella* beads and ornaments. Bone and shell artifacts closely resemble those from the Delta "Late Horizon," Phase I (Moratto 1984:192; Olsen and Payen 1969). However, relatively little is known of this period as the only excavated occurrences have consisted of funerary sites and the majority of the artifacts have consisted of grave goods (Breschini et al. 1983:79).

Panoche Complex (ca. 500-150 BP) Although the Panoche and Gonzaga are fairly well documented in the area and have been found at a limited number of sites, there appears to be a hiatus of approximately 500 years between these distinctive manifestations. During this time, there is a possibility that environmental conditions in the region were unfavorable, and could not support oaks and a subsistence system focused on the gathering and processing of acorns. However, direct archaeological evidence of a dramatic decrease in acorn-bearing oaks during this period has yet to be documented and only additional research may shed some light on the apparent abandonment of the region between approximately 1,000 and 500 BP (Olsen and Payen 1969; Moratto 1984:191-193).

While a Gonzaga/Panoche 500-year occupation hiatus may be apparent based on the excavations of sites in the Pacheco Pass area, according to Breschini and Haversat (1987), this apparent abandonment may have been somewhat limited and more local in nature. Breschini and Haversat, based in part on excavations conducted at CA-Fre-1333, have suggested that the Gonzaga complex dates should probably be extended several hundred years, considerably narrowing the gap between the Gonzaga and Panoche in the region. However, evidence for a period of abandonment in the late Panoche/early Gonzaga complexes can be discerned at CA-Fre-1333 and a concurrent dramatic change in site function from a small village to a sporadically utilized camp or shelter (Breschini and Haversat 1987:39). Although additional research would be necessary to confirm this hypothesis, such shifts in site function, population density, and intensity of land use could be related to a decrease in the density of acorn-bearing oaks in the region during this time.

The late prehistoric to early historic Panoche complex (or Late Period Phase II) has been documented at a number of western San Joaquin Valley sites (Breschini et al. 1983:79). Large circular structures occur frequently along with flexed burials and primary and secondary cremations. Bone and shell artifacts including *Haliotis* epidermis disk beads and side-ground and rough disk *Olivella* beads appear similar to those noted from the Delta "Late Horizon" period. Small side-notched arrow points are found on sites dating to this period and many features of this complex extend well into the historic period as contacts with Euro-Americans increased in frequency and intensity (Moratto 1984; Olsen and Payen 1969).

Although Pritchard (1970) noted some proto-historic and early historic materials at CA-Mer-3, early accounts suggest Pacheco Pass and the area around the San Luis Reservoir had been largely abandoned by the local Native Americans by the early 19th century (Latta 1949; Olsen and Payen 1968). Much of this was likely due to the increased Spanish, Mexican, and, ultimately, American use of the pass as an important transportation route. Bands of cattle and horse thieves apparently made frequent use of the pass and military expeditions also made incursions into the area in search of runaway coastal mission Indians or in search of new workers. Collectively, these pressures proved too much for the local Native American inhabitants, who soon fled the area precipitated by Euro-American settlement beginning in the 1840s and by a short-lived gold rush in the Pacheco Pass area in 1851 (Hill et al. 1996; Shumate 1977:22).

Ethnographic Setting

Ethnographic and archaeological evidence indicates that, at least in later prehistoric and early historic times, Native American populations residing in the San Luis area belonged to the Yokut tribe and, more specifically, the Northern Valley Yokut (Wallace 1978:462-470; Kroeber 1925; Olsen and Payen 1968 65-66). Although the Yokuts appear to have been the predominant group in the region, evidence suggests strong coastal influences by Costanoan (Ohlone) groups, and Olsen and Payen (1969) suggest that a Western Yokut division from the Pacheco Pass area has just as much in common with the Costanoan as it does with the Yokut; a situation recognized by Kroeber (1925) as well. Contact between coastal and interior tribal groups would have been facilitated by the presence of routes through Pacheco Pass, providing for an easy exchange of goods and cultural traits in prehistoric and early historic times. Archaeological materials uncovered by Treganza (1960), Riddell and Olsen (1964), Olsen and Payen (1969), Pritchard (1966; 1970; 1983), and Riddell (1970), although analyzed and interpreted according to the Valley cultural and temporal scheme, may have much in common with manifestations from the west side of the Diablo range. If this is indeed the case, the late prehistoric and early historic inhabitants of the San Luis area may have been affiliated just as much with the Ohlone as they were with the Yokut.

Based on current interpretations of archaeological and ethnographic evidence, the conventional interpretation of the cultural associations of the Native American from the San Luis area is that the Yokuts were the predominant tribe. The Yokut's Penutian language was spoken by some 40 groups using distinctive but closely related dialects. These groups inhabited three main geographic locales in Central California: the Southern Valley (Tulare Lake), the Northern Valley (San Joaquin Valley), and the foothills (Sierra Nevada) (Kroeber 1925; Wallace 1978).

The San Luis Reservoir area, historically a broad, well-watered grassy plain, offered a diverse range of natural resources within a transition zone between the oak savanna and grassland environments. These varied ecosystems provided a wide array of floral species such as acorns, oats, and other seeds that

served as staple foods, and various grasses utilized for basketry. Faunal resources found in the area include numerous fish species, shellfish, turtles, waterfowl, deer, tule elk, pronghorn antelope, lagomorphs, and numerous rodent, reptile, land bird, and insect species that would have provided sustenance and sources of various materials such as hide, bone, feathers, and ligament.

The influence of Ohlone and Ohlone-descendent groups can be seen in the San Luis area and throughout the Central Valley in the form of exotic materials not found in the region. Abalone shell is found on many archaeological sites and accounts indicate that salt, mussels, and dried abalone were frequently traded with interior groups (Davis 1961:23). Linguistic evidence of extensive contact between the coastal Ohlone and valley tribes can be found as well. For example, some Valley Miwok terms are the same as those found in Ohlone groups and suggest an exchange network involving not only material goods but more diverse cultural traits as well. Trade and contact between the coastal and interior groups was not simply a one way exchange. For example, Davis (1961:23) notes that piñon nuts found their way to coastal tribes from inland sources and clam shell beads were traded from the coastal areas to regions far inland.

Yokut groups lived in small seasonal camps geared towards hunting or the gathering and processing of acorn and a variety of grasses, or in larger settlements established near perennial water sources including the San Joaquin River and smaller drainages and springs. Dwellings in the larger villages consisted of circular tule covered structures and more elaborate semi-subterranean pit houses. Ceremonial sweat houses and assembly chambers were often constructed within the more substantial villages. These larger settlements might include approximately 200 inhabitants constituting a small sub-tribe of the Yokut. A headman, while not necessarily possessing absolute powers, served as an advisor to these self-contained communities (Cook 1960:249-250, Wallace 1978:466). In general, open conflict or warfare appears to have been rare and even when confronted with often hostile Euro-American contact, the Yokut preferred to flee to remote canyons or tule marshes (Cook 1960:249-250, 260, 263; Gayton 1936:83; Wallace 1978: 467)

Yokut material culture and technological systems were as varied as the environments in which the Yokut resided and reflected the diversity of the available resources. Mortars and metates, both portable and bedrock, were used for the processing of acorns and other gathered seeds and nuts. Baskets were produced in a wide variety of sizes and shapes, each suited to a particular task and adorned with patterns characteristic of Yokut artistic expressions. Exotic materials such as marine shell, ocean fish, and shellfish were obtained from Ohlone contact and obsidian was acquired from distant sources.

Although little is known regarding traditional pre-European spiritual life, early historic-period religious, and spiritual practices among the Yokut are somewhat better documented and are closely related to that of the Costanoan groups (Kroeber 1907; Levy 1978). Based on some early ethnographic research (Kroeber 1925), it appears the Yokuts living in the San Luis Reservoir area participated in the Kuksu ritual system during the historic period. Other spiritual components of Yokut culture such as shamanism, although not specifically described for inhabitants of the San Luis area, was almost certainly an important element contributing to the physical and spiritual stability and wellbeing of the people in prehistoric and early historic times.

Historic Setting

The history of the project area is inextricably linked with the history of Pacheco Pass itself and its prominence as an important transportation route. Although the pass was clearly a well known and heavily utilized corridor in prehistoric times, historic-era use first occurred shortly after the Spanish coastal missions began to be established. Starting in the late 18th century, the pass and the rolling hills of Los Banos Creek watershed immediately to the southeast served as a direct route from the Mission San Juan Bautista to the Central Valley. The watershed area has since become known as the "Path of the Padres" with the established trails and the perennial water of the creek (the Spanish Los Banos roughly translates to "baths") being a major attraction. The path was most notably employed by the Franciscan mission representatives and friars from San Juan Bautista, and it was likely followed by others associated with the Spanish colonial and later Mexican governments as well.

Spurred by mining in the Sierra foothills and expanding agriculture in the Central Valley during the early American period, at least five formal roads were built through the pass in including the original pass toll road constructed by Andrew Firebaugh in the late 1850s. Merced County built a new road by Firebaugh's grade in the 1870s and the general route of Firebaugh's highway was also followed by the state in the early 1900s, again in the 1930s and finally with construction of SR 152 in the 1960s. Although SR 152 is the predominant route through the pass today, traces of the earlier roads can still be seen today and, in some cases, are still utilized for local traffic.

The first documented European expedition into the pass occurred when Gabriel Moraga and Father Pedro Munoz traveled through the area in 1806. This encampment likely occurred along Cottonwood Creek at the San Luis waterhole on the night of June 21st, the feast day of San Luis de Gonzaga. As was tradition with Spanish explorers of the day, Moraga and Munoz named the area in the saint's honor (Hill et al. 1996). Moraga's and Munoz' expedition essentially cleared the way for future development of the pass as a transportation route, and throughout the early decades of the 19th century, the pass served as an escape route for Native Americans attempting to escape the coastal missions or, conversely, who went through the pass to attack coastal missions. Many of these Indians, trained as vaqueros, had previously been through the region when driving herds into the Central Valley, making the area an ideal refuge. In fact, Native American familiarity with the pass clearly pre-dated historic periods, and the pass likely served as an important transportation route between the Central Valley and the coast (Cook 1960; Kyle 2002; Shumate 1977; Pilling 1955).

One of the most important historical developments to occur in relation to the San Luis Reservoir area occurred in September of 1843 when Jose Mejia and Juan Perez Pacheco petitioned the governor for rights to over 48,000 acres in and around the pass that had previously been granted to Francisco Jose Rivera in 1841. The establishment of their ranch and their occupation and development of the property was presented as an "aid in the defense against hostile Indians." The Rancho San Luis Gonzaga was granted in November of that year and bordered the ranch (Rancho Ausaymas y San Felipe) owned by Pachecos' father since 1833. Through additional grants and the purchase of additional lands in the region, the Pacheco family holdings exceeded 150,000 acres by the middle of the 19th century (DPR 1973; Hill et al., 1996).

To support the establishment of the new Rancho San Luis Gonzaga and run the agricultural and herding operations, the Pacheco's saw to the construction of the area's first adobe building around 1844 near the spot where Moraga and Munoz had camped 40 years earlier. In later years it served as a stage stop, café,

gambling hall, and eventually as a gas station and roadside stop for travelers heading through the pass (Hill et al. 1996). The original location of the adobe, and of the entire Rancho complex, was destroyed during construction of San Luis Reservoir Dam and associated facilities. Paula Fatjo, fifth-generation Pacheco descendent, attempted to have the adobe building moved to her new ranch facilities (now contained within Pacheco State Park) prior to the construction of the reservoir. During transit, large portions of the structure collapsed as a result of unseen termite damage and all that remains today are the two end walls currently on display at the Pacheco State Park headquarters (Hill et al. 1996; Crosby et al., 2003).

During the Gold Rush of 1849 and following the discovery of gold in the Kern River in 1853, the San Luis Reservoir area saw a dramatic increase in the number of travelers. Another gold rush, albeit a very brief and unsuccessful one, occurred in the Pacheco Pass area in 1851. With the consistent flow of would-be miners and travelers, the area became a favorite haunt for bandits and outlaws, including Joaquin Murietta and his gang who reportedly frequented the San Luis *aguajes* (waterhole) (Shumate 1977). In light of the rugged and often lawless nature of his new rancho, Francisco Pacheco moved his family away to the safety of Monterey in 1851. Shortly following this period, Pacheco leased the rancho to his son-in-law, Mariano Malarin, to operate a herding operation to supply meat to San Francisco and miners in Sierra Nevada foothill towns (Hill et al. 1996, Shumate 1977). Following the Pachecos' departure, the rancho headquarters and the adobe may have been abandoned, becoming an ideal hideout for Murietta. It was at this location in 1853 that Captain Harry Love, a deputy sheriff of Los Angeles County, and a contingent of State Rangers cornered Murietta and his gang who were apparently on their way to the Mother Lode region to stage a large horse-theft raid. Although the raid itself was thwarted, Murietta and all of his men still managed to escape, despite eyewitness accounts that Love had most of them cornered in the Pacheco ranch adobe. (Latta 1980; 363,368).

Although several preliminary moves to establish a railroad through Pacheco Pass were made during the 19th century (Adler and Wheelock 1965; Eldredge 1915), transportation through the area remained centered on trails and roadways. These routes became more formalized in 1857 when Andrew Firebaugh constructed a tavern and completed a toll road that went over the pass. A year later, the Butterfield Overland Mail stage started regular runs along this roadway but these only lasted until 1861 (Shumate 1977:4). The Pachecos' San Luis Ranch at the eastern end of the pass became a regular stop for the stage and an inn and stables were soon constructed to service travelers. In the 1860s, Lafayette Bell purchased a tavern and stage stop at the western end of the pass and Bell's Station was established; operating at the same time as another stage stop at the top of the pass operated by William Hollenbeck (Shumate 1977:3). Although the original buildings are no longer extant, Bell's Station still exists today and, until its recent closing, served as a popular stopping point at the base of Pacheco Pass (DPR 1973; Hill et al. 1996; Wulzen pers. comm., 2002).

Since the pass was such an important transportation route between the coast and the Central Valley, the stage stops and roadways attracted not only the attention of private entrepreneurs such as Bell, but of government concerns as well. Merced County eventually went on to purchase the toll road; and present-day Whiskey Flat Road, constructed by the county in 1878, follows portions of the original toll road alignment. In later years, the State of California developed a new highway through the pass, finally leading to further realignments and construction of present day SR 152 (Shumate 1977:3; Wulzen pers. comm., 2002).

Ranching continued to be the predominant economic pursuit within and in the vicinity of the project area throughout the 20th century. Paula Fatjo, owner of San Luis Gonzaga, moved into the new ranch

headquarters, located just to the north of the original Rancho adobe, in 1948. Over the coming years, Ms. Fatjo sold some parcels of the ranch. By the early 1960s, construction began on San Luis Reservoir and large portions of the Fatjo ranch and properties belonging to other local residents were to be inundated. As planned, San Luis Reservoir construction was also going to destroy the 1844 ranch headquarters site and the adobe building. Ms. Fatjo reestablished her operations 12 miles to the east near the summit of Pacheco Pass (Hill et al. 1996) and moved a number of structures from the old ranch complex to this new location, including an addition she had attached to the adobe sometime after 1948. With no surviving family members, Paula Fatjo bequeathed the entire remaining acres of the Rancho San Luis Gonzaga to the State in 1992. Ultimately, this gift led to the establishment of Pacheco State Park situated immediately adjacent and to the west of San Luis Reservoir (DPR 1973; Hill et al. 1996; Wulzen pers. comm., 2002).

Regulatory Setting

Cultural resources situated within the project area are protected primarily by the provisions of Section 106 of the National Historic Preservation Act (NHPA) of 1966 and, in the case of Native American human remains, the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990. In addition, as a state agency, the Department is obligated to conform to the cultural resource provisions of California Environmental Quality Act (CEQA). The NHPA includes and provides for:

- The Advisory Council on Historic Preservation (ACHP), which is authorized by the Secretary of the Interior to maintain the National Register of Historic Places (NRHP)
- Approval by the Secretary for state historic preservation programs that provided for a State Historic Preservation Officer (SHPO)
- A National Historic Preservation Fund program

Section 106 of the NHPA requires that federal agencies take into account the effects of their actions on properties that may be eligible for or listed on the NRHP, and afford the ACHP a reasonable opportunity to comment. To determine if an undertaking could affect NRHP eligible properties, all cultural sites that could be impacted must be inventoried and evaluated for inclusion in the NRHP.

NAGPRA (25 USC 3001 et seq.) requires federal agencies and certain recipients of federal funds to document Native American human remains and cultural items within their collections, notify native groups of their holdings, and provide an opportunity for repatriation of these materials. This Act also requires planning for dealing with potential future discoveries and collections of Native American human remains and associated funerary objects, sacred objects, and objects of cultural patrimony. NAGPRA also provides for the possibility that such remains could be found on property owned or otherwise administered by federal agencies such as Reclamation.

Both the Public Resources Code (PRC) 5024, 5024.5 and CEQA offer guidelines regarding impacts on cultural resources. Whether of historic or prehistoric age, cultural resources are referred to as historical resources. "'Historical resource' includes, but is not limited to, any object, building, structure, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California" (PRC §5020.1(j)).

Section 5024 and 5024.5 of the PRC states that "each state agency shall formulate policies to preserve and maintain, when prudent and feasible, all state-owned historical resources under its jurisdiction listed in or potentially eligible for inclusion in the National Register of Historic Places or registered or eligible for registration as a state historical landmark pursuant to Section 5021 of the PRC." The PRC requires state agencies to formulate policies to preserve and maintain, when prudent and feasible, all state-owned historical resources under their jurisdiction that are listed or potentially eligible for inclusion in the NRHP. The criteria for inclusion are essentially equivalent to those for the California Register of Historical Resources (CRHR). Agencies may not undertake projects that adversely affect such resources without prior consultation with the State Historic Preservation Officer (SHPO). The Department's policies for insuring compliance with these requirements are included in a Memorandum of Understanding with the SHPO and are incorporated in a Department Notice (DN 2002-3 and amendments).

CEQA states that if implementation of a project would result in significant impacts on important cultural resources, then alternative plans or mitigation measures must be considered. However, only significant cultural resources need to be addressed. The State CEQA Guidelines define a significant historical resource as a resource listed or eligible for listing on the CRHR. In addition, the State CEQA Guidelines require consideration of unique archaeological sites. If an archaeological site does not meet the criteria for inclusion on the CRHR but does meet the definition of a unique archeological resource as outlined in CEQA (PRC §21083.2), it may be treated as a significant historical resource.

The preferred treatment option for both eligible and unique archaeological resources under CEQA (PRC §21083.2) is preserving such resources in place in an undisturbed state. Other acceptable methods of mitigation include excavation and curation or study in place without excavation.

The State Health and Safety Code (§7050.5) 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. The NAHC will immediately notify those persons it believes to be most likely descended from the deceased Native American, and direct the lead agency to consult with the appropriate Native Americans to develop an agreement for the treatment and disposition of the remains (PRC §5097.98).

For historic structures, public agencies follow the 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).

Significant Cultural Resources

Within the project area, a total of 49 prehistoric and historic cultural resources have been documented (Table 2-12). This includes 10 sites situated in the area of Los Banos Reservoir, five sites in San Luis Wildlife Area, and one resource in O'Neill Forebay Wildlife Area. At the time most of these sites were recorded, there were no federal or state regulations in place designed to protect cultural resources. Despite the absence of laws at the time requiring such studies be conducted prior to the implementation of projects such as San Luis Reservoir, archaeologists recognized the importance of the area and studied a number of sites and areas within the present day project area.

The primary focus of the 1960s inventories and excavations was on sites related to early Native American habitation of the San Luis area. Sites such as CA-Mer-3 and 94 proved to be highly significant due to their extensive cultural deposits. Their intact stratigraphy, presence of diagnostic cultural materials, human remains, and datable organics on these sites contributed to the definition of several important phases of early cultural manifestations in the region.

While prehistoric sites have been subjected to the bulk of researcher's attention in the past several decades, historic resources have been largely ignored. A number of sites have never been formally recorded or investigated, including the original site of the Rancho San Luis Gonzaga. Although much of this site, related to the Pacheco family's 1843 grant from the Mexican government, was destroyed by construction of San Luis Dam, considerable traces of this early operation may still exist in the area.

Other existing and potential historic resources within the project area have also not been formally recorded. Portions of Firebaugh's 1857 toll road can be seen in several areas within the SRA and San Luis Wildlife Area but have not yet been documented. Other historic sites, many related to the ranching history of the area may be found throughout the project area and include quarries, road grades, ranch fences, ponds, windmills, and water tanks.

Despite the number of studies conducted within and in the vicinity of the project area, and the number of cultural resources recorded, additional prehistoric and historic sites likely remain to be discovered and documented. The topography, climate, diverse natural habitats, and accessibility of the area to valley and coastal ecosystems made the San Luis Reservoir area a region uniquely suited to intensive prehistoric and historic occupation and activities. As such, and due to the fact that the project area has never been subjected to an inclusive and systematic cultural resources survey, the known sites within San Luis Reservoir cannot necessarily be considered a representative sample of site locations, types, or cultural or temporal affiliations.

Table 2-12
Cultural Resources Documented in Project Area

SITE NUMBER (CA-MER-)	DATE* RECORDED	SITE TYPE	COMMENTS	USGS QUAD.
14	5-15-62	prehistoric-village site	under San Luis Dam: destroyed	San Luis Dam
15	9-5-63	prehistoric - midden	extant and typically above high water line	Pacheco Pass
16	9-5-63	prehistoric - habitation	destroyed	San Luis Dam
17	10-10-63	prehistoric-housepits, midden	destroyed	San Luis Dam
18	5-27-64	prehistoric - midden	extant and typically above high water line	Pacheco Pass
19	5-28-64	prehistoric -midden	inundated at least part of the year	Pacheco Pass
20	5-28-64	prehistoric - midden	inundated at least part of the year	Pacheco Pass
21	5-28-64	prehistoric - midden	inundated at least part of the year	Pacheco Pass
22	5-28-64	prehistoric - midden	inundated at least part of	Pacheco Pass

Table 2-12
Cultural Resources Documented in Project Area

SITE NUMBER (CA-MER-)	DATE* RECORDED	SITE TYPE	COMMENTS	USGS QUAD.
			the year	
23	5-28-64	prehistoric - midden	inundated at least part of the year	Pacheco Pass
24	5-28-64	prehistoric - BRMs, midden, housepits	inundated at least part of the year	Pacheco Pass
26	4-15-64	prehistoric -midden	inundated at least part of the year	Pacheco Pass
27	6-25-65	prehistoric - midden	excavated : Riddell, 1965 (outside project area under tunnel spoils)	Pacheco Pass
28	6-25-65	prehistoric - midden	inundated at least part of the year	Pacheco Pass
29	6-25-65	prehistoric - midden	inundated at least part of the year	San Luis Dam
30	6-25-65	prehistoric - lithic artifacts	inundated at least part of the year	San Luis Dam
31	6-25-65	prehistoric - midden	inundated at least part of the year	San Luis Dam
32	6-25-65	prehistoric and historic	extant and typically above high water line	San Luis Dam
41	6-2-66	prehistoric - midden	inundated at least part of the year	Pacheco Pass
42	6-2-66	prehistoric - midden	inundated at least part of the year	Pacheco Pass
56	10-11-63	prehistoric - midden	under/adjacent to San Luis Dam - destroyed	San Luis Dam
82	6-2-66	prehistoric - midden	inundated at least part of the year	Pacheco Pass
83	6-2-66	prehistoric - midden	extant and typically above high water line	Pacheco Pass
94	6-13-69	prehistoric - midden	excavated by Olsen & Payen 1969 inundated at least part of the year	Pacheco Pass
96	9-20-68	prehistoric - midden	inundated at least part of the year	Pacheco Pass
99	10-11-63	prehistoric - midden	destroyed – located near San Luis Dam	San Luis Dam
130	6-13-69	prehistoric - BRMs, midden	excavated by Olsen & Payen 1968	Pacheco Pass
131	6-13-69	prehistoric - midden, housepit	inundated at least part of the year	Pacheco Pass
132	6-13-69	prehistoric - midden	inundated at least part of the year	Pacheco Pass
133	6-13-69	prehistoric - midden	inundated at least part of the year	Pacheco Pass

Table 2-12
Cultural Resources Documented in Project Area

SITE NUMBER (CA-MER-)	DATE* RECORDED	SITE TYPE	COMMENTS	USGS QUAD.
134	10-11-63	prehistoric - midden	partially destroyed by pond	Pacheco Pass
135	10-11-63	prehistoric - midden	inundated at least part of the year	Pacheco Pass
136	10-11-63	prehistoric - midden	extant and typically above high water line	Pacheco Pass
137	10-11-63	prehistoric -midden, housepit	inundated at least part of the year	Pacheco Pass
138	10-11-63	prehistoric - midden	extant and typically above high water line	Pacheco Pass
139	-	prehistoric - midden	extant and typically above high water line	Mariposa Peak
261	1-21-82	historic – rock footings, refuse	inundated at least part of the year	San Luis Dam
3	-	prehistoric – village site with house pits	inundated at least part of the year – Menjoulet site; Pritchard 1970	Ortigalita Peak NW
25	9-27-64	prehistoric - midden	destroyed by Los Banos Dam	Ortigalita Peak NW
33	4-30-90	prehistoric - BRM	extant and typically above high water line	Ortigalita Peak NW
34	10-10-63	prehistoric - BRM	inundated at least part of the year	Ortigalita Peak NW
35	10-10-63	prehistoric - midden	inundated at least part of the year	Ortigalita Peak NW
36	10-10-63	prehistoric - house pit	inundated at least part of the year	Ortigalita Peak NW
37	10-10-63	prehistoric - housepit	inundated at least part of the year	Ortigalita Peak NW
68	7-9-93	prehistoric - midden, housepits	excavated by Riddell, extant	Ortigalita Peak NW
97	10-11-63	prehistoric - village site	inundated at least part of the year	Ortigalita Peak NW
98	10-11-63	prehistoric- village site	inundated at least part of the year	Ortigalita Peak NW
277	4-30-86	Prehistoric midden, lithic scatter	extant and typically above high water line	Ortigalita Peak NW
38	1-21-82	prehistoric - BRM, midden, housepits	"Indian Point" site extant and above high water line	San Luis Creek

Apart from the recorded prehistoric and historic sites and features situated within the SRA and in San Luis and O'Neill Forebay wildlife areas, collections of materials associated with the project area and vicinity are presently being curated by the Department while early collections from the sites are curated at Reclamation's New Melones facility. These include artifacts from some of the resource survey and

excavation projects mentioned above and items without origin found within and in the vicinity of the SRA and San Luis and O'Neill Forebay wildlife areas.

Interpretive and Educational Resources

A visitor center at the Romero Overlook, operated by DWR, provides educational information on the CVP and SWP, the local reservoirs and dams, and statewide water projects through audio-visual and printed materials. The location of the center high above San Luis Reservoir provides spectacular views to the east, west, and south. Telescopes are available for viewing the area.

A campfire center that seats about 75 visitors is located in the Basalt campground, and interpretive staff conduct evening programs during the summer months. The group campsite facilities at San Luis Creek and O'Neill Forebay are used occasionally for more informal presentations to scouts and other groups that request a ranger program. School field trips to the project area primarily from April through June have used the picnic facilities, swim beach, and expansive turf areas at San Luis Creek. An increasing number of school groups have been combining DWR tours of the power plant with ranger-led tours of the wind-generation farm located at nearby Pacheco State Park. A variety of special events, including Kids' Fishing Day, the Police Activities League Northern California Camporee, and the Native Californian Fall Gathering also make use of the group and family picnic facilities at the north beach. Freestanding outdoor exhibit shelters house interpretive displays in six locations throughout the project area, and informational bulletin boards are provided at each restroom.

The Path of the Padres all-day guided boat ride and hike at Los Banos Reservoir takes visitors on the route once used by the padres of Mission San Juan Bautista to travel to and from the Central Valley. Along the way, there are stops by Native Californian acorn grinding rocks, and the pools that gave the town of Los Banos its name. Cultural history and natural history are both featured in this popular all-day hike, which is booked solid four days each week during March and April. Thursday and Friday dates are held for school group hikes. The Department's pontoon boat carries the hikers to the trailhead at the west end of Los Banos Reservoir, which limits group size into the backcountry area.

Additionally, the following interpretive themes are used to tell the story of the area through campfire programs, boat tours, guided hikes, audio-visual programs, and outdoor exhibits:

- Wind & Water: Strong winds are common at the project area making the area a treacherous location for boaters and anglers. Signage and wind danger signals are provided to assist in informing visitors of this climatic factor.
- Big Fish: San Luis Reservoir holds the world record for land-locked striped bass, and a new rearing program is expected to make the fishery even more fun.
- Life in the Rain-shadow: Despite an abundance of imported water, the project area receives less than 10 inches of rainfall each year. Roadrunners, tarantulas, kangaroo rats, and kit foxes are among the desert-adapted species that inhabit the area.
- San Luis Reservoir: The reservoir stores water for state and federal water projects, supplying drinking water to the Santa Clara County, San Joaquin Valley, and Southern California, as well as provide irrigation to farmers as far south as the Imperial Valley.

Aesthetic Resources

Designated Scenic Areas and Routes

State Route 152

The Merced County Year 2000 General Plan designates SR 152 west of I-5 as a state scenic highway because of its scenic vistas (Chapter VI: Open Space/Conservation.)

According to the Santa Clara County General Plan, 1995-2010, SR 152 is considered one of the most dramatically scenic gateways into Santa Clara County. The county is currently seeking state designation of this road as a scenic highway. Policy R-RC(i) 36 of the Santa Clara County General Plan is intended to protect the scenic value of several major county thoroughfares and entranceways through state scenic highway designation, including Pacheco Pass (SR 152 east of Gilroy).

Recreational Resources

Recreational Activities

The project area is noted for boating, windsurfing, camping, picnicking, and fishing. The SRA includes five major use areas: Basalt, Dinosaur Point, San Luis Creek, Medeiros and Los Banos Creek. A sixth use area is the designated OHV area along Gonzaga Road. Additionally, the two wildlife areas in the project area offer hunting and hiking opportunities. The project area is one of the most popular recreation areas associated with the SWP. It is known for excellent boating, swimming, windsurfing, camping, and picnicking, but the reservoir's biggest draw is its excellent angling. Los Banos Reservoir is also known primarily for its fishing, although boating and swimming are also popular. Fishing is available in all three reservoirs. The DFG keeps Los Banos Reservoir well stocked with trout, and O'Neill Forebay with striped bass. Bass fishing derbies are often held at O'Neill Forebay, and crappie and bluegill are also caught. Table 2-13 details the primary activities in each of the use areas.

Table 2-13
Project Area Primary Activities

USE AREA	PRIMARY ACTIVITIES
Basalt Use Area	Fishing, Camping, Hiking, Boating, Day Use
Dinosaur Point Use Area	Fishing, Boating, Day Use
San Luis Creek Use Area	Fishing, Windsurfing, Swimming, Boating, Camping, Day Use, Group Activities
Medeiros Use Area	Fishing, Windsurfing, Camping, Day Use
OHV Use Area	Adult/Children OHV Use
Los Banos Creek Use Area	Fishing, Boating, Camping, Hiking, Horseback Riding
O'Neill Forebay Wildlife Area	Hunting, Hiking, Nature Study
San Luis Wildlife Area	Hunting, Hiking, Nature Study

Recreation Facilities

Each of the main use areas provides a range of recreation facilities, as detailed below. In addition, the Romero Visitor Center offers educational information, literature and visitor programs, along with viewing stations equipped with telescopes. Map 5 illustrates existing recreation in the project area. Day use facilities and boating are permitted from sunrise to sunset. Camping check-in is at 2 PM and checkout is at noon.

Basalt Use Area

The Basalt Use Area is located at the southeastern corner of San Luis Reservoir. The area includes 79 tent/RV campsites, including eight Americans with Disabilities Act (ADA) accessible, with piped water, fire grills, picnic tables, and storage lockers. A sewer dump station, flush toilets, showers, and a fish cleaning station help make Basalt a popular use area. The Basalt Use Area also provides trail access, a campfire center, a four-lane boat launch with a 60-foot boarding dock, and proximity to a grocery store and laundry facilities.

Dinosaur Point Use Area

Dinosaur Point, located on the western edge of San Luis Reservoir where Dinosaur Point Road ends, offers excellent lake access, including a four-lane boat ramp with a 60-foot boarding dock and parking for approximately 100 vehicles, with additional parking on the boat launch ramp. Dinosaur Point also provides five shade ramadas, chemical toilets, and a public telephone. The gentle, but steady slope and length of Dinosaur Point Road provide for a relatively new activity known as street luge, which is becoming more popular at this location. However, currently it only takes place as a special event and requires permission from the Sector. Other activities provided in this area include fishing and bicycling.

San Luis Creek Use Area

The San Luis Creek Use Area is located on the west side of O'Neill Forebay directly northeast of San Luis Dam and is the most popular use area. The area provides two large beaches with beach platforms, large irrigated lawn with 148 shade ramadas with barbeques, three-lane boat launch ramp with 80-foot boarding dock, fish-cleaning station, restrooms and changing area, picnic area, and 171 parking spaces for vehicles with boat trailers and 390 spaces for single vehicles. In addition, camping facilities include 53 tent and RV campsites (including 6 ADA accessible) with electric and water hookups, fire pits, and picnic tables. San Luis Creek has two group campsites. The first, which can accommodate 60 campers, provides a large cooking/gathering shelter with lights and electricity, 8 shade ramadas with fire rings and picnic tables, and restrooms with showers. The second, which can accommodate 30 campers, provides a smaller cooking shelter with lights and electricity, 5 shade ramadas with fire rings and picnic tables, and restrooms with showers. The group campsites also share an irrigated lawn area and a parking area with approximately 36 single-vehicle spaces.

San Luis and O'Neill Forebay Wildlife Areas

DFG manages two wildlife areas in the project area. The San Luis Wildlife Area is located at the northwest edge of San Luis Reservoir, south of SR 152, and is accessed from a parking area off of

Santa Clara County
Merced County

Upper Cottonwood Wildlife Area

Cottonwood Bay

Lower Cottonwood Wildlife Area

San Luis Wildlife Area

Honker Bay

Dinosaur Point Use Area

Dinosaur Point Road

152

Pacheco State Park

San Luis Reservoir

Romero Overlook Visitor Center

B.F. Sisk San Luis Dam

Gonzaga Road

Gonzaga Road DPR Facilities

Goosehead Point

Quien Sabe Point

Existing Quarry

Lone Oak Bay

Lone Oak Trail

Portuguese Creek Area

Basalt Use Area

San Luis Creek Use Area

33

Santa Nella

Henry Miller Road

O'Neill Forebay

O'Neill Dam

O'Neill Forebay Wildlife Area

Volta Road

Medeiros Use Area

152

To Los Banos
(approx 6 miles)

Off-Highway Vehicle Use Area

California Dept. of Forestry Fire Station

Jasper-Sears Mitigation Parcel

Pioneer Road

5

Canyon Road

Los Banos Creek Use Area

Arroyo Padre Flat

Horse Camp

Los Baños Reservoir

"Path of the Padres" Trail

Land Management and Ownership Status

- DPR and DWR managed (USBR owned)
- DFG managed (USBR owned)
- Joint Use Area
- Pacheco State Park
- DFG owned and managed
- DWR owned

Boundaries

- Project Area

Source: USGS DRG / EDAW, 2002

1 0.5 0 1 2 Miles

Scale 1 : 79,200
1" = 1.25 miles

N

4/20/05

EDAW

Existing Recreation Resources and Uses

Facilities

- Ranger Station
- Visitor Center
- Wind Warning Light

Camping

- Tenting
- Recreational Vehicle
- Group Site
- Horse Camping

Recreation Uses and Activities

- Boat Launch
- Windsurfing
- Swimming
- Fishing
- Hunting
- Equestrian
- Bicycling
- Off-Highway Vehicle
- Wildlife Viewing
- Hiking
- Day Use

San Luis Reservoir State Recreation Area

MAP 5
Existing Recreation

P:\2002\2s035.01\gis\arcmap\sanluis_m5_ownrec_17x11.mxd

Dinosaur Point Road. The O'Neill Forebay Wildlife Area is at the eastern side of the forebay dam, accessible from a parking area off of SR33. Both sites have a self registration system at the entry points and permit nature study, hiking and hunting. Hunting for waterfowl, pheasants, quail, doves, rabbits and crows is allowed at O'Neil Firebay Wildlife area and hunting for all legal species including deer, pig, dove, quail, turkey and small game, subject to DFG regulations is allowed at the San Luis Wildlife Area.

Medeiros Use Area

The Medeiros Use Area is located on the southeastern shore of O'Neill Forebay. The area provides 42 campsites with shade ramadas, picnic tables, and barbeques, as well as approximately 350 primitive campsites for tents and RVs. The day use and camping areas have potable water from four portable water tanks (water is trucked in), and chemical toilets. The boat launch at the Medeiros Use Area was closed in 2000 due to security issues.

OHV Use Area

The OHV area is located south of Gonzaga Road and approximately 2 miles east of the DPR's Administrative Offices. The OHV area is an open flat, partially vegetated, parcel that is developed with an Off Highway Vehicle (OHV) track, consisting of unpaved trails, including an area for children's OHV activities, enclosed with low fencing. The area also includes a parking area and chemical toilets.

Los Banos Creek Use Area

The Los Banos Creek Use Area surrounds the Los Banos Reservoir. The main use area at Los Banos Reservoir is located at the northeast end of the reservoir and includes 14 campsites with shade ramadas, barbeques, and picnic tables. Los Banos Creek Use Area also includes a two-lane boat launch ramp with 60-foot boarding dock, horse camp, and parking for approximately 40 vehicles with boat trailers, chemical toilets, hiking and equestrian trail access, and a swimming area.

Existing Facilities

Buildings

Visitor Center

The Romero Visitor Center, operated by DWR, is located on the eastern side of San Luis Reservoir at the Romero Overlook. The visitor center provides extensive information on the reservoirs and water projects through audio-visual and printed materials. Telescopes are also available for viewing the area. The visitor center is open everyday from 9am until 5pm, except for Christmas and Thanksgiving.

Entrance Stations

There are four vehicular access points with an entrance station: Basalt, Los Banos Creek, Medeiros, and San Luis Creek Use Areas. Entrance stations are located in the roadway, with windows on both sides to serve traffic entering and leaving the recreation area. All entrance stations provide climate-controlled work space for staff, some with multiple rooms. The Basalt and San Luis Creek Use entrance stations are

equipped with restroom facilities. Entrance stations are staffed during peak use seasons. All four entrance stations are staffed for both day use and camping

Operations Facilities

The SRA Administrative Offices are located on Gonzaga Road, south of SR 152. Department facilities located at this location include the administrative office building, ranger office building, and a number of storage and maintenance buildings, including a multipurpose building, the Department's maintenance shop, an auto shop, and a large warehouse. In addition, a large fuel tank and propane tank are located at this location. Finally, there is one trailer used to house visiting specialists and SRA interns. Further Department operations facilities include water treatment facilities, sewer lift stations, and wind warning lights located at both the Basalt and San Luis Creek areas. Water tanks are located at each of the use areas.

Concessions

Concessions within the project area are limited. Kayak rental is available sporadically at the San Luis Creek Use Area through a private vendor operating from a picnic table and a private vehicle. No buildings are used for concessions, and no other concessions are offered.

Employee Housing

Employee housing is located at Basalt and Los Banos Creek Use Areas, and the SRA Administrative Offices. Basalt Use Area provides one mobile home pad, which is currently occupied by the maintenance chief's trailer. Los Banos Creek Use Area provides one Department-owned mobile home trailer, which is usually occupied by the unit ranger. Some staff are currently housed at Pacheco State Park. The SRA Administrative Offices also provides one Department-owned mobile home trailer; however, it has no fulltime residents and typically is used to house visiting specialists and interns.

Restrooms

Restrooms are available at the Romero Visitor Center and each use area excluding the wildlife areas. The Basalt Use Area provides two restrooms with showers and one without. The Dinosaur Point Use Area provides four to six chemical toilets and the Los Banos Creek Use Area provides 14 chemical toilets depending on water level. The Medeiros Use Area provides one vault-type restroom and 40 chemical toilets; and the San Luis Creek Use Area provides three restrooms with dressing rooms, four restrooms without dressing rooms, four vault-type restrooms, and one restroom with showers. Chemical toilets are available at the OHV area. In addition, there are a number of chemical toilets located throughout high-use areas during the peak season.

Circulation

Regional Traffic and Transportation

The project area is located between two of California's primary north-south conduits, SR 101 and Interstate 5 (I-5), and adjacent to SR 152, one of the main east-west routes through the Diablo Range. I-5 lies approximately five miles east of the reservoir along SR 152 and provides a direct route from the

Stockton and Sacramento areas. U.S. Highway 101 runs 35 miles west of the reservoir and provides a reasonably direct route from the San Francisco Bay, San Jose, and Salinas areas. Numerous smaller roads and highways farther east and west of the recreation area, including SR 33, SR 99, SR 156, and SR 25, connect with SR 152 in the general vicinity of the project area and provide access from Fresno, Modesto, Hollister, Monterey, Santa Cruz, Castroville, and surrounding areas.

SR 152 between the Merced-Santa Clara County line and the junction with I-5 has been designated as a High Emphasis and Focus Route for the Interregional Road System (IRRS), a designation that highlights the route's critical importance to interregional travel and to the state as a whole. SR 152 carries industrial, commercial, agricultural, recreational, and private vehicle traffic, with annual average daily traffic of more than 24,000 vehicles per day (Caltrans 2001). According to the 2001 Regional Transportation Plan for Merced County, SR 152 exceeds capacity in the vicinity of San Luis Reservoir (MCAG 2001).

In addition to IRRS designation, the segment of SR 152 in the project vicinity is a designated Bike Route on State Highway (Caltrans 2001). Public transportation along SR 152 near the recreation area includes the Merced Area Regional Transit System (MARTS) and Greyhound-Trailways bus lines, though neither stops within the project area. In addition, a high-speed rail line has been proposed and is being evaluated by the California High Speed Rail Authority (see description below under Regional Planning Influences) that may pass through Pacheco Pass, northeast of San Luis Reservoir. Bicycle routes and public transportation are recognized as important alternatives to private vehicles and are proposed throughout Merced County. Furthermore, the segment of SR 152 in the project vicinity is designated as a Scenic Highway, and is therefore protected from certain development and degradation of the roadway's scenic corridor.

Project Area Access and Roads

The location of project area access points are noted in Table 2-14. In addition to the roads accessing use areas, there are numerous roads within the recreation area that provide access to San Luis Dam and the associated operations facilities, areas along the western shore of O'Neill Forebay, and areas along the southeastern shore of San Luis Reservoir in the Basalt area. Access roads are all two-lane paved roads, but roads extending past designated use areas include a variety of two-lane paved, single-lane paved, gravel, and unimproved roads.

Table 2-14
Project Area Entrance Points

ENTRANCE	LOCATION	NEAREST PRIMARY RD.	ENTRANCE ROAD
Basalt Use Area	Southeast corner of San Luis Reservoir	SR 152	Basalt Road
Dinosaur Point	Northwest corner of San Luis Reservoir	SR 152	Dinosaur Point Road
San Luis Wildlife Area	West side of San Luis Reservoir	SR 152	Parking area off Dinosaur Point Road.
San Luis Creek Use Area	Western edge of O'Neill Forebay	SR 152	San Luis Creek Service Road, South Loop
O'Neill Forebay Wildlife Area	East of O'Neill Forebay and dam	SR33	Parking area off SR33
Medeiros Use Area	South side of O'Neill Forebay	SR 33	Entry road off SR33.
Los Banos Creek Use Area	Around Los Banos Reservoir	SR 152	Unnamed (Off of Canyon Road)

Parking

In addition to the roads throughout the project area, the Department maintains public parking areas at each of the use areas. Parking is described in Table 2-15 below.

Table 2-15
SRA Use Areas Parking

LOCATION	CAPACITY	DESCRIPTION
Basalt Use Area (Total) Fisherman's Point Willow Point Goosehead Main Boat Ramp	434 100 116 62 156	278 auto spaces, 156 spaces for autos with trailers
Dinosaur Point Use Area	123	Auto spaces, with additional auto and boat trailer parking on boat ramp
San Luis Creek Use Area (Total) South Beach North Beach Main Boat Ramp Check 12	561 110 289 125 37	390 auto spaces, 171 spaces for autos with boat trailer
Medeiros Use Area	300	Informal, unpaved parking along existing roads
OHV Use Area	30	Informal, unpaved parking
Los Banos Creek Use Area	40	All for autos or autos with boat trailer

Source: DPR 2003.

Utilities and Services

Sewage and Water Treatment

There are two water treatment facilities located within the recreation area. The 72,000 gallons per day (gpd) San Luis Reservoir Water Treatment Plant, located in the Basalt Use Area, serves the campground and dump station. The 86,000 gpd O'Neill Forebay Water Treatment Plant, located in the San Luis Creek Use Area, serves the day use areas and campgrounds. Sewage treatment at both facilities routes waste through sewer grinders and uses lift station pumps to move wastewater to evaporation/percolation ponds, located at the facilities. Chemical and vault toilets located throughout the project area are serviced by pumper trucks on a regular basis.

Water Storage Tanks

There are a total of seven water storage tanks located throughout the project area. Table 2-16 details tank locations, sizes, and purposes.

Table 2-16
Project Area Potable Water Storage Facilities

LOCATION	TANK SIZE	TANK PURPOSE
Basalt Use Area	100,000	Storage at Treatment Plant
Dinosaur Point Use Area	5,000 5,000	Potable Water Irrigation
San Luis Creek Use Area	250,000 (total storage)	Storage (2 tanks) at Treatment Plant Potable Water at Group Camp
Medeiros Use Areas	4 x 1,000	Potable Water: Campgrounds
Los Banos Creek Use Area	2,000 1,000 1,000	Potable Water: Residences Potable Water: Boat Launch Potable Water: Campgrounds

High Voltage Power Lines

Electricity throughout the project area is provided by the Pacific Gas and Electric Company. Distribution lines enter the San Luis Creek area from the north, paralleling the project area's western boundary and terminating at the San Luis Creek entrance station kiosk. Electricity is provided to the Medeiros Use Area by the same distribution network, with lines terminating at the entrance station. Distribution lines enter the Basalt area from the east, paralleling the Basalt entrance road and terminating at San Luis Reservoir Water Treatment Plant and Quien Sabe wind warning lights. Los Banos Creek receives electricity from distribution lines on Canyon Road, which enter the use area and terminate at the residence area. No electricity is provided at the Dinosaur Point area.

Other Utilities

Other utilities within the project area include propane tanks located at the SRA Administrative Offices, Basalt campground, and Los Banos Creek residences.

Project Area Support and Emergency Services

The SRA is maintained by staff located at the SRA Administrative Offices while the wildlife areas are maintained by DFG staff based at the Los Banos Wildlife Area field office in Los Banos.

Fire Protection

Emergency fire protection is provided by the CDF, stationed south of Gonzaga Road, east of the SRA Administrative Offices, with supplemental protection provided by the County of Merced. Fire protection includes fire prevention efforts, which range from signs to public education, as well as emergency response in the event of a fire, rescue or other incident.

SRA Security

Rangers and lifeguards perform law enforcement duties at the SRA. Use areas and camping areas are patrolled daily. Patrol shifts vary according to the season; patrols are longer, more frequent, and at later hours during peak use seasons. Seasonal lifeguard staff is added during peak seasons. A patrol boat patrols the reservoirs on weekends during high use seasons and is on call year round. In addition, general Department staff aid in project area security by performing camp checks, collecting fees, assisting rangers, and reporting disorderly or suspicious activity to the proper authorities.

Medical Aid

General first aid is provided by project area staff; all rangers and lifeguards are trained for emergency medical response. Emergency medical response also falls under the jurisdiction of California Department of Forestry and Fire Protection (CDF), who is equipped to respond to all medical emergencies and holds cooperative contracts and agreements with other state and local emergency response agencies that provide supplemental resources when needed.

2.2 PLANNING INFLUENCES

System-Wide Planning

Planning for the project area must be wide ranging to consider issues that cross regional, local, community, and project area boundaries. Federal, state, county, and community agencies are responsible for providing oversight and review of various planning-related laws and policies, such as the National Environmental Policy Act (NEPA), California Environmental Quality Act (CEQA), Americans with Disabilities Act (ADA), as well as Regional Water Quality Control Board (RWQCB) and Air Quality Management District (AQMD) regulations.

Additionally, numerous U.S Bureau of Reclamation (Reclamation) and California Department of Parks and Recreation (Department) resource management directives guide the project area planning process. Most of the following resources apply to San Luis Reservoir State Recreation Area (SRA) lands managed by the Department as they have the largest management responsibility in the project area. However, each of the managing agencies have individual management directives that should be consulted during Plan implementation:

- Reclamation Mission and Vision Statement
- Department Mission Statement
- DFG Mission Statement
- DWR Mission Statement
- Department Resource Management Directives
- National Fire Plan
- Department Operations Manual
- Department Administrative Manual
- California Recreational Trails Plan – Phase I
- Access to Parks Guidelines
- California State Parks Systems Plan
- Employee Housing Policies
- Concessions Program Policies
- California Outdoor Recreation Plan 2002
- California State Parks and the Great Central Valley
- Public Opinions and Attitudes on Outdoor Recreation in California (2003)
- California Heritage Task Force
- Vegetation Management Guidelines for Trails and Roads in the Units of the State Park System
- Public Resources Code

Reclamation Mission and Vision Statement

The U.S Bureau of Reclamation (Reclamation) Mission Statement is "to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public." Additionally, their vision is "through leadership, use of technical expertise, efficient operations, responsive customer service and the creativity of people, Reclamation will seek to protect local economies and preserve natural resources and ecosystems through the effective use of water."

Department Mission Statement

The California Department of Parks and Recreation (Department) Mission Statement is "to provide for the health, inspiration, and education of the people of California by helping to preserve the state's extraordinary biological diversity, protecting its most valued natural and cultural resources, and creating opportunities for high quality outdoor recreation."

DFG Mission Statement

The Mission of the California Department of Fish and Game (DFG) is "to manage California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public."

DWR Mission Statement

The Mission of California Department of Water Resources (DWR) is "to manage the water resources of California in cooperation with other agencies, to benefit the State's people, and to protect, restore, and enhance the natural and human environments."

Department Resource Management Directives

The Resource Management Directives for the Department were originally adopted in 1979 and provide specific policies associated with use patterns, allowable use, and avoidance of resource degradation with California's park system.

National Fire Plan

The National Fire Plan is a long-term strategy that will help protect communities and natural resources, and most importantly, the lives of firefighters and the public. The U.S. Department of Agriculture (USDA) Forest Service and the Department of the Interior are in the second year of National Fire Plan implementation. It is a long-term commitment based on cooperation and communication among federal agencies, states, local governments, tribes and interested publics. The federal wildland fire management agencies worked closely with these partners to prepare a 10-Year Comprehensive Strategy, completed in August 2001. Congress also called on the Secretaries to work collaboratively and cooperatively with Governors in the development of this strategy and as full partners in planning, decision making, and implementation. This resulting strategy has been developed by federal, state, tribal, and local government and nongovernmental representatives for the purpose of improving the management of wildland fire and hazardous fuels, as well as meeting the need for ecosystem restoration and rehabilitation in the United States on federal and adjacent state, tribal, and private forest and range lands.

In addition, this strategy outlines a new collaborative framework to facilitate implementation of proactive and protective measures that are appropriate to reduce the risk of wildland fire to communities and the environments. Meeting the objectives of the strategy requires a coordinated effort across landscapes to restore and maintain the health of fire-prone ecosystems. This strategy recognizes the importance of suppressing fires, especially those near homes and communities, but there needs to be a continued shift in fire management emphasis from a reactive to a proactive approach. This new approach assures a more active collaboration between the fire management organizations and communities.

The purpose of a long-term strategy for reducing wildland fire risks to communities and the environment is meant, in part, to correct problems associated with the long-term disruption in natural fire cycles. This disruption has increased the risk of severe wildland fires on some fire-prone ecosystems. The introduction of now pervasive invasive species has also increased the wildland fire threat. At the same time, communities have grown into the forests and range lands, increasing the risk to people, their homes, and water supplies. The following core principles are overarching for all goals:

- Collaboration – Facilitate a collaborative approach at the local, regional, and national levels.
- Priority Setting – Emphasize the protection of communities, municipal, and other high-priority watersheds at risk. Long term emphasis is to maintain and restore fire prone ecosystems at a landscape scale.
- Accountability – Establish uniform and cost-effective measures, standards, reporting processes, and budget information in implementation plans.

The goals of the 10-Year Comprehensive Strategy are 1) Improve prevention and suppression, 2) reduce hazardous fuels, 3) restore fire adapted ecosystems and 4) promote community assistance.

California Recreational Trails Plan

The California Recreational Trails Plan (Phase I) was prepared by the Department and released in June 2002. It identifies 12 trail-related goals and lists general action guidelines designed to reach those goals. The goals and their action guidelines will direct the future actions of the Department's Statewide Trails Office regarding trail programs. This Plan is Phase I of a more comprehensive statewide trails plan (Phase II) to be developed. Phase I should serve as a general guide for trail advocates and local trail management agencies and organizations in planning future trails and developing trails-related programs. Phase II will utilize the best of Phase I as a guide and will incorporate hard data and generally accepted planning practices, including additional public input and comment.

The Statewide Trails Office has as its mission to "promote the establishment and maintenance of a system of trails and greenways that serves California's diverse population while respecting and protecting the integrity of its equally diverse natural and cultural resources. The system should be accessible to all Californians for improving their physical and mental well-being by presenting opportunities for recreation, transportation, and education, each of which provides enhanced environmental and societal benefits."

Access to Parks Guidelines

The 2001 Department Access to Parks Guidelines specifies accessibility standards for a variety of activities and uses, including trails, concessions, and picnic sites.

Concession Program Policies

The Department's Concession Program Policies have provisions for leases and permits, program conflict resolution, integrated management plan, outsourcing, contracts, interpretive concessions, request for interest (RFI) process, public stakeholder meetings, performance bonds and sureties, and concessionaire conflict resolution.

An "interpretive concession" is defined as a concession that provides an educational service to the public by practicing skills reflective of the interpretive period or interpretive theme of a park unit through products sold, services rendered, or interpretive programs provided.

California Outdoor Recreation Plan 2002

The California Outdoor Recreation Plan (CORP), prepared by the Department, describes federal and state land management agencies and their programs for managing public recreation resources. The report also summarizes local, nonprofit, and private sector providers of recreation within the state.

The CORP discusses demographic trends and challenges that are affecting and will continue to affect California's recreation in the future. Trends include robust population growth, urbanization, and growth of inland counties. Demographic shifts include a continuing increase of Hispanic and Asian populations as a percentage of the total state population. The "baby boom" generation is expected to become a more active senior population than today's seniors.

Popularity of nature study, adventure-based activity, and high-technology recreation are all trends that will influence future recreation numbers and types of recreation participation. Outdoor recreation is very important to Californian lifestyles in general. Recreational walking was the number one activity among surveyed California residents. There is a high, unmet demand for several activities: recreational walking, camping at developed sites, trail hiking, attending outdoor cultural events, visiting museums, historic sites, swimming in lakes, rivers, ocean, general nature, wildlife study, visiting zoos and arboretums, camping in primitive areas, beach activities, use of open grass or turf, freshwater fishing and picnicking in developed sites.

The CORP lists issues facing parks and outdoor recreation and outlines actions for dealing with the challenges faced by park managers. Issues include funding, access to parks and recreation areas, natural and cultural resource protection, and leadership in recreation. The CORP also outlines health and social benefits of recreation. Wetlands and future reports to be published by the Department are also discussed (DPR 2002).

California State Parks and The Great Central Valley

This brochure, issued by the Department in April 2004, summarizes the results of a study that the Department undertook to develop a roadmap for the State Park System's future role in the Central Valley. The study was initiated due to several changes taking place in the Central Valley including unprecedented growth in its evolving economies and in the diversity, needs and interests of its residents. The study will guide future acquisition and development programs for the region. There are key strategies presented in the brochure and these should be consulted when implementing the Plan and prioritizing future development projects in the project area.

Public Opinions and Attitudes on Outdoor Recreation in California (2003)

The study focused on two major areas of inquiry: 1) public attitudes, opinions, and values with respect to outdoor recreation in California, and 2) demand for and current participation in 42 selected types of outdoor recreation activities for both adults and youth. The specific aims of the study were to determine participation (and therefore changes to participation patterns) in activities and visitation to different types of recreation areas; cultural/ethnic differences in user participation in outdoor recreation activities, support facilities and services; importance of outdoor recreation lands, facilities, and services; satisfaction with existing facilities and opportunities; preferred funding mechanisms; and preferences for and perceived personal value of outdoor recreation activities.

The research study design consisted of a telephone survey with a follow-up mail survey. The survey was a replication of the survey taken by the DPR in 1997, however several questions were slightly altered, some 1997 mail survey questions were moved to the telephone survey portion in 2002, and several mail questions were slightly changed. In addition, there was a separate survey dealing strictly with youth under the age of 18. In total 2,512 telephone interviews were completed, 326 of which were in Spanish. Sampling error was +/- 2.1% at a 95% confidence level. Follow-up mail surveys were completed by 610 people with a sampling error of +/- 4.1%. In addition, 144 youth (people age 17 and younger) completed the youth mail survey with a sampling error of +/- 9.5%. The survey sample does not perfectly represent California demographics in that the survey over-represents females and households with incomes of $50,000 or more, and under-represents Asians, and households with incomes less than $20,000 per year.

Regional Planning Influences

The following local and regional plans will have an influence on plan implementation and should be consulted for guidance during detailed design and development of project area components:

- Merced County General Plan
- City of Los Banos General Plan
- Central Valley Region Water Quality Control Plan (Basin Plan)
- MCAG Regional Transportation Plan
- SCVWD San Luis Reservoir Lowpoint Improvement Project
- Caltrans District 10 State Route 152 Transportation Concept Report
- Santa Nella Community Specific Plan
- California High-Speed Train Program Environmental Impact Statement / Environmental Impact Report (EIS/EIR)
- MCAG Draft Regional Housing Needs Plan
- Merced County's 20-Year Transportation Expenditure Plan
- Los Banos Grande Facilities Plan and Draft EIR

County of Merced General Plan

The project area is located within Merced County, which has approved several major new towns within the immediate vicinity. Regional planning efforts envision new town development providing housing for commuters using SR 152 to access jobs in Santa Clara County. The Merced County General Plan was last updated in 1990 and covers physical growth and development through 2000.

Land Use

The Merced General Plan supports the conservation of open space. The Urban Centered Concept is the basic principle of land use policy and is directed at utilizing cities and unincorporated communities or centers to accomplish anticipated urban expansion in an orderly manner. The purpose of using the urban centered concept to plan land use is to ensure that:

- Growth occurs in an orderly and logical manner;
- Land is utilized efficiently;
- Agricultural operations are not eliminated prematurely;
- The County's planning efforts are complementary to those of the cities; and
- Urban development occurs where proper services are available.

The project area is designated Foothill Pasture under the Merced County General Plan. This designation generally applies to lands on the east and west sides of the County, the Sierra Nevada foothills, and the Diablo Range, respectively. The Foothill Pasture areas are used for noncultivated agricultural practices as well as livestock facilities, wastewater lagoons, and agricultural commercial facilities. Certain nonagricultural uses may also be found including mineral resource extraction and processing, institutional facilities, outdoor public and private recreational facilities, and all accessory uses thereto. The zoning classification considered most compatible for Foothill Pasture designated areas is generally A-2 (Exclusive Agricultural), which applies to the study area (Merced County 2000 General Plan).

Safety

The Merced General Plan also addresses some issues relevant to the San Luis Reservoir area including safety issues related to dam failure and seiches (waves occurring in confined bodies of water). The risk at San Luis Reservoir is heightened because it is in the vicinity of several major fault zones, including the extremely active San Andreas and Calaveras faults and the less active Ortigalita Fault. However, the location of San Luis Reservoir in proximity to potential seismic activity has been compensated for by structural design. San Luis Dam was built to withstand a magnitude 8.3 occurrence at Hollister; however, this does not completely eliminate the possibility of dam failure with resulting floods.

Open Space/Conservation

The Merced General Plan acknowledges that recreational facilities provide both economic and open space benefits to county residents and places a high emphasis on public lands and public recreation areas. It mentions that the Department's California Recreational Trains and Hostel Plan promotes a Yosemite to Monterey Hiking/Biking/Equestrian Corridor, which would weave between the two points, passing through the northern and western areas of the county.

The County also has implemented an Open Space Action Plan to carefully manage open space resources in order to support the County's anticipated population growth while preserving nonrenewable assets for future generations. The Open Space Action Plan relies on written policies and inventory maps in addition to the General Plan land use map or individual community Specific Urban Development Plans as a means to define or delineate open space lands.

Aesthetics

SR 152 from the Santa Clara County line to the junction with I-5 is designated a State Scenic Highway because of its scenic vistas. In addition to traversing rich agricultural farmlands, a considerable distance of the route provides drivers with views of the extensive San Luis Reservoir.

The State has established standards for protecting state designated scenic corridors. Minimum standards for scenic corridor protection include:

- Regulation of land use and density of development;
- Detailed land and site planning;
- Control of outdoor advertising (including a ban on billboards);
- Careful attention to and control of earthmoving and landscaping; and
- Careful attention to design and appearance of structures and equipment.

Agriculture

The Merced General Plan describes and maps a potential Agricultural Services Center (ASC) zone to the west of San Luis Reservoir. An ASC would provide a location for agricultural services, farm support operations, and convenience commercial services for the rural population. A limited amount of housing would be allowed, not to exceed one dwelling unit per acre.

The general plan also describes and maps potential Planned Agricultural Industrial Development (PAID) zones to the north and to the southeast of San Luis Reservoir. This zone would provide a minimum of 160 acres for agriculture-related industrial and support operations that create negative impacts on surrounding properties (animal sales yards and meat packing plants, for example).

City of Los Banos General Plan

Los Banos is the largest city in the western part of Merced County and the closest city to the project area. The Los Banos General Plan was adopted in 1999. The plan states that the most significant influence on future land use patterns in Los Banos will be the ultimate realignment of SR 152. This project was identified in the Merced County Regional Transportation Plan to occur over the next 20 years, depending on funding.

Central Valley Region Water Quality Control Plan (Basin Plan)

San Luis Reservoir and O'Neill Forebay are located in the southwestern part of the Central Valley Region of the California Regional Water Quality Control Board (RWQCB). The most recent Central Valley Region Basin Plan was adopted in 1998 and covers the entire Sacramento River and San Joaquin River basins. Basin Plans complement water quality control plans adopted by the State Water Board. They describe existing and potential beneficial uses, define water quality objectives, and establish implementation and monitoring plans.

MCAG Regional Transportation Plan

Merced County Association of Governments (MCAG) was designated the Regional Transportation Planning Agency (RTPA) for Merced County in 1972. As the RTPA, MCAG is required by state law to prepare the Regional Transportation Plan (RTP) and transmit it to the California Transportation Commission and the California Department of Transportation (Caltrans) every 3 years. The most recent RTP is from July 2001 (MCAG, 2001 Regional Transportation Plan, July 2001).

Regional Improvement Project priorities relevant to the study area include the SR 152 Los Banos Bypass as a Tier One project and the widening of SR 152 to six lanes from SR 33 to San Benito County as a Tier Two project (MCAG, 2001 Regional Transportation Plan, July 2001).

San Luis Reservoir Low Point Improvement Study

San Luis Reservoir is a key component of the State's water supply system. With a capacity of more than 2 million acre-feet (af), the reservoir stores water from both the State Water Project (SWP) and the federal Central Valley Project (CVP). San Luis Reservoir currently supplies water to Santa Clara Valley Water District (SCVWD) and San Benito County Water District through the San Felipe Division.

The health of San Luis Reservoir has been degrading. During the summer, as San Luis Reservoir is drawn down, a thick layer of algae grows on the surface. When the amount of water drops to the beginning of the low point (300,000 af), algae begins to enter the San Felipe Division intake, degrading water quality and making the water harder to treat. In response, operations have been changed such that water levels are maintained above the low-point elevation, rendering approximately 200,000 af unavailable to state and federal users each year.

In response to the low-point problem, and encouraged by the CALFED Bay-Delta Program (CALFED), SCVWD prepared the *San Luis Reservoir Low Point Improvement Project Draft Alternatives Screening Report* (MWH and Jones & Stokes 2003). The report summarizes the low-point problem at San Luis Reservoir, objectives of the project, alternatives development, screening process conducted to date, and information on the public outreach process. A summary of how this report may affect future plans at the project area is included as Appendix D. Seventy-five conceptual alternatives were screened to arrive at seven feasible alternatives recommended for further consideration, based on their ability to meet the goal and objectives of the project. The goal of the project is to increase the operational flexibility of storage in San Luis Reservoir and ensure a high-quality, reliable water supply for San Felipe Division contractors. The seven alternatives that met this goal include the following:

- Algae Management
- Dissolved Air Flotation (DAF Treatment)
- Lower San Felipe Intake
- Bypass San Luis Reservoir
- Expand Pacheco Reservoir
- Combination Project
- No Action/No Project

SCVWD and Reclamation will act as co-lead agencies to prepare a joint EIR/EIS to further evaluate a combination of these alternatives.

Caltrans District 10 State Route 152 Transportation Concept Report

State Route 152 is an east-west rural interregional facility connecting the southern portions of the San Francisco Bay Area to the Central Valley, with linkages to Southern California via I-5 and SR 99. SR 152 provides a moderate level of service for commercial truck travel, agricultural truck access to the Salinas

and Central valleys, and recreational travel to the Monterey Bay areas (via U.S. 101 and SR 156). In Merced County, SR 152 crosses the city of Los Banos and is approximately 40 miles long (Caltrans, State Route 152 Transportation Concept Report, June 2001).

The State Route Transportation Concept Report (TCR) established the future concept for Level of Service (LOS) for segments along SR 152 and broadly identified the nature and extent of improvements needed to attain that LOS. Operating conditions for each corridor were projected for 10-year and 20-year horizons. Beyond the 20-year planning period, the TCR identified the Ultimate Transportation Corridor (UTC) to ensure that adequate right-of-way was preserved for future ultimate facility projects. The TCR determined that the projected level of service was adequate within the next 20 years for a four-lane expressway for all segments, but that the UTC was a six-lane expressway (Caltrans, State Route 152 Transportation Concept Report, June 2001).

Santa Nella Community Specific Plan

Santa Nella grew 40% in population and 20% in housing from 1980 to 1990. A number of large planned communities are proposed in this area. As a result, the Santa Nella Community Specific Plan was revised with the help of a Citizen's Advisory Committee. Since the vast majority of the residences in the community are mobile homes, the residents indicated a desire for new single-family homes and apartments to provide a more balanced community (Merced County Year 2000 General Plan).

Four project sites were proposed for development within the Santa Nella Community Specific Plan Area. All of the project sites are located between I-5 and San Luis Reservoir. The developers proposed residential development, some commercial development, and open space community parks. The proposed number of home sites per acre range from 3.2 to 5.5.

California High-Speed Train Program EIS/EIR

Following adoption of a Final Business Plan in 2000, the California High-Speed Rail Authority (Authority) recommended that the state proceed with implementation of a statewide high-speed train system by initiating the formal state and federal environmental review process through preparation of a Program Environmental Impact Statement/Environmental Impact Report (EIS/EIR). As part of the Program EIS/EIR, a number of project alternatives will be evaluated, including a high-speed train alternative. Within the high-speed train alternative, there is a range of high-speed train alignment and station options to be considered. Parsons Transportation Group is working on alternative development.

The alignment relevant to the project area extends from Merced through the San Joaquin Valley and Pacheco Pass and then heads north. Station options include Los Banos (near I-5) and either Gilroy (near the existing Caltrain Station) or Morgan Hill (next to U.S. 101), and the existing San Jose (Diridon) Station (Parsons Transportation Group, High-Speed Train Alignments/Stations Screening Evaluation Summary, August 2001).

All of the Pacheco Pass alignment options would place Merced on the Sacramento-to-Bay Area high-speed train line, with less frequent service than the Los Angeles-to-Bay Area trains. As currently configured, the Pacheco Pass alignment options would also involve construction of tunnels, including a tunnel up to 13.5 miles (21.6 km) in length and one or two additional shorter tunnels. All Pacheco Pass alignments would provide high-speed train service to the Los Banos and Gilroy or Morgan Hill areas. The

Pacheco Pass alignments would cross the San Luis Waterway but pass to the north of O'Neill Forebay and San Luis Reservoir (Parsons Transportation Group, High-Speed Train Alignments/Stations Screening Evaluation Summary, August 2001).

MCAG Draft Regional Housing Needs Plan

Merced County Association of Governments (MCAG) is required to determine existing and projected regional housing needs for the period January 2001 through July 2008. MCAG is also required to determine each local jurisdiction's share of the regional need for housing. Jurisdictions will then decide how they will address this need through the process of updating the Housing Elements of their general plans. The final Regional Housing Needs Plan must be submitted to the California Department of Housing and Community Development by December 31, 2002. The most recent Regional Housing Needs Plan was adopted by the MCAG Governing Board April 25, 1991. The Regional Housing Needs Plan for January 2001 through June 2008 was adopted November 21, 2002. This plan discusses employment opportunities, commuting patterns, housing needs and demands, and local housing needs determinations for Merced County.

Merced County's 20-Year Transportation Expenditure Plan

The Merced County 20-Year Transportation Expenditure Plan will guide the expenditure of more than $212 million dollars in county transportation funds, plus federal and state matching funds over the next 20 years. The new plan was developed to serve major regional transportation needs in Merced County and addresses local street and road requirements in each of the incorporated cities in the county, as well as unincorporated streets and roads maintained by the county.

The 20-Year Transportation Expenditure Plan was developed as an outgrowth of the 2001 Regional Transportation Plan (RTP), which projected significant unmet transportation needs given current financing sources and identified the need for a supplemental plan based on the creation of additional revenue (Merced County's 20-Year Transportation Expenditure Plan, June 2002). The 20-Year Expenditure Plan does not include any projects along SR 152.

Los Banos Grande Facilities Draft EIR

The Los Banos Grandes Facilities Draft EIR was developed to evaluate the environmental impacts and feasibility of the Los Banos Grandes Facilities. The Los Banos Grandes Facilities, which were not constructed, were planned as an offstream storage reservoir upstream (southwest) of Los Banos Reservoir on Los Banos Creek. The Draft EIR discusses the potential benefits of the project, along with the economic, environmental, and cumulative impacts of the project and mitigation measures to reduce or eliminate these impacts. Lastly, the Draft EIR includes a brief discussion of planning and regulatory measures related to the proposed Los Banos Grandes Facilities, as well as to the region as a whole.

Socioeconomics

The project area is located within the 1- to 2-hour travel time zone of the Stockton Metropolitan area and the Fresno metropolitan area and the 2- to 4-hour travel time zone of the San Francisco Metropolitan area and the Sacramento Metropolitan area.

Between 1990 and 2000, the Bay Area added 760,000 new residents—an increase of more than 12%, for a total current population of approximately 6.8 million. The Association of Bay Area Governments (ABAG) projects that growth in the region will accelerate, adding another 1.4 million residents by 2025, an increase of more than 20%. ABAG (2000) estimated that the Bay Area economy supported 3.7 million jobs during 2000 and of these approximately 49 percent of the jobs were located in Santa Clara and Alameda Counties. These counties support the largest populations of the Bay Area counties (ABAG 2000), and the most jobs. The majority of jobs in the nine-county Bay Area, about 37 percent, were in the services industry, which includes business services. Retail trade and manufacturing (including high technology) industries accounted for 15 percent each of regional jobs in 2000. The remaining 33 percent of the region's jobs were distributed among the following industry categories: agriculture, forestry, fisheries, mining, construction, transportation, wholesale trade, finance, insurance, real estate, and government. Employment refers to the number of full- and part-time jobs by category or sector for the Bay.

The Sacramento area is also growing in population, increasing by 14.7% between 1990 and 2000; this is similar to California's overall growth rate of 13.6% over the same time period (*U.S. Census*). This regional growth could contribute to higher use demand at the project area.

Merced County General Plan

The Merced County General Plan is based on the 1990 Census. The MCAG Regional Transportation Plan and Regional Housing Needs Plans were updated with the 2000 Census. A Summary of the population growth from these plans is included in Tables 2-17 and 2-18 below.

Regional Transportation Plan

Population growth is a significant issue for the San Joaquin Valley and for Merced County. Incorporated urban areas in Merced County include: Atwater (population 23,650), Livingston (10,700), Los Banos (27,500), Dos Palos (4,660), and Gustine (4,870). The county seat, the City of Merced, has a population of 65,400. The total population for Merced County (including 10 rural population centers) is 216,700 as of January 2001 (source: Department of Finance, May 2001).

MCAG prepares and maintains population and employment forecasts for use in regional planning. The population and employment forecasts reflect the growth that is anticipated to occur during the next 25 years within Merced County and its cities and communities (see Tables 2-17 and 2-18). These forecasts were last updated in July 2000. They are consistent with the Department of Finance countywide projections, with the addition of the University of California (UC) Merced related growth. The totals for the county and selected communities are shown below.

Table 2-17
Merced County Population and Employment Forecast

	2000	2005	2010	2015	2020	2025
Population	215,256	242,846	273,923	304,784	337,935	373,170
Employment	81,661	88,857	94,656	100,412	104,963	121,929

Table 2-18
Population Forecast by City or Community Growth Area Boundaries

	2000	2005	2010	2015	2020	2025
Cities						
Gustine	4,655	5,119	5,588	6,020	6,502	6,965
Los Banos	24,106	29,645	36,194	43,613	52,681	63,116
Communities						
Santa Nella	1,308	1,868	2,648	3,705	5,197	7,230
Totals						
Incorporated	144,636	166,708	189,741	210,361	231,350	252,168
Unincorporated	70,620	76,138	84,182	94,423	106,585	121,002
County	215,256	242,846	273,923	304,784	337,935	373,170

Sources and Notes:

1. *County total population without UC Merced from Department of Finance, December 1998.*
2. *County total employment without UC Merced from Woods & Poole Economics, Inc., and Economic & Planning Systems, Inc., March 2000.*
3. *City and Community Forecast from MCAG, July 2000.*

MCAG Regional Housing Needs Plan

Merced County is located in the center of the San Joaquin Valley (also known as the Central Valley). The County's 2000 population of 210,554 is distributed among six incorporated cities: Merced (63,893), Los Banos (25,869), Atwater (23,113), Livingston (10,473), Gustine (4,698), and Dos Palos (4,581). The remaining 77,927 residents are in unincorporated areas.

Table 2-19 depicts population growth during the past decade among jurisdictions in Merced County. Population shifts in Los Banos are especially noteworthy. The catalyst for its rapid growth (78.1% between 1990 and 2000) was migration from Santa Clara and other San Francisco Bay Area counties, as families pursued affordable housing on the west side of Merced County.

Continuing pressures on Merced County's west side from San Francisco Bay Area commuters and the projected 2004 opening of the UC Merced campus guarantee that substantial planning decisions will be made over the next decade.

Table 2-19
Merced County Population Estimates and Percent Change 1990-2000

JURISDICTION	1990	2000	PERCENT CHANGE
Merced County Total	178,403	210,554	11.4%
Atwater	22,282	23,113	3.7%
Dos Palos	4,196	4,581	9.2%
Gustine	3,931	4,698	19.5%
Livingston	7,317	10,473	43.1%
Los Banos	14,519	25,869	78.1%
Merced	56,216	63,893	13.7%
Unincorporated areas	69,942	77,927	11.4%

Source: 1990 & 2000 Census, www.census.gov

Santa Clara County General Plan

Between 1995 and 2010, Santa Clara County's population is projected to grow by more than 206,000 people. By 2010, the population of the county should reach an estimated 1.8+ million persons, nearly 315,000 more than in 1990. Annual growth rates during that period will range from 12,000 to 22,000 persons per year. These figures contrast sharply with the growth experienced in the 1950s and 1960s, when the population grew between 40,000 to 60,000 persons per year. More moderate rates of employment growth and housing development account for the slower rates of growth.

The percentage of population growth from immigration has steadily declined since the early 1970s, whereas between 1950 and 1970, immigration had been the predominant source of population growth. Levels of in-migration ranged from 11,000 persons in 1950 to a peak of 46,000 persons in 1960, making up 79% of the population growth for the county that year. In contrast, recent years have seen a net outmigration, particularly for young families.

Most of the growth in Santa Clara County's population is expected to occur in San Jose and to a lesser extent in the south county, while the north and west valley cities are expected to experience relatively little growth.

City of Los Banos General Plan

The City of Los Banos General Plan used a 4% growth projection based on past growth statistics, expectations of growth by state and regional planning agencies, building permit activity, public improvements, and typical growth rates of similar Central Valley communities. Population growth estimates are included in Table 2-20. The actual population of Los Banos in 2002 was 28,150, indicating that actual growth has exceeded projected growth.

Table 2-20
Los Banos Population Growth Estimates 1997-2020 (at 4%)

YEAR	POPULATION
1997	20,694
2000	23,278
2005	28,321
2010	34,457
2015	41,992
2020	51,005

Source: City of Los Banos General Plan 1999.

Local and Regional Residents

Population Trends and Projections

The project area is in a primarily rural area in western Merced County, the closest cities being Gustine, approximately 15 miles to the northeast, and Los Banos, approximately 12 miles to the east. The recreation area is within the 1- to 2-hour travel time zone of several cities and major metropolitan areas, including the San Francisco Bay Area, the Sacramento metropolitan area, Fresno, Merced, Modesto, Salinas, San Jose, and Stockton.

Merced County population projections, shown in Tables 2-17 and 2-18, show rapid growth over the next 25 years. The county has one of the highest percent annual growth rates in California, with a growth of 2.8% from January 2001 to January 2002, and projected growths of 27% between 2000 and 2010 and 23% between 2010 and 2020. The majority of the county's population lives in incorporated areas including Atwater, Dos Palos, Gustine, Livingston, Los Banos, and Merced, all of which have shown steadily increasing population growth over recent decades. Santa Clara County's projected growth rates for the periods of 2000 to 2010 and 2010 to 2020 are much lower, 12% and 7%, respectively.

Demographic Diversity

Merced County has a relatively young population, with a median age of 27 years. Santa Clara County has a slightly older population, with a median age of 34 years. Of the Merced adults age 25 and older, 63.8% are high school graduates and 11.0% have a bachelor's degree or higher. Of those in Santa Clara County, 83.4% are high school graduates and 40.5% have a bachelor's degree or higher. Merced County has a diverse ethnic profile: 56.2% white, 3.8% black or African American, 1.2% Native American or native Alaskan, 6.8% Asian, and 45.3% Hispanic or Latino. A language other than English is spoken in 45.2% of households and 24.8% of the county population is foreign-born. Santa Clara County is 53.8% white, 2.8% black or African American, 0.7% Native American or Native Alaskan, 25.6% Asian, and 24.0% Hispanic or Latino. A language other than English is spoken in 45.4% of Santa Clara County households; 34.1% of the county population is foreign-born.

Employment (Local Market Analysis)

Merced County's economy is based primarily on agriculture and related industries, along with a significant tourist trade, leading to highly seasonal employment patterns and high rates of unemployment. The median household income is $35,500 (1999 data). Unemployment is 14.4% (2001 data), the fourth highest county in the state, and 21.7% of the population lives below the poverty level. In recent years, the county has sought to develop a broader economic base by expanding the tourist trade, such as recreational opportunities associated with the project area. and manufacture of light industry. The county's primary employers include the farming industry (19%), local governments (17%), retail (16%), the service industry (15%), and the nondurable goods manufacturing industry (14%). Minor employers include transportation, utilities, durable goods manufacturing, construction, mining, finance, insurance, real estate, and wholesale trade, and the state and federal governments. Santa Clara County has a much stronger economy, with a median household income of $74,335 (1999 data). Santa Clara County has a much broader economic base, including agriculture and related industries, manufacturing and light industry, trade, and tourism. Unemployment in Santa Clara County is much lower than in Merced and only 7.5% of the population lives below the poverty level.

Visitor Use and Experience

Visitor Attendance and Seasonal Fluctuations

Current attendance at the recreation areas is approximately 475,000 visitors per year, with significantly higher numbers of visitors during spring and summer months and lower numbers during fall and winter. San Luis Creek and Basalt are the most popular use areas, with up to 40,000 visitors a month at San Luis Creek during peak use. Dinosaur Point, Los Banos Creek, and Medeiros experience similar seasonal fluctuations, although visitor attendance is less.

Paid day use has shown an increasing overall trend since 2000, and free day use and overnight camping have increased overall. Annual project area attendance has fluctuated since 1995 with a low of 350,000 visitors in 1997-1998 and a high of 750,000 visitors in 1999-2000; total attendance has shown an overall increasing trend over the past 7 years. Tables 2-21 through 2-26 from the Department summarize visitor attendance by use area. These tables are broken down by day use, overnight use and boat launching. Additional focused surveys on visitor demographics and existing and desired activities at the SRA have not been conducted.

Table 2-21
San Luis Creek Use Area Monthly Visitor Attendance Data

MONTH	2000 – 2001				2001 – 2002				2002 – 2003			
	PAID DAY USE	FREE DAY USE	OVERNIGHT USE	BOATS LAUNCHED	PAID DAY USE	FREE DAY USE	OVERNIGHT USE	BOATS LAUNCHED	PAID DAY USE	FREE DAY USE	OVERNIGHT USE	BOATS LAUNCHED
July	31,848	3,533	1,737	850	20,278	2,251	1,350	441	19,740	2,207	2,108	763
August	26,367	2,958	1,401	659	19,169	2,135	1,370	265	30,039	3,332	2,632	859
September	17,901	1,992	1,224	410	14,756	1,646	908	258	31,253	3,475	1,884	892
October	7,330	890	620	323	9,249	1,035	942	292	15,801	1,749	873	324
November	5,392	662	530	435	5,499	615	1,257	253	11,847	1,329	897	438
December	4,652	570	298	429	3,882	423	621	253	6,186	687	318	301
January	3,476	422	312	210	4,866	549	573	464	6,534	729	1,074	484
February	2,950	359	392	138	9,084	1,014	-	690	7,998	888	1,179	538
March	6,658	975	840	243	18,921	2,031	825	774	12,672	1,398	1,482	310
April	20,237	2,244	1,095	225	10,679	1,193	2,009	524	18,751	2,281	1,166	185
May	40,484	6,208	1,459	544	14,834	3,029	2,700	887	27,234	3,026	1,727	290
June	26,782	2,995	1,469	372	14,889	1,639	2,298	898	36,472	4,052	1,914	218
Annual Total	194,077	23,808	11,377	4,838	146,106	17,560	14,853	5,999	224,527	25,153	17,254	5,602

- *Numbers in table represent the number of visitors applying to each use category.*
- *Vehicle data were recorded by vehicle counters.*
- *Blank cells can mean a) that there were no visitors or b) that none were recorded.*

Source: DPR Four Rivers Sector Ranger Reports

Table 2-22
Medeiros Use Area Monthly Visitor Attendance Data

MONTH	2000 – 2001				2001 – 2002				2002 – 2003			
	PAID DAY USE	FREE DAY USE	OVERNIGHT USE	BOATS LAUNCHED	PAID DAY USE	FREE DAY USE	OVERNIGHT USE	BOATS LAUNCHED	PAID DAY USE	FREE DAY USE	OVERNIGHT USE	BOATS LAUNCHED
July	9,299	1,034	1,591	32	8,983	24	932	40	10,200	1,125	3,159	-
August	6,882	758	629	31	9,418	1,044	660	6	7,344	823	2,268	-
September	6,562	721	1,047	32	10,027	1,112	527	39	6,674	741	1,904	-
October	3,296	382	265	34	5,610	615	357	-	5,307	594	498	-
November	2,449	278	302	41	3,465	384	441	-	4,101	438	354	-
December	2,317	271	216	29	1,029	105	132	-	2,289	255	240	-
January	2,207	260	245	14	1,350	150	195	-	2,529	282	1,074	-
February	1,925	221	239	12	1,374	150	510	-	3,102	360	720	-
March	3,923	458	356	54	1,479	150	951	-	4,635	513	732	-
April	8,962	1,000	564	22	1,833	184	1,095	-	6,463	721	660	-
May	9,588	1,068	1,945	44	6,868	717	2,071	-	15,895	1,367	857	-
June	2,300	867	1,710	19	5,212	530	2,077	-	7,094	788	1,378	-
Annual Total	59,710	7,318	9,109	364	56,648	5,165	9,948	85	75,633	8,007	13,844	-

- *Numbers in table represent the number of visitors applying to each use category.*
- *Vehicle data were recorded by vehicle counters.*
- *Blank cells can mean a) that there were no visitors or b) that none were recorded.*

Source: DPR Four Rivers District Ranger Reports

Table 2-23
Basalt Use Area Monthly Visitor Attendance Data

MONTH	2000 – 2001				2001 – 2002				2002 – 2003			
	PAID DAY USE	FREE DAY USE	OVERNIGHT USE	BOATS LAUNCHED	PAID DAY USE	FREE DAY USE	OVERNIGHT USE	BOATS LAUNCHED	PAID DAY USE	FREE DAY USE	OVERNIGHT USE	BOATS LAUNCHED
July	9,721	1,081	2,629	76	14,831	1,642	1,761	113	12,332	1,363	2,346	326
August	8,218	915	1,703	94	13,777	1,527	1,346	108	12,835	1,414	3,074	534
September	6,436	717	1,782	167	12,706	1,418	1,370	90	11,796	1,999	2,414	1,827
October	3,764	422	497	156	8,646	1,860	747	153	18,768	2,091	855	1,595
November	3,086	348	235	224	4,725	519	396	131	20,406	2,226	711	1,879
December	2,884	324	131	254	3,627	411	144	80	9,474	1,041	327	893
January	2,438	268	143	95	5,067	555	132	144	14,130	1,581	516	1,079
February	2,996	332	202	68	6,687	744	507	377	13,266	1,473	594	1,817
March	5,128	574	994	173	11,154	1,221	1,062	575	17,811	1,983	795	1,480
April	11,410	1,268	904	74	12,342	1,363	1,040	204	19,897	2,196	1,180	481
May	17,989	1,996	1,544	89	10,649	972	2,812	813	21,750	2,553	1,265	395
June	23,015	2,553	1,894	88	11,264	1,520	2,717	367	17,955	1,996	1,561	242
Annual Total	97,085	10,798	12,658	1,558	115,475	13,752	14,034	3,155	190,420	21,916	15,638	12,602

- *Numbers in table represent the number of visitors applying to each use category.*
- *Vehicle data were recorded by vehicle counters.*
- *Blank cells can mean a) that there were no visitors or b) that none were recorded.*

Source: DPR Four Rivers District Ranger Reports

Table 2-24
Dinosaur Point Use Area Monthly Visitor Attendance Data

MONTH	2000 – 2001				2001 – 2002				2002 – 2003			
	PAID DAY USE	FREE DAY USE	OVERNIGHT USE	BOATS LAUNCHED	PAID DAY USE	FREE DAY USE	OVERNIGHT USE	BOATS LAUNCHED	PAID DAY USE	FREE DAY USE	OVERNIGHT USE	BOATS LAUNCHED
July	5,158	558	-	222	6,759	751	-	143	5,505	629	-	258
August	3,505	411	-	147	6,695	741	-	163	5,797	643	-	456
September	2,989	316	-	99	4,328	483	-	197	7,293	816	-	920
October	1,370	104	-	82	5,964	663	-	157	6,933	765	-	545
November	1,430	103	-	164	2,253	255	-	194	8,775	972	-	790
December	1,754	127	-	174	1,008	96	-	194	5,442	603	-	776
January	1,490	113	-	99	2,379	258	-	149	7,686	849	-	684
February	1,592	113	-	34	1,965	216	-	218	5,646	627	-	1,065
March	2,618	190	-	88	2,805	324	-	524	4,509	525	-	344
April	-	-	-	-	3,825	432	-	258	-	-	-	-
May	5,124	571	-	168	4,009	459	-	434	10,996	1,387	-	441
June	5,991	1,700	-	77	5,437	602	-	381	8,674	964	-	384
Annual Total	33,021	4,306	-	1,354	47,427	5,280	-	3,012	77,256	8,780	-	6,663

- *Numbers in table represent the number of visitors applying to each use category.*
- *Vehicle data were recorded by vehicle counters.*
- *Blank cells can mean a) that there were no visitors or b) that none were recorded.*

Source: DPR Four Rivers District Ranger Reports

Table 2-25
Los Banos Creek Use Area Monthly Visitor Attendance Data

MONTH	2000 – 2001				2001 – 2002				2002 – 2003			
	PAID DAY USE	FREE DAY USE	OVERNIGHT USE	BOATS LAUNCHED	PAID DAY USE	FREE DAY USE	OVERNIGHT USE	BOATS LAUNCHED	PAID DAY USE	FREE DAY USE	OVERNIGHT USE	BOATS LAUNCHED
July	6,372	702	798	375	3,309	369	786	209	6,495	723	963	275
August	4,677	513	684	273	4,335	480	918	173	4,959	522	933	411
September	3,654	402	477	281	5,448	603	447	201	3,804	-	666	289
October	1,744	139	138	264	2,673	298	280	161	3,398	380	258	241
November	1,931	159	104	316	2,650	295	165	177	2,108	233	98	185
December	2,167	173	52	326	2,563	290	28	207	2,068	228	43	105
January	2,405	194	22	319	3,393	375	58	309	1,915	205	58	263
February	2,308	185	52	267	4,850	543	178	619	1,988	223	78	324
March	7,076	576	116	622	6,285	715	270	938	6,285	715	270	938
April	8,346	937	438	353	7,086	777	567	749	4,353	489	291	525
May	6,075	681	867	386	7,221	813	789	736	2,559	828	663	853
June	4,044	453	627	210	6,594	732	612	436	2,454	679	954	381
Annual Total	50,799	5,114	4,375	3,992	56,407	6,290	5,098	4,915	42,386	5,225	5,275	4,790

- *Numbers in table represent the number of visitors applying to each use category.*
- *Vehicle data were recorded by vehicle counters.*
- *Blank cells can mean a) that there were no visitors or b) that none were recorded.*

Source: DPR Four Rivers District Ranger Reports

Table 2-26
Annual Visitor Use on San Luis and O'Neill Forebay Wildlife Areas

MONTH	O'NEILL FOREBAY WILDLIFE AREA			SAN LUIS WILDLIFE AREA		
	2000	2001	2002	2000	2001	2002
Hunters	1298	1589	1208	1184	1490	1038
Anglers	7	23	15	8	24	8
Nature Study/Sightseeing	416	232	278	309	304	214
Campers	0	0	0	0	0	0
Dog Training/Trials	1010	841	248	0	0	0
Other	477	446	752	223	168	270
Total	3208	3131	2501	1724	1986	1530

- *Numbers in table represent the number of visitors applying to each use category.*
- *Vehicle data were recorded by vehicle counters.*
- *Blank cells can mean a) that there were no visitors or b) that none were recorded.*

Source: DPR Four Rivers District Ranger Reports

Visitor Demographics

Tables 2-27 through 2-31 summarize visitor demographics on Department-managed lands by age, gender, ethnicity, education, and income.

Table 2-27
Age (Years) Averages

	0 – 18	18 – 24	25 – 34	35 – 44	45 – 54	55 – 64	64+
Percent of Visitors	1.2%	4.4%	10.8%	17.8%	23.7%	21.6%	20.5%

Source: DPR Office of Visitor Services, November 2002.

Table 2-28
Gender Averages

	MALE	FEMALE
Percent of Visitors	60.8%	39.2%

Source: DPR Office of Visitor Services, November 2002.

Table 2-29
Ethnicity Averages

	ASIAN	NATIVE AMERICAN	BLACK	FILIPINO	HISPANIC	PACIFIC ISLANDER	WHITE	OTHER
Percent of Visitors	4.3%	4.6%	3.4%	1.3%	11.9%	1.3%	69.2%	4.0

Source: DPR Office of Visitor Services, November 2002.

Table 2-30
Education Averages

	SOME HIGH SCHOOL	HIGH SCHOOL GRADUATE	SOME COLLEGE	COLLEGE GRADUATE
Percent of Visitors	4.9%	22.9%	33.8%	38.4%

Source: DPR Office of Visitor Services, November 2002.

Table 2-31
Income Averages

	$0 – $14,999	$15,000 – $29,999	$30,000 – $44,999	$45,000 – $59,999	$60,000 – $75,000	$75,001 OR GREATER
Percent of Visitors	5.7%	18.1%	20.2%	19.1%	13.9%	23.0%

Source: DPR Office of Visitor Services, November 2002.

2.3 OPPORTUNITIES AND CONSTRAINTS

This section summarizes the key issues addressed in the Plan as well as a summary of opportunities and constraints for each. The issues and their associated opportunities and constraints have been identified and documented from numerous sources during the planning process including user surveys and letters, public and planning team meetings, diverse and knowledgeable agency staff and academic research and reports. The five following planning areas have been identified to cover the range of issue topics and these will also be used in Chapter 3 to categorize the goals and guidelines:

- Resource Management
- Visitor Experience, Interpretation and Education
- Local & Regional Planning
- Infrastructure & Operations
- Water Operations

Resource Management

Resource management for the project area is intended to provide a comprehensive approach for the management of all resources for the life of the Plan. As future projects are implemented, more specific actions can be taken to follow the broader, general policies of the Plan. Previously, the project area has not been the subject of a comprehensive planning effort to look at existing resources or to plan for the future management of these resources. The issues related to resource management have been categorized into the key topics listed and described below. Due to the lack of previous study and planning, issues related to resource management include the need for more study or surveys to better understand the project area resources, which in turn will assist in refining the management actions for the future.

Key Issues

- Cultural and historic resources inventory and protection
- Vegetation and wetlands management
- Wildlife species inventory and management
- Climate
- Scenic resources

Cultural and Historic Resources Inventory and Protection

Currently, many of the project area's historic and cultural resources are mapped; however, this database is not comprehensive and additional resources may need to be included. Additionally, certain resources need to be recorded with the State Historic Preservation Officer (SHPO). This information is integral to planning for future uses and activities and to determine the best management strategy for such resources. Additionally, it is necessary to comply with the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA) during Plan implementation.

Opportunities and Constraints

- Lack of a strategy for completing a cultural resources inventory for the project area.
- Opportunity to have better public accessibility to collections and to interpret all aspects of cultural resources.
- Need to determine the best management actions for protecting the known resources at the site.
- Opportunity to work with SHPO to prepare a programmatic agreement for cultural resources which would limit individual review for future projects.
- Need to ensure that planning conforms to Section 106 review standards.
- Need better facilities for storage, preservation and display of collections.

Vegetation and Wetlands Management

A vegetation and wetland inventory does not exist for the project area. To understand what resources are needed for vegetation management, how visitor uses affect vegetation, and how to protect certain vegetative resources, habitat communities should be mapped. Future management actions and tools should be devised to ensure ample protection and to comply with CEQA. Additionally, invasive species have been identified as a threat in the upland and aquatic areas of the unit. Grazing occurs at the Medeiros portion of O'Neill Forebay and if it continues, the effects of this activity should be studied and recorded to determine the long-term results. There are active vegetation management programs taking place such as the weed elimination program at O'Neill Forebay. Vegetative management should be consistent with the National Fire Plan.

Opportunities and Constraints

- Need to define and map known problem areas, such as invasive species, and devise and prioritize strategies for managing these areas.
- Need to determine the adequacy of the existing vegetation and wetlands inventory and define data gaps.
- Need to address erosion, sediment deposition and non-point source pollution off roads and trails.
- The effects or role of grazing in vegetation management in the project area is unknown.
- Role of prescribed fire in vegetation management is unknown.
- Evaluate adequacy of weed elimination program.
- Need to review consistency with the National Fire Plan.
- Lack of overall vegetation management plan.

Wildlife Species Inventory and Management

Although a thorough biological inventory has not yet been completed at the project area, information has been compiled about species that are likely to exist on the site. Future facilities planning will require more detailed wildlife inventories. The San Joaquin kit fox is a state listed Threatened and federally listed Endangered species in the project area. There is important wildlife species habitat in the project area that may require mapping or additional study or survey to determine the full extent of a particular species. The current status of the kit fox within the project area is not known; however, kit foxes were

documented in the vicinity of the project area on numerous occasions during the 1990s. In 1998, the USFWS issued a recovery plan for the kit fox and other upland species of the San Joaquin Valley. The kit fox recovery plan includes development of a conservation strategy so that various agencies can work collectively to positively impact declining populations of the kit fox and other threatened or endangered species in the valley.

The Kit Fox Planning and Conservation Team (KFPACT) has recently identified the range of the kit fox in this region between San Luis Reservoir on the west, and agricultural lands and wetlands on the east. The KFPACT is currently drafting a strategy to preserve kit fox habitat and protect kit foxes in this region.

Opportunities and Constraints

- Lack of a comprehensive wildlife management plan.
- Opportunities exist to partner with sister agencies and local institutions to further data collection, mapping, and analysis.
- Need to use existing data and knowledge to plan for wildlife protection through the definition of corridors and minimum disturbance to habitat.
- Assess the need for future wildlife inventories and define the protocols so they can be included in future budget allocations.
- Coordinate with KFPACT on the kit fox recovery action plan and potential habitat corridors.
- Work with the California Department of Fish and Game (DFG) to coordinate hunting and fishing management and recreation and resolve current conflicts.
- Current degree of poaching and enforcement constraints unknown.
- Lack of signage regarding feeding and petting of wildlife.

Climate

Wind is a strong factor affecting use at the project area. For some uses such as windsurfing, wind is a positive feature; however, for many other users, the hot, dry summer weather coupled with the wind is a deterrent for many activities. Warning lights have been installed as a safety feature for boaters and other users, and trees have been planted as a wind barrier around picnic areas; however, high winds are an impediment to day and overnight users.

Opportunities and Constraints

- Additional boating facilities such as ramps and marinas should consider wind factors and location and identify landscape solutions to reduce effects from wind.
- Additional camping facilities or other improvements should consider wind factors and location and identify landscape solutions to reduce effects from wind.
- Need for additional wind warning lights.

Scenic Resources

The open, undeveloped nature of the project area and the rolling, sometimes steep topography are easily affected by intrusions on the landscape. Many areas contain views of the engineered nature of the landscape with the dam as a dominant feature. This is a reminder of the large-scale water operations that take place. The size and configuration of San Luis Reservoir provide a viewer-inferior perspective from some vantage points, evoking an awe-inspiring presence in an otherwise dry landscape. It is important that future planning for facilities and landscape features considers the open, uninterrupted nature of much of the landscape and avoids visual clutter.

Opportunities and Constraints

- Significant view corridors and highpoints have not been inventoried.
- Criteria to determine when views will be affected need to be formulated.

Visitor Experience, Interpretation and Education

The project area serves thousands of visitors each year and as the Central Valley and other regional populations grow, additional visitors may be expected to participate in the recreation opportunities that the project area provides as well as seek new and expanded use of such activities and associated facilities. The joint purpose of the project area as an important water storage and distribution location and the land and water-based recreation it provides allow for key educational and interpretive opportunities in addition to the core recreational activities for visitors. Future visitor experience, interpretation and education are dependant on many factors and the key issues that highlight these are listed and described below as they relate to the project area.

Key Issues

- Visitor facilities
- Interpretive opportunities
- ADA accessibility
- Concession opportunities
- Limited visitor use and demand data
- Carrying capacity

Visitor Facilities

The project area currently provides a variety of active land and water-based recreational uses occurring in five major use areas within the San Luis Reservoir State Recreation Area (SRA) and two wildlife areas. Visitor surveys, staff evaluations and population projections have yielded suggestions for additional and expanded facilities. Additional swimming areas and a marina at San Luis Creek have been identified as potential expansion actions. Additional and upgraded camping areas and hiking and biking trails throughout the project area have also been identified as needs. A restroom facility at Medeiros could be supported by the users in that area. Fishing and boating access is sometimes limited. There are some trail

opportunities in the project area currently and the possibility of improving linkages and loops within and in the vicinity of the project area. Lands managed by DFG allow passive recreational activities; however, DFG must coordinate visitor use with California Department of Parks and Recreation (Department) managers.

Opportunities and Constraints

- Need to assess the adequacy of existing restrooms and the need for additional restroom facilities.
- Need to assess the demand and feasibility of developing additional and upgraded camping facilities.
- Need to determine opportunities for trail connections around the San Luis Reservoir and to other parklands such as Pacheco State Park and Los Banos Creek Use Area.
- Lack of a trails map that illustrates for the public all accessible trails by use and condition.
- Review existing biking trails and the ability to expand and provide continuity and loops where possible.
- Explore opportunities for expanded swimming areas and the need for a marina.
- Need to assess adequacy of Los Banos Creek Use Area camping and boat launching facilities.
- Need to review all recreation facilities and expand if necessary to relieve overuse and accommodate a variety of uses and future growth.
- Lack of improvements at Medeiros Use Area.
- Lack of management zones that correspond with land uses in the project area to assist in allocating staff resources and to determine the best locations for new facilities.
- Need to consult with other managing agencies to ensure proposed activities are consistent with their missions and set up Memorandum of Understandings (MOUs) when necessary.
- Need to determine the ultimate uses for the project area for the next 25 years.
- Determine the need for additional trails.
- Explore partnerships with trail user groups for maintenance, trails patrols and stewardship.
- Investigate the possibility of building additional facilities, including a visitor center and a paved multiuse trail for walking and bicycling.
- A trails map could enhance visitor experience and assist staff as new trails and uses are set up.
- Lack of a comprehensive trails assessment and management plan.

Interpretive Opportunities

Currently the project area staff host a variety of interpretive programs, predominantly through guided walks and tours. The unit's history and character and function of water supply offer future opportunities to expand interpretive programs.

Opportunities and Constraints

- Expand possibilities of allowing project area events and planned group use of the project area through partnering with interested organizations and agencies such as California Department of Water Resources (DWR).

- Need to review the status of existing interpretive programs and assess the need for improvement or expansion and identify how that need can be accomplished.
- Explore the ability and need for providing a visitor's center that could orient and educate visitors and could also serve to house cultural resources collections and information.
- Investigate the opportunities for self-guided interpretive walks and the need for additional interpretive displays.

Americans with Disabilities Act Accessibility

The majority of the visitor facilities are currently ADA accessible with recent improvements to certain areas to provide additional access. Accessibility should be considered in the planning and development of all future facilities. Visitor access needs to include opportunities for users with varying degrees of ability.

Opportunities and Constraints

- Lack of inventory of which areas within the project area can be planned to best accommodate ADA accessibility.
- Opportunities to expand ADA accessible water access for fishing or swimming.
- Need to designate the probable improvements and their locations for ADA-compliant programs and facilities.

Concession Opportunities

Currently, temporary vendors exist at the San Luis Creek Use Area. There are opportunities for concessions to be added that complement the character of the site and enhance overall project area function. Concessions should be considered for improving and enhancing the operations of the project area in partnership with Department staff.

Opportunities and Constraints

- Lack of concession services may limit visitation.
- Need to assess the viability of providing concession services through communication with the appropriate Department staff.
- Need to assess the viability of providing concession services that compliment and enhance the project area's operations.
- It is not known whether the level of visitor use warrants a viable concession operation.

Limited Visitor Use and Demand Data

Facilities and uses should be planned utilizing visitor information. Currently, there is limited visitor use and demand data. Site specific surveys of visitors attending the various use areas and what they do or their needs have not been conducted. More information on where visitors are coming from and how long they visit the project area would help to develop future facilities. These data would help to determine the greatest need for facilities and where there are existing problems and opportunities. In addition, it would provide a means to track visitor satisfaction.

Opportunities and Constraints

- Review data currently being collected by Department Visitor's Survey Division to determine how this can aid in planning for future visitor's needs.
- Explore the opportunity to use regional data sources and collaborating with county agencies and other entities to plan regional park facilities and conservation efforts.
- Devise an enhanced system for tracking visitor use at the project area and improve the database that can be readily accessed by agency staff to gain information about visitor and use trends.

Carrying Capacity

Carrying capacity herein covers the capacity of the project area to be sustained over time ecologically, physically and socially. More information is provided about carrying capacity in Chapter 3 but it is listed here as an issue that must be addressed including some of the factors or topics that assist in delineating an area's capacity. Capacity is partially determined through a series of limiting factors. A limiting factor is defined as an indicator that constrains the level of use (capacity) at an area. A system of site indicators needs to be established to help staff members evaluate the project area's carrying capacity, so that future facilities and uses can be planned based on the ability of the resources to withstand such activity. Measuring carrying capacity requires baseline information about the project area users and resources to monitor change and gauge if capacity requires an alteration of management actions.

Opportunities and Constraints

- To assist in determining carrying capacity, there is a need to prescribe the desired future condition for visitors at the project site.
- There is no single method for measuring carrying capacity.
- Carrying capacity is often limited by the lack of available data to quantify change and its resultant effects on resources.
- The opportunity exists to provide simple indicators for managers to monitor and to be incorporated into standard operating procedures.

Local and Regional Planning

The project area is managed by three State agencies and owned by Reclamation, requiring ongoing coordination and cooperation. Additionally, the project area is located within the Central Valley region of the State and will be surrounded by increased mixed use development as the region continues to grow. The role of the project area within the developed region as well as in relation to other public parks and open space lands may change over time and the Plan needs to work in concert with local and regional planning efforts. The key issue areas have been listed and described below and are meant to be comprehensive and inclusive to allow flexibility while defining some specific opportunities and constraints.

Key Issues

- Relationship with multiple agencies and landowners
- Regional population and demographics
- Coordination with local and regional plans

Relationship with Multiple Agencies and Landowners

Reclamation constructed the project area facilities and owns a majority of the surrounding land. Lands adjacent to the reservoir are managed by several agencies, including the Department, DWR, and DFG. Water operations are managed by DWR. The Department manages lands adjacent to the reservoir for recreation as part of the SRA while the adjacent Pacheco State Park is also managed by the Department, but for a different purpose. Within the project area, DFG manages two of the parcels for passive recreation, hunting and fishing. DFG also owns and manages two additional parcels in the vicinity; however, these are not part of the project area.

The Central Valley Project (CVP) construction of the reservoirs yielded many specialized agreements for long-term management and operations and wildlife mitigation on the project area lands. Additionally, right-of-way agreements were executed between Reclamation and various utility interests. The project area is also surrounded by private landowners predominantly to the south and east of San Luis Reservoir and along the northern and southern boundaries of Los Banos Reservoir.

The sharing of management responsibilities facilitates a coordinated, working relationship between these agencies and stakeholders and is an important factor in successful project area management and development. Project area planning therefore should be coordinated to ensure compatibility with the goals of federal, state, and local jurisdictions and stakeholders.

Opportunities and Constraints

- Need to identify all agencies, individuals, and stakeholders with ownership and management authority, or vested interest in the project area and responsibilities of each.
- Need coordination with agencies and landowners to encourage their participation and ensure their awareness of recommended planning projects and potential Department actions.
- Lack of agency MOU or similar agreement to share resources and ensure coordinated implementation of project area management.
- Need to work with DFG to review conflicts of use, and issues regarding fish and game hunting.
- Need to review enforcement responsibility and ensure continued cooperation with local agencies to share resources.

Regional Population and Demographics

The growing populations and changing demographics of the Central Valley and Merced, Monterey, San Benito, and Santa Clara counties will influence future recreational demand at the project area. In addition,

planned new communities in the immediate area will increase demand on project area resources. Increased project area use associated with changes in population and demographics will increase recreation demand, including demand for active and nature-based recreational uses, such as hiking, mountain biking, and nature study, as indicated by the 2000 California State Parks Visitor Satisfaction Survey. The Department will need to respond to these trends through appropriate unit development, while maintaining a balance between facilities and recreation development and natural and cultural resource protection.

Opportunities and Constraints

- Lack of system to track development in the area and coordinate with adjacent counties to ensure that proposed project area activities facilities respond to demographic trends.
- Need to respond to regional demands for recreational and nature-based facilities.

Local and Regional Plans

Several planning efforts are underway that will affect facility development and resource management at the project area. Adjacent planned new communities include Lagunas San Luis and the Santa Nella Specific Plan. Caltrans is undergoing analysis of the Regional Transportation Plan (RTP), which includes long term improvements near the project area along the SR152 corridor. The San Luis Reservoir Low Point Improvement Project may affect use of certain portions of the project area for extended periods and may have a significant impact on natural and cultural resources. Additional studies conducted as part of that effort could be utilized in Plan implementation efforts. The California High-Speed Rail Corridor program is in process and one alignment may affect land near the project area. All of these efforts will influence the project area planning process and can be opportunities to coordinate with resource collection efforts and other Plan implementation.

Opportunities and Constraints

- Need to review and maintain consistency with plans and environmental documentation of proposed development and transportation planning projects.
- Need to ensure development plans for property adjacent to the project area are compatible and that buffers are provided.
- Opportunities to consolidate data collection for the project area.

Infrastructure and Operations

As the region surrounding the project area has continued to develop and visitor use has increased, existing infrastructure and operations need to be evaluated for efficiency, safety and optimal use. Key issues have been listed and described below and include broad areas that will need to reviewed during the life of the Plan at the regional level as well as for site specific use areas. Related to this planning area are the overall staff resources that will be provided by the Department in the future and the ability to limit the project area to expansion. Opportunities exist to coordinate new and improved infrastructure and operations more economically and efficiently if planned holistically and in coordination with partner agencies.

Key Issues

- Ingress and egress from SR 152, SR 33 and access to Los Banos Creek
- Adequacy of existing staffing and operations and maintenance facilities
- Utilities

Ingress and Egress from SR 152 and Route 33 and Access to Los Banos Creek

Local and regional traffic and safety issues affect the project area, and should be addressed in planning for future use and development. Access to and from SR 152 to the San Luis Creek Use Area and Gonzaga Road facilities has been identified as one of the primary safety concerns for present and future project area use due the increasing traffic volumes and limited blending and turning lanes on SR 152. Access to Medeiros Use Area off SR 33 lengthens staff travel time to this location. Access in and out of Dinosaur Point Road onto SR 152 is hazardous because of limited turning lanes and sight distance as well as traffic volumes. Separation between San Luis Creek and Medeiros Use Areas by O'Neill Forebay requires staff access on to SR152 for patrolling and monitoring. Distance to Los Banos Creek and the indirect route currently available requires substantial time for staff coordination of maintenance and operations activities.

Opportunities and Constraints

- Need to assess the adequacy of signage both within and outside the project area.
- Need to coordinate with and provide recommendations to Caltrans for future safety and traffic flow improvements for ingress and egress from SR 152.
- Explore an option for internal access between San Luis Creek and Medeiros Use areas.
- Explore an option for more direct access to Los Banos Creek from headquarters.
- Review all access points for security, emergency access, and management coordination with DWR and other agencies with jurisdiction.
- Traffic impacts of proposed uses and facilities need to be assessed.
- Need to identify public and agency internal access routes and determine what improvements are necessary to maintain or improve these routes over time.
- Internal circulation/parking.

Adequacy of Existing Staffing and Operations and Maintenance Facilities

Staff operations for the Department's management of the project area are currently centered at the Gonzaga Road complex. This is also the SRA Administrative Offices and services other parks in the district. The SRA and Pacheco State Park share staff personnel, and some staff members work district wide. Adjacent to Department facilities, are DWR's main operations center, known as the San Luis Field Office. Reclamation owns most of the lands of the SRA, but does not have any field operations on-site. DFG, who manages lands that are part of the project area operates out of the Los Banos Wildlife Area field office offsite. CDF has a field station on Reclamation lands, off Gonzaga Road. The Department, other than for water operations, is responsible for the largest segment of land management in the project area.

Opportunities and Constraints

- Determine the adequacy of existing facilities and identify future needs.
- Identify ways to consolidate and maximize staff resources between all the managing agencies.

Utilities

Any future uses or activities are potentially limited by potable water storage and distribution. Other existing infrastructure, such as sanitary, electric, and communications systems, is also limited and need upgrading prior to facilities development. The potential for cell tower development exists on federally owned land. Current RV hook-ups may not be adequate.

Opportunities and Constraints

- Lack of a database or as built drawings of existing infrastructure systems.
- Need to determine the extent of future facilities and define the infrastructure requirements and limitations.
- Need to prioritize and plan for phased improvements as staff and monies become available.
- Evaluate adequacy of lighting at all use areas for operations and visitor safety.
- Ensure future facility improvements can be adequately served by existing infrastructure and determine the need for system upgrades.
- Potable water storage and distribution systems need upgrading or improvements.

Water Operations

The project area was designed and engineered to store and distribute water for the region. Recreation is provided as an accessory to that land use and can have an affect on recreational visitors. Currently, DWR works closely with the Department to ensure minimal disruption to recreational facilities however some requirements, such as during peak water use, can leave the water surface levels lower than desired for certain recreational uses. The two key issues related to water operations are listed and described below with the understanding that water storage and distribution are the primary land uses and activities that preceded the recreational lands.

Key Issues

- Water elevation fluctuations
- Operation of dam and power facilities

Water Elevation Fluctuations

While water level changes are integral to the operation of the water supply facilities, fluctuations require the need for boat launches to be moved, reduced water recreation user days, and other impediments to recreational use. The primary function of the project area is for water supply and distribution; however,

communication between the managing agencies can assist in minimizing the impacts associated with water level fluctuations.

Opportunities and Constraints

- Define the acceptable minimum elevation and level of elevation changes.
- Lack of information regarding current elevation levels available to assist recreational water users.
- Identify ways to improve inter-agency communication to reduce field time associated with water level modifications.

Operation of Dam and Power Facilities

Certain areas of the project area lands are managed solely by DWR for water supply, distribution, and operations. These areas require separate regulations regarding access for recreational use. The old quarry site is open; however, it is not slated for recreation as it needs to remain available for future extraction for dam repairs.

Opportunities and Constraints

- Need to identify security issues and locations that need improvements.
- Need to improve inter-agency coordination to provide more efficient management and enforcement such as sharing of gate keys, etc.
- Need to clearly define where agency management units are within the overall project area boundary to ensure clear definition of jurisdiction.