Draft

Environmental Impact Statement/ Environmental Impact Report

F-5 MILESTONE

FOR THE

MATILIJA DAM ECOSYSTEM RESTORATION PROJECT

Prepared by:

U.S. Army Corps of Engineers
Los Angeles District

July 2004

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Prepared by:

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With Technical Assistance from:

Aspen Environmental Group
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July 2004

DRAFT ENVIRONMENTAL IMPACT STATEMENT/REPORT
FOR THE
MATILIJA DAM ECOSYSTEM RESTORATION FEASIBILITY STUDY

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The U.S. Army Corps of Engineers (Corps), as lead agency under the National Environmental Policy Act (NEPA), and the Ventura County Watershed Protection District (VCWPD), as lead agency under the California Environmental Quality Act (CEQA), prepared this Environmental Impact Statement/ Environmental Impact Report (EIS/EIR) to analyze potential environmental impacts of the Matilija Dam Ecosystem Restoration Project options at Matilija Dam in Ventura County, California. This document analyzes the Matilija Dam Ecosystem Restoration Project, which aims to remove both Matilija Dam and accumulated sediment. Removal of Matilija Dam would eliminate a barrier to fish passage on Matilija Creek and facilitate the migration, spawning, and rearing of endangered southern steelhead. Accumulated sediment would be removed or re-configured to improve the Matilija Creek flow regime and ultimately restore Matilija Creek to a more natural pre-dam streambed configuration. This EIS/EIR examines seven project alternatives, including sub-alternatives, for dam and sediment removal plus the No Action Alternative. This document is written in compliance with NEPA, CEQA, and applicable federal, State and local environmental regulations.

PROJECT LOCATION

Matilija Dam is a concrete arch dam located about 16 miles from the Pacific Ocean and just over half a mile from the Matilija Creek confluence with the Ventura River in western Ventura County. Matilija Creek and North Fork Matilija Creek join approximately 15.5 miles from the coast to create the Ventura River, which has a drainage area of approximately 226 square miles (BOR, 2001). Matilija Creek exits the Los Padres National Forest about seven miles north of Matilija Dam, and then flows through a sliver of private land, surrounded on all sides by the Los Padres National Forest, until it reaches the northern areas of the City of Ojai. South of the confluence of Matilija Creek and North Fork Matilija Creek, the Ventura River flows south past the western edge of the City of Ojai, through the unincorporated areas of Oak View and Casitas Springs. In its lower reaches, the Ventura River flows through the City of San Buenaventura until it reaches its estuary.

BACKGROUND OF THE PROJECT

The Ventura County Flood Control District (now the VCWPD) completed Matilija Dam in 1948 to provide water and flood control for adjacent areas. Over time sediment accumulated behind the dam, diminishing reservoir and flood control capacity. The dam also blocks the federally listed endangered steelhead trout's access to prime spawning habitat above the dam and inhibits sediment transport, a fundamental mechanism for beach replenishment. Downstream beaches have narrowed measurably since construction of Matilija Dam (BOR, 2002). Since its construction, the dam has blocked approximately 6,000,000 cubic yards of sediment (BOR, 2002). With a diminished supply of river-based sand replenishment, beaches in the region are becoming increasingly eroded, causing habitat reduction and a loss of beach sand for recreational use (BEACON, 1989).

Pollution and waterway alterations have also become major impediments to natural functions within the Ventura River watershed. Agricultural, industrial, and urban development of the watershed has degraded the natural environment by adding system-wide stresses, such as increased point and non-point pollution, loss of habitat, groundwater depletion, increased water use, over-harvesting of wildlife, invasion of exotic plants and wildlife, and structural alterations of waterways (Chubb, 1997; Moore, 1980; CRWQCB-LA, 2002; Capelli, 1999). Additionally, flood control structures contribute to reduced riparian habitat, altered stream flows, limited access of species (such as the steelhead) to critical habitat, and altered sediment transport.

PURPOSE AND NEED FOR THE PROJECT

The action proposed and analyzed in this EIS/EIR is the restoration of the Matilija Creek and Ventura River ecosystem with particular attention focused on restoring anadromous fish populations in Matilija Creek and returning natural sand replenishment to Ventura and other southern California beaches (USACE, 2001). The flood control and water supply functions of Matilija dam have diminished markedly since construction, and would be functionally obsolete within the next fifty years. The dam currently obstructs the natural watershed system of the Ventura River, resulting in decline of the steelhead trout population and alteration of sediment transport and downstream coastline erosion. Dam and sediment removal would restore the natural watershed system of the Ventura River.

PROJECT ALTERNATIVES

From many options initially considered, the following options were carried forward for analysis in this EIS/EIR.

No Action Alternative. Under the No Action Alternative, neither the Corps nor the VCWPD would initiate any action to restore the Matilija Creek riverine ecosystem, including removal of Matilija Dam. At an unspecified future date, Matilija Dam would need to be demolished due to age and structural deterioration. At that time, methods for removal of the sediment behind the dam would need to be investigated.

Alternative 1: Full Dam Removal/Mechanical Sediment Transport – Dispose of Fines, Sell Aggregate. For Alternative 1, the majority of the sediment behind the dam would be removed mechanically with the majority of fines slurried or trucked to a disposal area off site. Commercially marketable material would be sold as aggregate. Alternative 1 is designed to fully remove the dam in one continuous process.

Steps to complete the one-notch dam removal process would include: (1) constructing downstream flood protection measures; (2) removing fine material against the dam by sluicing material through low-level outlets during high flows (greater than 400 cfs), which generally occur in the winter months when the river flows, and/or dredging by either mechanical or hydraulic means; (3) constructing a temporary diversion for low flows; (4) removing the entire dam; (5) regrading sediments and constructing a low flow channel through the sediments; (6) waiting for a significant flow; and (7) monitoring downstream impacts during and after a significant flow.

Graded areas, including the slurry disposal area, would be re-vegetated with local native stock or sterile annual grasses to control erosion. Dam removal and slurry operations would require approximately two years to complete, but sale of the aggregate material is assumed to take approximately ten years.

Alternatives 2a and 2b: Full Dam Removal/Slurry and Natural Sediment Transport. Alternative 2 is designed to fully remove the dam in one continuous process and allow sediment removal by river hydraulic forces. This would move trapped sediment to locations more suitable for natural river functions, thereby reducing cost and impacts associated with mechanical means of relocating sediment. Downstream sediment concentrations would be controlled only by river flow. The advantage of the single-notch scheme would be speed of removal and overall cost. Potentially, the dam could be deconstructed in a single season.

Steps to complete the one-notch dam removal process would include: (1) constructing downstream flood protection measures; (2) removing fine material against the dam by sluicing material through low-level outlets during high flows (greater than 400 cfs), which generally occur in the winter months when the river flows, and/or dredging by either mechanical or hydraulic means; (3) constructing a temporary diversion for low flows; (4) removing the entire dam; (5) regrading sediments and constructing a low flow channel through the sediments; (6) waiting for a significant flow; and (7) monitoring downstream impacts during and after a significant flow.

Within Alternative 2, there are two sub-alternatives, which differ in how fine sediments are transported. In Alternative 2a (Slurry "Reservoir Area" Fines Off Site), the 2.1 million cubic yards of fine sediment in the reservoir area would be excavated and slurried to an off-site disposal area. In Alternative 2b (Natural Transport of "Reservoir Fines"), approximately 0.5 million cubic yards of material immediately behind the dam sufficient to allow safe removal of the dam would be excavated and stockpiled upstream. All sediment would then erode by storms and naturally transport downstream.

Alternatives 3a and 3b: Incremental Dam Removal/Slurry and Natural Sediment Transport. Dam and sediment removal techniques for this alternative would be similar to Alternative 2a, but the Incremental Dam Removal Alternative interrupts the dam demolition process. This interval of interruption is assumed to be two years, although may require more time to allow erosion of a sufficient quantity of impounded sediments. Interruption of demolition would allow eroded reservoir sediments to stabilize downstream of the dam and provide the river with an opportunity to adjust to sediment inflows.

Steps to complete a two-notch dam removal process include: (1) constructing downstream flood protection measures; (2) removing fine material against the dam (to the elevation of 1,000 feet in the first phase and to the base of the dam in the second) by sluicing material through low-level outlets during high flows (greater than 400 cfs), which generally occur in the winter months when the river flows, and/or dredging by either mechanical or hydraulic means; (3) constructing a temporary diversion for low flows; (4) regrading sediments and constructing a low flow channel through sediments as necessary; (5) notching the dam; (6) waiting for a flow that moves a significant amount of sediment; (7) monitoring downstream impacts during and after a significant flow; (8) revising modeling estimates based on monitoring results; and (9) repeating Steps 2 through 7 to remove the remainder of the dam.

Within Alternative 3, there are two major sub-alternatives, which differ in how fine sediments are transported. In Alternative 3a (Slurry "Reservoir Area" Fines Off Site), the fine sediment in the reservoir area would be excavated and slurried to an off site disposal area. In Alternative 3b (Natural Transport of "Reservoir Fines"), a quantity of material immediately behind the dam sufficient to allow safe removal of the dam would be excavated and stockpiled upstream. All sediment would then erode by storms and naturally transport downstream.

Alternatives 4a and 4b: Full Dam Removal/Long-Term and Short-Term Sediment Transport. In this alternative, a channel would be excavated through the sediments upstream of the dam. There are two options under consideration for this alternative: long- and short-term transportation periods for the sediments (Alternatives 4a and 4b). Both Alternatives 4a and 4b are designed to fully remove the dam in one continuous process. For Alternative 4a (Long-Term Transport Period), remaining sediments would be stabilized and erode by storm events over a 50- to 100-year time period. In Alternative 4b (Short-Term Transport Period), the remaining sediments would be stabilized in a manner that would allow sediments to erode naturally, but at a rate controlled in order to minimize downstream impacts. For Alternative 4, the entire concrete dam structure above the original streambed would be removed. This alternative is estimated to take three years to complete, including slurry of the Reservoir Area sediment, dam removal, channel excavation, placement of riprap stone protection, and re-vegetation.

THE RECOMMENDED PLAN

The Corps evaluated the alternatives using a variety of methodologies and over a range of variables, examining hydrologic input, downstream sediment and turbidity, flooding, flood protection improvements, beach nourishment and ocean sediment yield, environmental resources, topography, groundwater impacts, completeness, effectiveness, efficiency, acceptability, costs, benefits, and contributions to National Ecosystem Restoration (NER) goals. The results of these comparative analyses led the Corps to choose Alternative 4b as the Recommended Plan for the Proposed Action.

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

This EIS/EIR analyzes all environmental issue areas deemed necessary by NEPA and CEQA guidelines, and presents mitigation measures intended to avoid or reduce significant impacts. The environmental issue areas considered for the alternatives analyzed, including the No Action Alternative, are:

- Earth Resources
- Hydrology and Water Resources
- Biological Resources
- Cultural Resources
- Aesthetics
- Air Quality
- Noise
- Socioeconomics
- Transportation
- Land Use
- Recreation

The resource areas are addressed in detail in Section 5. The level of significance is also included for each impact based on the following classification system: significant unavoidable impact (Class I); significant but mitigable impact (Class II), less-than-significant impact (Class III); and beneficial impact (Class IV). Table ES-1 (at the end of this section) summarizes the impacts and mitigation measures by resource area for each project alternative. Section 5.12 summarizes compliance with applicable laws, regulations, and executive orders.

IMPACT SUMMARY AND ENVIRONMENTALLY SUPERIOR ALTERNATIVE

Of the alternatives other than No Action, Alternative 4b is environmentally superior. Alternative 4b would result in the largest overall increase in habitat value when measuring benefits to steelhead habitat, riparian habitat, and natural hydrologic and sedimentation processes. Alternative 4b would also return a greater amount of sediment to the Ventura River and Ventura County beaches than the other alternatives. While Alternative 4b does not have the least impacts across all issue areas, it also does not have substantially greater impacts than the other action alternatives and most of its adverse impacts, particularly air quality and noise impacts related to construction, are short term in nature. A comparison of the alternatives is provided in Table ES-1.

PUBLIC CONCERNS/AREAS OF CONTROVERSY

The Corps and VCWPD have worked with local, State, and federal agencies and involved the public during the EIS/EIR process. No significant public controversy regarding the Proposed Action has emerged to date. The public involvement process is summarized in Section 1.5.4.

UNRESOLVED ISSUES

The application of existing regulations and permitting requirements and the implementation of mitigation measures recommended in this EIS/EIR would resolve nearly all environmental issues associated with the implementation of the alternatives discussed in this document. Impacts that would remain significant despite application of existing regulations and proposed mitigation measures are summarized in Section 6, Unavoidable Significant Impacts.

Table ES-1: Summary of Impacts and Mitigation Measures

Impacts	Impact Classification								Mitigation Measures for Proposed Action
	NA	1	2a	2b	3a	3b	4a	4b	
EARTH RESOURCES									
Temporary erosion impacts during construction.	III	III	II	II	II	II	III	II	ER-1: Implement Best Management Practices (BMPs). ER-2: Reduce off-site erosion.
Restoration of the more natural topography in Matilija Canyon and replenishment of sediment to the Ventura River.	III	IV	IV	IV	IV	IV	IV	IV	None
Potential for encountering unknown soil and/or groundwater contamination during grading or excavation.	III	II	II	II	II	II	II	II	ER-3: Observe exposed soil.
Spills of hazardous materials during construction (vehicle fuels, oils, and other maintenance fluids) could cause soil or groundwater contamination.	III	II	II	II	II	II	II	II	ER-4: Hazardous substance control.
HYDROLOGY AND WATER RESOURCES									
Violate water quality standards or waste discharge requirements or otherwise substantially degrade water quality.	III	III	III	II	III	II	III	III	None
Cause lateral erosion, streambed scour, or long-term channel aggradation/degradation resulting in damage to private property, utility lines, or structures.	III	III, IV	III, IV	III, IV	III, IV	III, IV	III, IV	III, IV	None
Increase flood hazards.	I	III	III	III	III	III	III	III	None
Deplete groundwater or surface water supplies or interfere with groundwater flow or recharge.	III	III	III	III	III	III	III	III	None
BIOLOGICAL RESOURCES									
Short-term disruption of wildlife movement during project construction	III	I	I	I	I	I	I	I	None
Temporary and permanent loss of lacustrine, riverine, and palustrine habitats at Matilija Dam.	III	II, III	II, III	II, III	II, III	II, III	II, III	II, III	B-1: Pre-Construction biological surveys. B-2: Pre-Construction plant surveys. B-3: Capture and relocate. B-4: Agency coordination. B-5: Restricted initial clearing. B-6: Fueling. B-7: Construction monitoring. B-8: Downstream monitoring. B-9: Worker training and Best Management Practices. B-10: Trash removal. B-11: Giant reed eradication. B-12: Predator removal plan. B-13: Restoration plan. B-15: Pre-Construction bat surveys. B-16: Development of an Operations and Maintenance Program.
Temporary loss of sensitive vegetation communities associated with the 94-acre slurry disposal site.	III	II	II	III	II	III	III	II	B-1, B-2, B-3, B-4, B-5, B-6, B-7, B-8, B-9, B-10 B-14: Oak and walnut replanting.

Table ES-1: Summary of Impacts and Mitigation Measures (cont.)

Degradation of riparian habitats and sensitive species impacts associated with downstream flood control improvements.	III	II, III	II, III	II, III	II, III	II, III	II, III	II, III	B-1, B-2, B-3, B-4, B-5, B-6, B-7, B-9, B-12, B-13, B-15, B-16
Short-term impacts from downstream sedimentation and temporary or localized loss of sensitive species or habitats.	III	III	I	I	I	I	III	III	B-1, B-2, B-3, B-5, B-7, B-8, B-9
Long-term restoration of ecosystem functions, development of wildlife corridors, and establishment of connectivity for steelhead and other wildlife species.	III	IV	IV	IV	IV	IV	IV	IV	B-8, B-11, B-13, B-16
CULTURAL RESOURCES									
Project construction could affect sites or structures listed on or eligible for listing on the National Register of Historic Places (NRHP).	III	II	II	II	II	II	II	II	CR-1: Survey for historic or prehistoric resources.
Erosion after removal of sediment may undermine the stability of sites COE#1 and COE#2, and damage any cultural deposits present.	III	II	II	II	II	II	II	II	CR-2: National Register of Historic Places Evaluation.
Removal of sediment by natural and mechanical means would have an adverse effect on any undiscovered buried historic and prehistoric resources that may be present beneath sediment behind Matilija Dam.	III	II	II	II	II	II	II	II	CR-3: Develop discovery plan for previously unknown resources. CR-4: Consultation with Native American Tribes.
AESTHETICS									
Improvement of the scenic value of Matilija Canyon by returning it to a more natural state.	III	IV	IV	IV	IV	IV	IV	IV	None
Obstruction or degradation of views of ridgelines from the Ojai Valley Trail due to construction of levees and floodwalls.	III	III	III	III	III	III	III	III	None
Obstruction or degradation of views of the Ventura River due to construction of levees and floodwalls.	III	I, II, III	I, II, III	I, II, III	I, II, III	I, II, III	I, II, III	I, II, III	AE-1: Adjust alignment of levees and floodwalls to allow vegetative screening of flood control improvements. AE-2: Screen levees and floodwalls with vegetation planting. AE-3: Create trails over the Rice Road slurry disposal site following re-vegetation of site.
Enhancement of unique and historically significant landmarks, such as Hanging Rock in Matilija Canyon.	III	IV	IV	IV	IV	IV	IV	IV	None
Temporarily obstruct views to the Ventura River and temporarily deteriorate the aesthetic value of the project area during project construction.	III	I	II	II	II	II	II	II	AE-4: Reduce visibility of project activities and equipment.
AIR QUALITY									
Conflict with or obstruct implementation of the VCAPCD Air Quality Management Plan.	III	III	III	III	III	III	III	III	None

Table ES-1: Summary of Impacts and Mitigation Measures (cont.)

Result in direct violation or substantially contribute to existing NAAQS/CAAQS violation.	III	I	I	I	I	I	I	I	A-1: Limit engine idling. A-2: Low emission diesel engines. A-3: Limit use of internal combustion engines. A-4: Low-emission vehicles. A-6: Watering areas to reduce dust. A-7: Controlling fugitive dust. A-8: Dust stabilization. A-9: Traffic speed limit signs. A-10: Excessive winds. A-11: Street sweeping.
Result in NOx/ROC emissions above 5 lbs/day in the Ojai Planning Area or 25 lbs/day elsewhere.	III	II	II	II	II	II	II	II	A-1, A-2, A-3, A-4
Expose sensitive receptors or project workers to substantial pollutant concentrations, or expose a substantial number of people to objectionable odors.	III	II	II	II	II	II	II	II	A-1, A-2, A-3, A-4, A-6, A-7, A-8, A-9, A-10, A-11. A-12: Respiratory protection. A-13: Valley Fever mitigation
Result in non-conformance with the federal General Conformity Rule.	III	II	II	II	II	II	II	II	A-1, A-2, A-3, A-4 A-5: NOx emission offsets.
NOISE									
Noise generated from construction and operation and maintenance activities.	III	I	I	I	I	I	I	I	N-1: Limit hours of hand-held equipment use. N-2: Limit hours of heavy-duty equipment use. N-3: Use of muffler equipment. N-4: Locate haul routes away from sensitive receptors. N-5: Use of electric motors. N-6: Controlled blasts. N-7: Use of hearing protection. N-8: Public notice of construction. N-9: Noise monitoring.
SOCIOECONOMICS									
Construction could require a labor force greater than is available locally, spurring unintended growth.	III	III	III	III	III	III	III	III	None
Construction could require production of additional housing to accommodate workers.	III	III	III	III	III	III	III	III	None
Benefit the local economy by employing local workers and using local nurseries for restoration.	III	IV	IV	IV	IV	IV	IV	IV	None
Displace businesses, such as Matilija Hot Springs.	III	III	III	III	III	III	III	III	None
Construction and/or operation could unduly burden a disadvantaged economic or social group.	III	III	III	III	III	III	III	III	None
TRANSPORTATION									
Construction commuter work trips would affect roadway level of service levels in the project area.	III	III	III	III	III	III	III	III	

Table ES-1: Summary of Impacts and Mitigation Measures (cont.)

Heavy construction haul truck trips would affect roadway level of service levels in the project area.	III	I	I	I	I	I	I	I	T-1: Transportation Management Plan.
Construction activities could physically damage public roads, sidewalks, mediums, etc.	III	II	II	II	II	II	II	II	T-2: Road repair from construction activities.
LAND USE									
Purchase of the Matilija Hot Springs retreat center and 11 residences along Camino Cielo and the relocation of the occupants.	III	III	III	III	III	III	III	III	None
Divisions or disruptions to communities caused by project construction or improvements of the levees and floodwalls.	III	III	III	III	III	III	III	III	None
Conversion of farmland (orchard) at one of the possible desilting basin sites to a non-agricultural use.	III	III	III	III	III	III	III	III	None
RECREATION									
Permanently degrade or displace existing recreational facilities.	III	IV	IV	IV	IV	IV	IV	IV	None
Impair the safety of recreational users.	III	II	II	II	II	II	II	II	R-2: Parks agency coordination, notification, and signage.
Close a public recreational facility for an extended period of time.	III	II	II	II	II	II	II	II	R-1: Construct a ramp to provide access over the Meiners Oaks flood protection.

1. INTRODUCTION

This document is a joint Environmental Impact Statement and Environmental Impact Report (EIS/EIR) that has been prepared to analyze and disclose the potential environmental effects associated with the proposed Matilija Dam Ecosystem Restoration Feasibility Study. The Feasibility Study is being undertaken by the Los Angeles District of the U.S. Army Corps of Engineers (Corps) and the Ventura County Watershed Protection District (VCWPD) to investigate feasible alternatives for restoring the Matilija Creek riverine ecosystem, including possible removal of Matilija Dam (see Section 1.1 below). The Feasibility Study also investigates alternatives for the removal of sediment that has accumulated behind Matilija Dam and the beneficial use of that sediment. This EIS/EIR has been prepared pursuant to and in accordance with the requirements of the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). The Corps is the NEPA lead agency for the project and VCWPD is the CEQA lead agency.

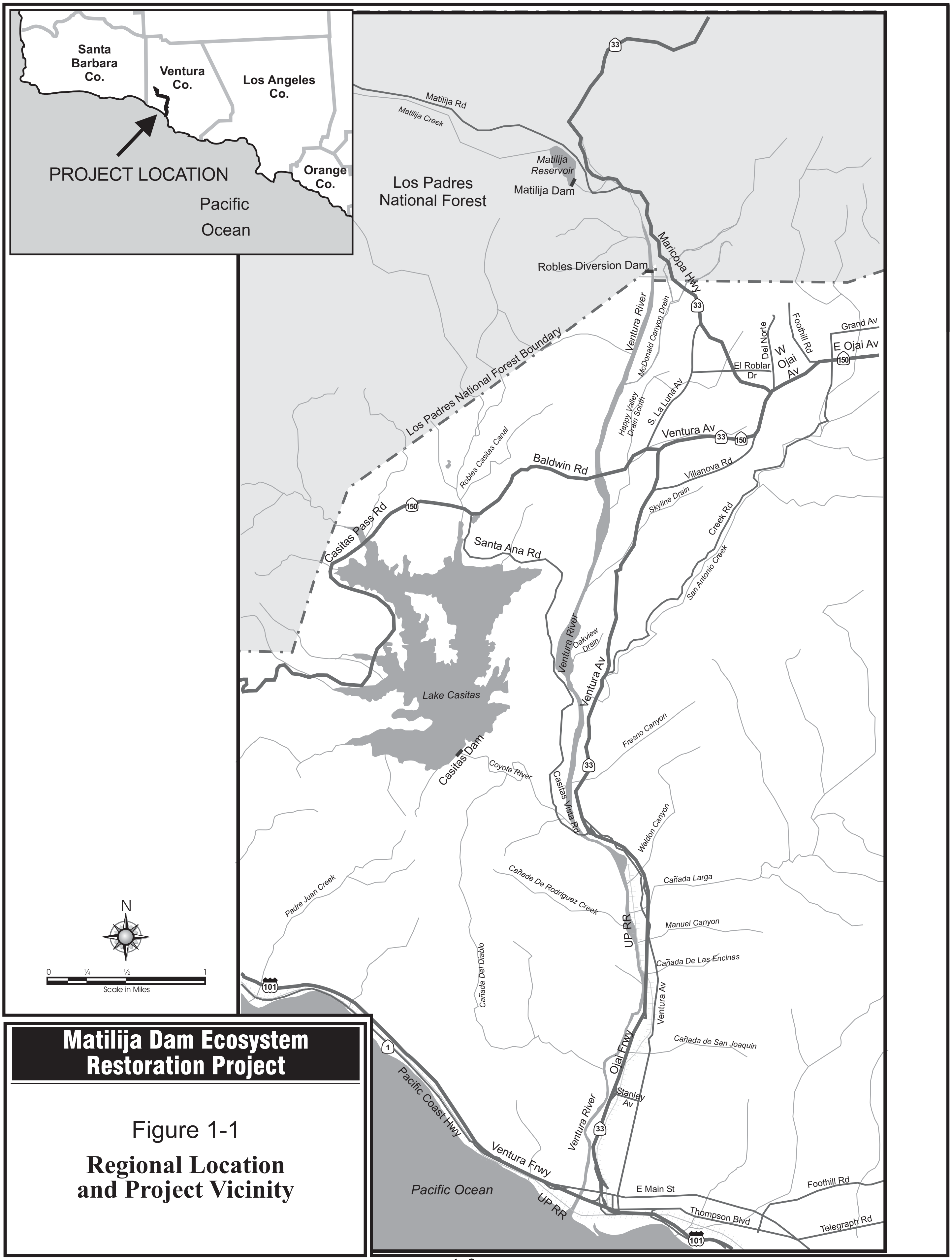
An EIS/EIR is an information document that is intended to inform decision-makers and the general public of the potential significant environmental impacts of the proposed project, referred to herein as the Proposed Action. The EIS/EIR also identifies possible ways to reduce or avoid significant impacts and describes and analyzes feasible alternatives to the Proposed Action. Both the Corps and the VCWPD will consider the information in this EIS/EIR along with other information before making any decision to approve the implementation of the Proposed Action.

In February 2000, the Corps initiated a reconnaissance study to determine if the Corps would have an interest in a cost-shared feasibility study of environmental restoration options for the Matilija Creek and Ventura River in the vicinity of Matilija Dam, within Ventura County (see Figure 1-1). The reconnaissance study determined there was a federal interest so the Corps initiated the Matilija Dam Ecosystem Restoration Feasibility Study. The VCWPD, the owner of Matilija Dam, became the local sponsor for the project.

The following sections provide more detail on the purpose of the Feasibility Study, the environmental compliance process, and the public participation program. In addition, the background of the physical characteristics and features of the study area is included.

1.1 PURPOSE OF THE FEASIBILITY STUDY

The Feasibility Study investigates options for the ecological restoration of Matilija Creek and the Ventura River (USACE, 2001), with particular attention focused on restoring steelhead populations on Matilija Creek and returning natural sand replenishment to Ventura County and other southern California beaches. The federally listed endangered steelhead, which historically had abundant runs in the Ventura River system, has been blocked access to over 50 percent of its prime spawning habitat in the upper reaches of Matilija Creek by the 1948 construction of Matilija Dam (Chubb, 1997; Moore, 1980; Capelli, 1999). In addition, beaches downstream in Ventura County have narrowed since construction of Matilija Dam, which has blocked an estimated 6,000,000 cubic yards of sediment to date. With a diminished supply of river-based sand (caused by dam construction, watershed improvements, and riverbed sand and gravel mining), beaches in the region are becoming increasingly eroded, causing habitat reduction and a loss of beach sand for recreational use.



Matilija Dam Ecosystem Restoration Project

Figure 1-1

Regional Location and Project Vicinity

For the purposes of this EIS/EIR, Matilija Creek and the Ventura River have been divided into a series of reaches, with Reach 1 beginning at the Ventura River Estuary and Reach 9 extending into the upper Matilija Creek watershed (Figure 1-2). The project reaches are defined as follows:

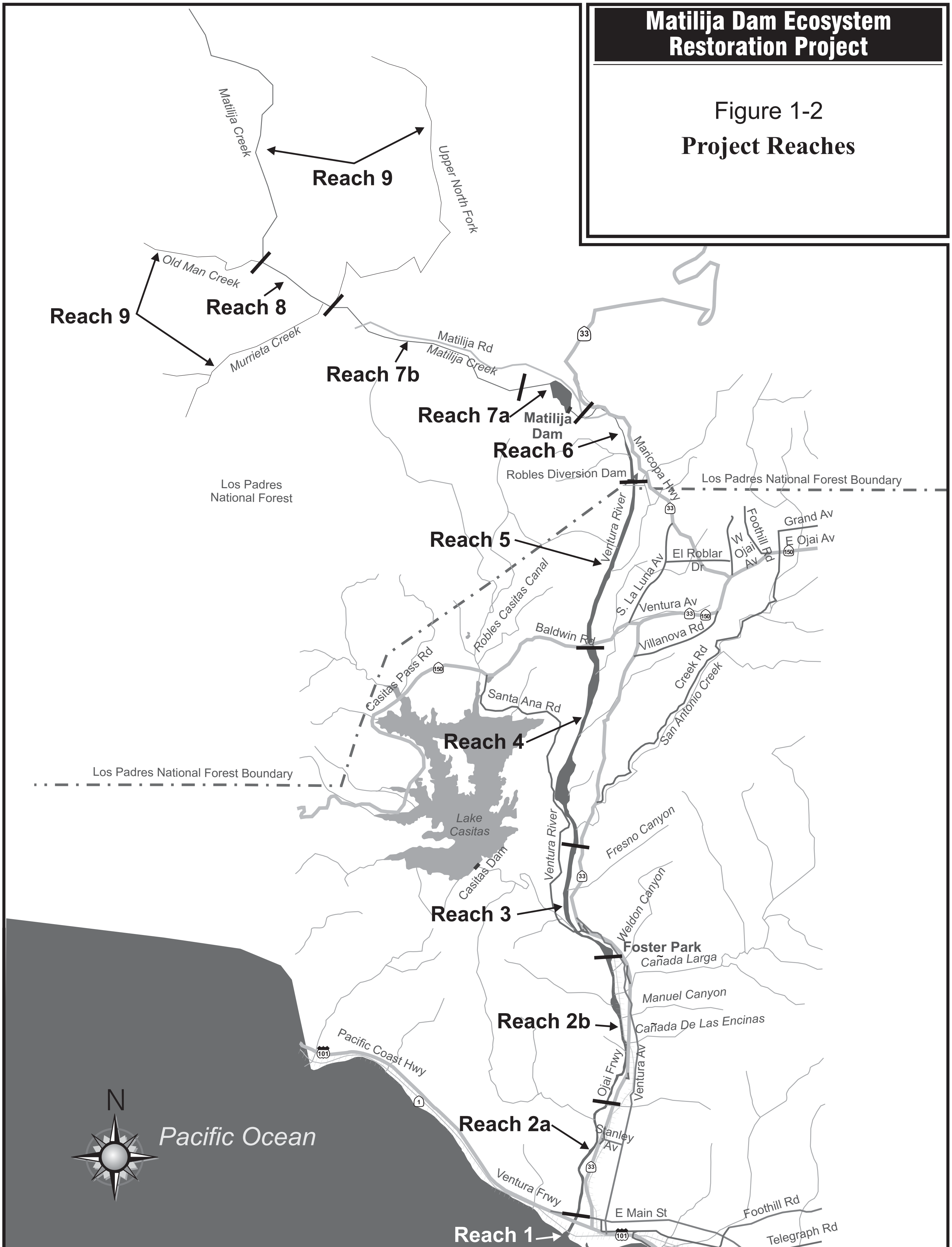
- Reach 1: Ventura River Lagoon/Mouth to Main Street Bridge
- Reach 2: Main Street Bridge to Foster Park (Casitas Vista Road Bridge)
- Reach 3: Foster Park to just above San Antonio Creek Confluence
- Reach 4: San Antonio Creek Confluence to Highway 150 Bridge
- Reach 5: Highway 150 Bridge to the upstream end of Robles Diversion Facilities
- Reach 6: Robles Diversion to Matilija Dam
- Reach 7: Matilija Reservoir from dam to the upstream end of reservoir influence (i.e., about 2 miles upstream of the dam)
- Reach 8: End of the reservoir influence on Matilija Creek upstream to the confluence of Old Man Creek and Matilija Creek
- Reach 9: Upper North Fork Creek to its confluence with Matilija Creek, Murrieta Creek to its confluence with Matilija Creek, Old Man Creek to its confluence with Matilija Creek, and Matilija Creek upstream of its confluence with Old Man Creek

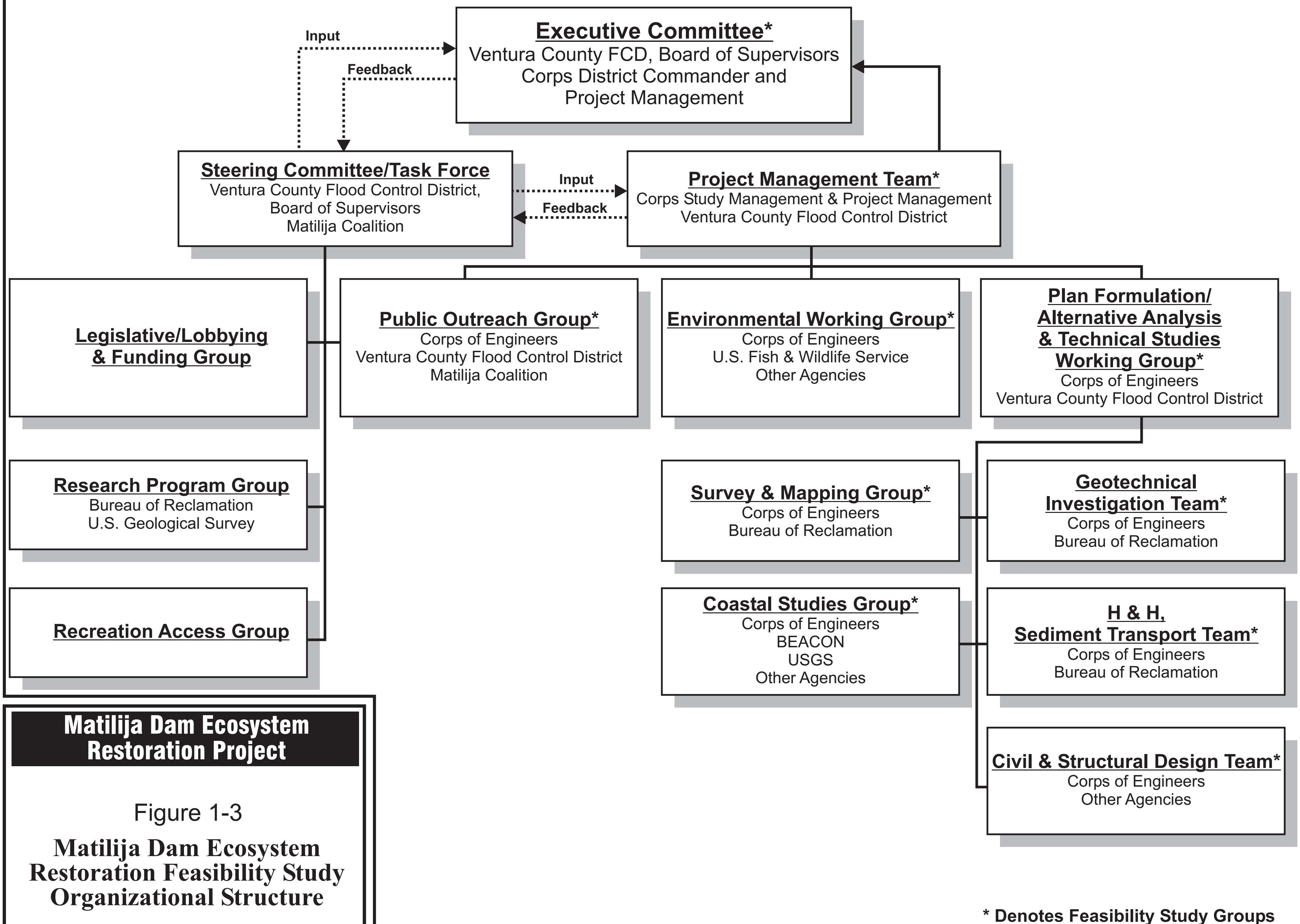
Feasibility Study activities have been coordinated by the Corps and VCWPD with other agencies and groups in the watershed at Steering Committee/Task Force meetings (USACE, 2001). This multi-agency committee and the Feasibility Study project management team have disseminated information about ongoing and proposed studies and projects within the Matilija Creek and Ventura River watersheds and the Ventura County shoreline. Members of this committee represent federal, State, and local agencies and groups. Current members include: the National Park Service, National Marine Fisheries Service (NMFS), United States Geologic Survey (USGS), United States Fish and Wildlife Service (USFWS), United States Forest Service - Los Padres National Forest, United States Bureau of Reclamation (BOR), Congressman Gallegly, State Senator Jack O'Connell, the California Department of Fish and Game (CDFG), the California Regional Water Quality Control Board, California Coastal Conservancy, National Fish and Wildlife Foundation, Cities of San Buenaventura (Ventura), Oxnard, Port Hueneme and Ojai, Casitas Municipal Water District, Matilija Coalition, Friends of Ventura River, Surfrider Foundation, American Rivers, California Trout, Fixing Stream Habitats Technical Assistance Program (FISHTAP), Ventura County Wetlands Task Force, and Ventura County Supervisors Flynn, Long, and Bennett.

In addition to the Corps Feasibility Study, there are other non-federally funded efforts working in parallel that report to the Steering Committee/Task Force. These groups include the Interim Deconstruction Group, Research Program Group, Recreation Access Group, the Legislative/Lobbying Group, and the Funding Group. These efforts, and the Corps Feasibility Study, have been coordinated with the Steering Committee/Task Force so there is a consistency of assumptions and no duplication of efforts (USACE, 2001).

Matilija Dam Ecosystem Restoration Project

Figure 1-2
Project Reaches





Matilija Dam Ecosystem Restoration Project

Figure 1-3

Matilija Dam Ecosystem Restoration Feasibility Study Organizational Structure

The organizational structure outlines the efforts by members of the Steering Committee/Task Force, VCWPD, and the Corps to address activities within the Matilija Creek and Ventura River watersheds (see Figure 1-3). The organizational chart includes the primary members of the working groups (USACE, 2001). The Corps chairs all groups that pertain directly to the Feasibility Study while other groups are chaired by the local sponsor, VCWPD, the Ventura County Board of Supervisors, the BOR, the Matilija Coalition, or other non-government organizations (NGOs). Figure 1-3 outlines the general management and the interaction of the groups. The alternatives for this project were formulated with the input of the public and the representatives of the working groups.

The planning process during the feasibility phase is guided by the Corps' *Water Resource Council's Principles and Guidelines* (USACE, 2001). The federal objective for the project is to contribute to the nation's ecosystems through ecosystem restoration, with contributions measured by changes in the amounts and values of habitat (USACE, 2001). The Corps refers to this objective as National Ecosystem Restoration (NER). The NER Plan reasonably maximizes ecosystem restoration benefits compared to costs.

1.2 ENVIRONMENTAL PROCESS AND DOCUMENTATION

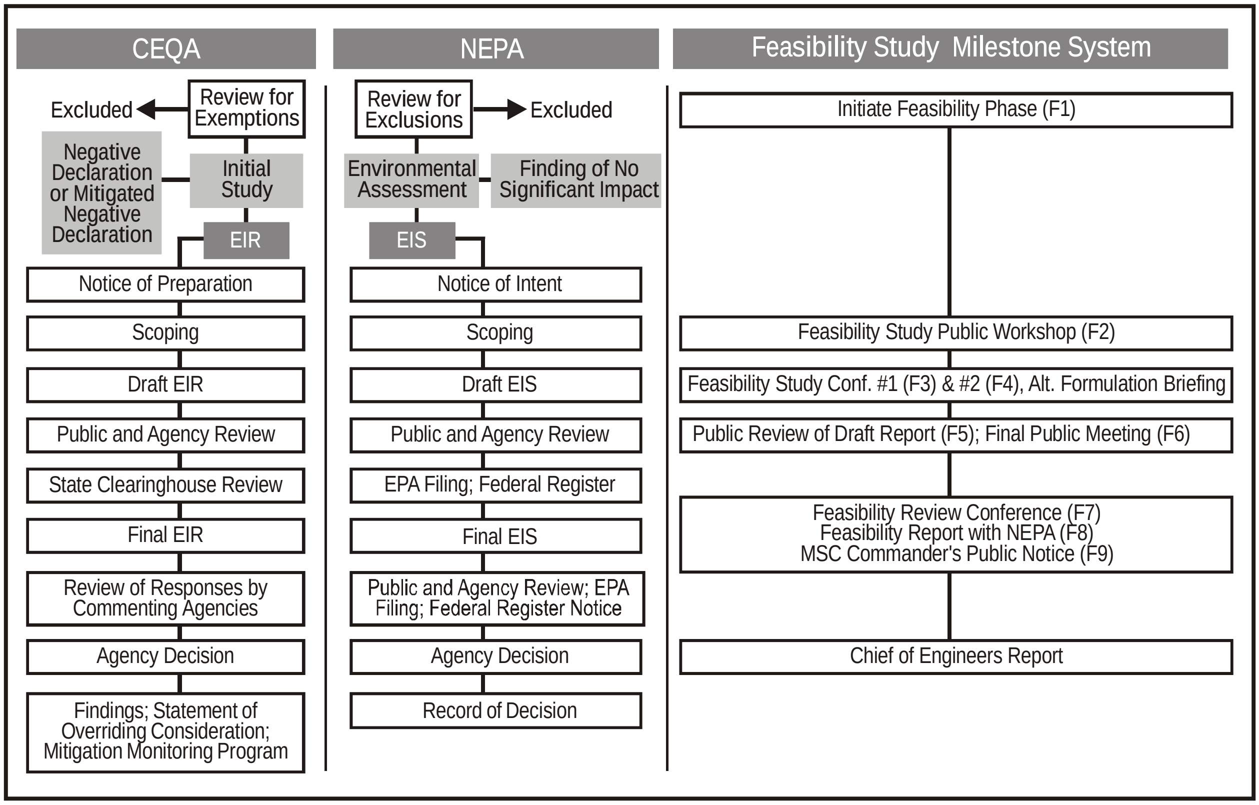
1.2.1 NEPA/CEQA Process

The involvement of a federal agency and a local California public agency requires compliance with both NEPA and CEQA, respectively. NEPA regulations and CEQA Guidelines encourage the agencies to prepare a single joint Environmental Impact Statement (EIS) and Environmental Impact Report (EIR) that satisfies both federal and California laws (Public Resources Code § 21083.5, CEQA Guidelines § 15222). Pursuant to these laws, the Corps and VCWPD have prepared this joint EIS/EIR, with the Corps as the federal lead agency (for NEPA) and the VCWPD as the local lead agency (for CEQA). Figure 1-4 shows how the EIS/EIR process corresponds to the Corps' Feasibility Study process.

This Draft EIS/EIR will be distributed for public review and comment in accordance with NEPA and CEQA procedures (see Section 1.4 for more information on the public participation program). Copies of this document will be submitted to the U.S. Environmental Protection Agency (USEPA) and California State Clearinghouse for agency distribution. A Notice of Availability will be published in the *Federal Register* and local newspapers, which will initiate a 45-day public review period. After distribution of the Draft EIS/EIR, a public hearing will be conducted to obtain public comment on environmental issues. The date, time, and location of the public hearings will be announced in the *Federal Register* and local newspapers. Public comments and responses will be compiled in the Final EIS/EIR.

Once the Final EIS/EIR is completed, a Notice of Availability will be published in the *Federal Register* and local newspapers stipulating that it will be available for the 30-day review period prior to signing a Record of Decision (ROD). The ROD is a written, public record explaining why the Corps chose a particular course of action. The selected action and all mitigation measures will be identified in the ROD. Similarly, the Ventura County Board of Supervisors, acting as the governing body of the

Figure 1-4 Corps Feasibility Study Process



VCWPD, will certify the adequacy of the Final EIR and will review the contents of the EIR prior to approving the project (CEQA Guidelines §15090). Furthermore, the Ventura County Board of Supervisors will make specific findings regarding the project's approval if the project leads to one or more significant effects.

The proposed action cannot be initiated before the ROD is signed and approved, the Final EIR is certified, and the specific CEQA findings are approved.

1.2.2 Environmental Impact Statement/Environmental Impact Report

This EIS/EIR is intended to be a stand-alone, detailed assessment of feasible alternatives for the ecological restoration of Matilija Creek and the Ventura River (USACE, 2001), with particular attention focused on restoring steelhead populations on Matilija Creek and returning natural sand replenishment to Ventura County and other southern California beaches. The format of this EIS/EIR complies with NEPA and CEQA requirements and addresses the relevant environmental issues raised during public scoping. The purpose of this EIS/EIR is to provide decision-makers and the public with information about the environmental consequences of the Proposed Action and project alternatives. Project-related consequences are determined by describing the existing environmental setting, superimposing an alternative on the setting, and then analyzing the impacts that would occur if the alternative were implemented.

This EIS/EIR analyzes all environmental issue areas deemed necessary by NEPA and CEQA guidelines, and presents mitigation measures intended to avoid significant impacts or reduce their severity. The future-without project condition (no action alternative) serves as the environmental baseline for assessing the impacts of the action alternatives. The environmental issue areas covered in this EIS/EIR are presented according to the following categories:

- Earth Resources
- Hydrology and Water Resources
- Biological Resources
- Visual Resources
- Land Use
- Noise
- Transportation/Traffic
- Recreational Resources
- Air Quality
- Socioeconomics
- Aesthetics

1.3 STUDY AREA LOCATION

The Matilija Dam is located approximately 16 miles north of the coast, on Matilija Creek in the upper Ventura River watershed (see Figure 1-1). Matilija Creek and North Fork Matilija Creek join approximately 15.5 miles from the coast to create the Ventura River, which has a drainage area of approximately 226 square miles. Matilija Creek exits the Los Padres National Forest about 7 miles north of Matilija Dam, although it continues to be surrounded on all sides by the Los Padres National Forest until it reaches the northern areas of the City of Ojai. South of the confluence of Matilija Creek and North Fork Matilija Creek, the Ventura River flows south past the western edge of the City of Ojai, through the unincorporated areas of Oak View and Casitas Springs. In its lower reaches, the Ventura River flows through the City of Ventura until it reaches its estuary. The estuary is typically open to the Pacific Ocean during winter months, but is often blocked off by a sandbar during summer months (CRWQCB-LA, 2002).

The geographic scope of the EIS/EIR will vary slightly depending on the environmental issue area. Typically, the study area includes the reaches of the Old Man, Murrieta, Upper North Fork, and Matilija Creeks above the Matilija Dam and below to the confluence with the North Fork Matilija Creek, along with the entire mainstem of the Ventura River. However, some environmental issue areas may involve a larger geographic scope, such as air quality, which requires the analysis of the entire air basin.

1.4 GENERAL CHARACTERISTICS OF THE STUDY AREA

Much of the information and references in the following section are based on the 2002 *Draft Ventura River State of the Watershed Report*, prepared by the California Regional Water Quality Control Board, Los Angeles Region (CRWQCB-LA, 2002).

1.4.1 Physical Characteristics and Features of the Study Area

The Ventura River and its tributaries drain a coastal watershed in western Ventura County. The watershed covers a fan-shaped area of 235 square miles, which is situated within the western Transverse Ranges (the only major east-west mountain range in the continental United States). From the upper slopes of the Transverse Ranges in the Los Padres National Forest, the surface water system generally flows in a southerly direction past the City of Ojai to its estuary located in the City of Ventura.

The coastal region is characterized by a Mediterranean climate with mild, moist winters and moderately warm, generally rainless summers. Point Conception, about 70 miles west of the Ventura River estuary, is considered a major climatic boundary because it marks the approximate boundary between relatively cool, moist conditions to the north and warmer and drier conditions to the east and south (Ferren, Jr. et al., 1990).

The climate of the Ventura area is influenced primarily by the prevailing westerly transoceanic air currents, but with cooling of the adjacent land surface at night, air movement during the night and early morning is offshore. Dry, warm offshore winds (Santa Ana Winds) may be generated in the fall and winter. Coastal fog is also an important characteristic of the study area. The coastline of southern California is subjected to an inversion layer that traps cool, moist air at low elevations, producing fog or low clouds during the night and early morning hours. The Ventura River valley acts as a corridor through which moisture-laden marine air moves inland. As ocean temperatures increase during the summer, the occurrence of fog decreases (Ferren, Jr. et al., 1990). Rain generally occurs between October and March, with 75 percent of the runoff occurring from January through April. Mean annual precipitation near the mouth of the river is about 15.5 inches (40 cm). The higher mountains in the upper watershed receive about 40 inches (103 cm), and the average amount for the watershed is about 22 inches (56 cm). Some snow does occur in the higher mountains but snowmelt has little effect on stream flow, as melting snowpack does not sustain substantial runoff in warmer months (Ferren, Jr. et al., 1990). The erratic weather pattern, coupled with the steep gradients throughout most of the watershed, results in high flow velocities with most runoff reaching the ocean.

The Ventura River watershed has a relatively steep gradient ranging from forty feet per mile at the mouth to ninety feet per mile at the headwaters (Ventura County, 1973). The highest point in the watershed is 1,830 m (6,025 feet) in the Santa Ynez Mountains. About 50 percent of the watershed land area lies below 500 m elevation, 25 percent between 500 and 1,000 meters, and 25 percent lies between 1,000 and 1,800 meters. Using the BOR classification, the watershed land areas roughly correlate with 15 percent valley, 40 percent foothill, and 45 percent mountain categories.

Most of the watershed bedrock is non-water bearing with the best water-bearing units being the shallow alluvium in the valley bottoms. In Ojai Valley, the maximum alluvial depth is 700 feet while in the Ventura River, the alluvium averages 60 to 80 feet deep, with maximum of 100 feet between Meiners Oaks and Foster Park. Within the bedrock sequences there are lenses of permeable and porous sandy material that hold substantial reserves of petroleum and natural gas, especially in the lower watershed area (Mertes et al., 1995). Approximately 85 percent of the exposed area in the watershed is composed of relatively impervious materials or bedrock (Ventura County, 1973).

The Ventura River watershed can be divided into three distinct fluvial zones. The headwaters and upper tributaries, including Matilija Creek, North Fork Matilija Creek and San Antonio Creek, is an area characterized by production of water and sediment. The middle zone from the confluence of Matilija Creek and North Fork Matilija Creek to the estuary is an area of storage and transfer of sediment. Mid-channel islands, sand and gravel bars, bank erosion areas and migrating channels make up this dynamic zone.

The features of the main stem of the Ventura River and contributing tributaries within the study area are described below (in order from the top of the watershed to the bottom).

Matilija Creek. Matilija Creek drains an area of about 56 square miles and has an average gradient of 200 feet per mile. The main stem is 15.6 miles long. The Matilija Creek sub-watershed provides 46 percent of the long-term natural flow in the Ventura River, as gauged at Foster Park (BOR, 1954).

Old Man Creek. Old Man Creek drains an area of about 4.0 square miles and has an average gradient of 1,300 feet per mile over the course of its 2.3-mile length (VCWPD, 2003).

Upper North Fork Matilija Creek. Upper North Fork drains an area of about 14.2 square miles and has an average gradient of 580 feet per mile over the course of its 4.1-mile length (VCWPD, 2003).

Murrieta Creek. Murrieta Creek drains an area of about 6.1 square miles and has an average gradient of 530 feet per mile over the course of its 2.1-mile length (VCWPD, 2003).

Matilija Dam Reservoir. The Matilija Dam was constructed in 1948 by the Ventura County Flood Control District (now VCWPD) to provide water supply reserves and reduce flood hazards. The structure is a concrete arch dam that was built across a narrow section of the Matilija Creek about 0.6 mile upstream from the confluence with the North Fork of Matilija Creek. The reservoir and dam had an initial capacity of 7,000 acre-feet. As the result of siltation, especially after the 1969 flood, and two large notchings (due to deteriorating concrete and safety concerns) that were cut in the dam's face in 1965, the reservoir now has a capacity of less than 500 acre feet. The VCWPD owns and maintains Matilija Dam while Casitas Municipal Water District (MWD) operates and maintains the dam outlet works. The reservoir is now used primarily to temporarily store flows and release waters at less than the 500 cubic feet per second (cfs) capacity of the Robles Canal in order to maximize diversions to the Casitas Reservoir (Ventura County, 1973; Casitas MWD and Ventura, 1978; Casitas MWD, 1995; Casitas MWD et al., 1997).

Some key historical facts about Matilija Dam include:

- In 1948, construction of Matilija Dam was completed, with an original height of 198 feet and a reservoir capacity of 7,018 acre-feet. Sediment aggradation (i.e., accumulation) behind the dam began to occur at a much faster rate than expected, which rapidly led to diminishing water storage and flood control capacities.
- In 1949, a major fish kill occurred from stagnant, hot water conditions in the reservoir.
- In 1959, the Casitas MWD assumed responsibility of the dam.
- In 1965, due to stresses in the dam from silt buildup and aging concrete, the County of Ventura elected to remove a section of the dam (30 feet deep and 285 feet wide).
- In 1973, the USFWS estimated that Matilija Dam blocked 116,000 cubic yards of sediment per year from reaching the coast.
- In 1978, another section of the dam was removed.
- After sediment aggradation and removal of two section of the dam, the dam is now 168 feet in height, with a reservoir capacity of 500 acre-feet.
- Currently, the dam has a negligible flood control function and provides only a minimal source of water supply (USACE, 2001). Continued aggradation is expected to completely eliminate the dam's water supply capabilities by 2017.

North Fork Matilija Creek. The North Fork Matilija Creek has an average gradient of about 460 feet per mile and drains an area of 15.5 square miles (Ventura County, 1973; Moore, 1980).

Upper Ventura River. Matilija Creek and the North Fork Matilija Creek merge and form the main stem of the Ventura River, a gravel bottomed channel that varies in width from 700 to 2,000 feet wide that extends 16.2 miles to the estuary (Casitas MWD and Ventura, 1978). The upper reach of the river is bounded downstream by a diversion dam at Foster Park. This reach includes the Robles Diversion structure, the San Antonio tributary, Casitas Springs area, and Foster Park.

The Casitas Springs area of the Ventura River (approximately 2.8 kilometers long) has high quality water and steelhead spawning and rearing habitat. Habitat conditions are not generally impaired (BOR, 2002). This section of the Ventura River has perennial flows, even during drought years, due to a natural bedrock barrier that forces subsurface flow to the surface. The river channel occurs as a wide flood plain and during high flows is "characterized by a typical pool riffle continuum found in low gradient streams" (Moore, 1980).

Robles Diversion. The Robles Diversion Dam, approximately two miles downstream of Matilija Dam, was constructed in 1959 as part of the Ventura River Project to divert up to 500 cfs of flows of winter runoff from the Ventura River to Lake Casitas. The watershed above the diversion is approximately 75 square miles (Casitas MWD, 1995). The diversion consists of a small rockfill dam, headgate, and four miles of concrete channel. The initial operating criteria were supposed to be for a five-year pilot period but the diversion is still operated under the original agreement. Under the March 2003 Biological Opinion for the Robles Diversion Fish Passage Facility, from January 1 to June 30, the first 30 cfs of surface flow must be allowed to pass down the Ventura River and all flows above 30 cfs and up to 500 cfs may be diverted to the Robles Canal. The low flows help support a flow in the river from Casitas Springs down to the estuary. During a storm event, however, the first 50 cfs of surface flow must be allowed to pass downstream for ten days following the storm peak to allow a minimum flow rate for successful steelhead migration. From July through December, the first 20 cfs of surface flow must be allowed to pass down the Ventura River and all flows above 20 cfs and up to 500 cfs may be diverted to the Robles Canal.

San Antonio Creek. San Antonio Creek originates in Senior Canyon and drains 52 square miles of the southerly slope of the Topa Topa Mountains. About 40 square miles are steep mountainous terrain and 12 square miles cover valley area (BOR, 1954). This sub-watershed represents the northeast portion of the Ventura River watershed. The average gradient is 60 feet per mile and the length of the main stem is 11.4 miles. The headwaters are in rugged mountain terrain and have stream gradients of 250 feet per mile. The river then flows through the alluvial plain of the Ojai Basin with a gradient of 100 feet per mile, five miles in a narrow canyon with an average gradient of 500 feet per mile before joining the Ventura River two miles above Foster Park.

Lower San Antonio Creek does not have favorable steelhead habitat; it lacks good pools and riffles and cover but the quality of upstream areas of the creek is unknown (Moore, 1980). The lower creek, between State Route 33 and the abandoned Southern Pacific right-of-way, is bounded by a levee with riprap and willows and alders (Casitas MWD and Ventura, 1984).

Foster Park Dam. An underground weir extending across Coyote Creek and Ventura River beds approximately 1,200 feet north of Foster Park Bridge was constructed in 1906 by the Ventura Power Company. The weir was designed to raise the water table in order to supply municipal pumps located upstream. The concrete weir is 973 feet long and maximum of 65 feet deep and stops short by 300 feet from extending the full breadth of both streams. A surface diversion is near the eastern side of the river bottom. Water from the surface water diversion and the subsurface collectors accumulates in a single receiving chamber that discharges into a 36-inch diameter concrete pipe that drains by gravity to the Kingston Reservoir at the City's water treatment plant. It was not completed all the way across, due to construction problems. The City of Ventura maintains five pumps approximately 300 to 1,500 feet upstream of the weir. In 1946, 300 feet of the weir was exposed to a height of four feet. Efforts to construct a fish ladder, in 1946, by the CDFG were never brought to fruition (Ventura County, 1973; Casitas MWD et al., 1997).

Coyote Creek. Coyote Creek drains an area of 41 square miles (30 sq. mi. are mountainous and the rest are rolling foothills and valley floor) and has an average gradient of 260 feet per mile. The length of the main stem of Coyote Creek is 16.6 miles although Lake Casitas now covers an area starting 2.5 miles above the confluence of Coyote Creek with the Ventura River. The lowest 2.5-mile reach of Coyote Creek has an average gradient of 35 feet per mile. Santa Ana Creek, a tributary to Coyote Creek, has an average gradient of 380 feet per mile. Coyote Creek below Casitas Dam is usually dry except for short periods after storms and spillage from the reservoir (BOR, 1954; Ventura County, 1973; Casitas MWD and Ventura, 1978; Moore, 1980).

Ventura River Estuary. The Ventura River terminates at the Ventura River estuary, which includes wetlands. The estuary area is approximately 30 acres and incorporates portions of the City of Ventura, Seaside Wilderness Park, and Emma Wood State Park. The estuary includes a main lagoon that is separated from the ocean by a sand/cobble bar during the dry season. When full, the lagoon covers approximately 1.5 surface hectares and ranges in depth from 0.6 to 2.4 meters. The lagoon sandbar gets breached by winter storm flows and then slowly rebuilds through the summer as sand is deposited by the long-shore drift. In some extremely wet years, such as 1986, the lagoon remains open to the ocean and thus tidal exchange all year. In some dry years, the sand bar never gets breached in the winter and water flows over the sand bar, as in 1987 (Casitas MWD and Ventura, 1990).

For most years, the lagoon is dominated by freshwater during most of the year (CRWQCB-LA, 1993; Moore, 1980). When the lagoon is open to the ocean, tidal water level changes are observed to about 150 meters upstream of the railroad bridge (Casitas MWD and Ventura, 1984). The estuary salinity is controlled by tidal flushing during the periods when it is open to the ocean (and ranged during 1988 and 1989 from 2 to 17 parts per thousand for surface and up to 20 parts per thousand at bottom) and by perennial freshwater inflows during rest of the year. During July and August, when the lagoon is closed, stratification may result in surface salinity of 10 parts per thousand and up to 31 parts per thousand at the bottom. If the mouth does not open during the summer, the salinity may drop to 0 parts per thousand by the fall.

During closed periods, the height of water in the lagoon (up to 1.8 m above mean high tide) is controlled by the amount of freshwater inflows (Mertes et al., 1995). When the lagoon is open, and during low tides, the estuary is fresh to the railroad bridge and then is brackish to just above the breakers at the sandbar, as was measured in early 1983. Pooled areas, however, as far upstream as the railroad bridge can have higher salinities. At high tide, that lagoon stratifies with saline water near the bottom. In the summer, the estuary is dominated by freshwater that tends to form a floating lens of less saline water over the more saline water. If there are less freshwater inflows then the layers tend to not mix resulting in increased temperatures and reduced dissolved oxygen in the lower saline layer, which impact aquatic habitats (Casitas MWD and Ventura, 1984).

The wetlands and lagoon area support coastal salt marsh, dune swale wetland, and scrub/shrub wetland. The west side of the estuary is dominated by nonpersistent emergent (annual) vegetation that is unique in the Los Angeles Region. Adjacent are southern arroyo willow riparian forest, alluvial scrub, and southern riparian scrub (CRWQCB-LA, 1993; Moore, 1980). An estuary at the second mouth continues to exist to the west of the main lagoon, but is only flushed during catastrophic floods. It does not dry out, apparently due to a persistent high water table. Salinities are between 10 and 20 parts per thousand (Ferren Jr. et al., 1990).

1.4.2 History of Modern Water Resources Management in Ventura County

As described above in Section 1.4.1, the Ventura County Flood Control District constructed the Matilija Dam in 1948 to provide water supply reserves and reduce flood hazards for the area. Shortly after, the Ventura River Municipal Water District was formed in 1952 for the purpose of investigating and solving the water supply problems existing within its boundaries (BOR, 1954). During the 1950s, the area's principal economic development centered around agriculture, oil and gas production, commercial, service, and recreational activities. The agricultural industry included both irrigated and dry farming. Oranges, lemons, walnuts, avocados, deciduous fruits, irrigated hay and pasture, and vegetables were the principal irrigated crops. Dry farmed crops included grain hay, barley, beans, nuts, deciduous fruits, and grapes. Three major and several minor oilfields were in production with the largest, Ventura Avenue Oilfield, ranked second in the State by quantity of crude oil produced (BOR, 1954).

The City of Ventura obtained its water supply during the 1950s from the Ventura River near Foster Park both by gravity and pumping from river gravels. The city also had three relatively deep wells along the beach. During 1953, a total of 6,250 acre-feet were taken from these two sources (80 percent from the river). In excess of 2,000 acre-feet of the city's total supply was used by the industrial area in or near the Ventura Avenue Oilfield. Over the previous 10 years, nearly 15 percent of the city's supply was used for irrigation below Foster Park (BOR, 1954).

A drought prior to 1954 pointed out the need to augment the water supply since the City of Ventura had to rely heavily on the beach wells, which were considered a temporary source due to salt water encroachment occurring after continued pumping (BOR, 1954). In 1959, the BOR constructed Casitas Dam in order to store water to meet demands for potable water and irrigation. The dam is a 285-foot high earth and crushed rockfill structure that holds back water in Lake Casitas that is distributed to residential, commercial, and industrial users in the Casitas Municipal Water District. The Robles Diversion was also constructed, which is a low concrete structure that can divert up to 500 cubic feet per second from the upper Ventura River. Diverted waters flow through a concrete-lined canal that empties into Lake Casitas. Southern Pacific Milling sand and gravel operations in floodplain were initiated during the 1960s (Keller and Capelli, 1992; Mertes et al., 1995).

Between 1962 and 1964, the 101 Freeway was constructed across the Ventura River delta between the Southern Pacific Railroad and Main Street bridge. Part of the crossing was built on fill material. During the mid-1960s, further development occurred in the area; much of the agricultural operations ceased. Construction of the 101 Freeway subjected the area to increasing pressures from urbanization, although the river itself and the levee on its eastern side act as a relatively stable urban-rural boundary.

In 1963, the Oak View Sanitary District constructed the Ojai Valley Sanitary District Wastewater Treatment Plant (formerly known as the Oak View Treatment Plant). This plant currently treats a maximum of three million gallons per day of domestic, commercial, and industrial wastewaters collected from the City of Ojai and unincorporated areas. After treatment, the effluent is discharged to the Ventura River, just below Foster Park. Up until 1982, the plant was capable of treating to a secondary level. In 1982, rotating biological contractors were added for oxidation of ammonia into nitrate. In 1969, an oil and gas line was laid along the inland side if the Southern Pacific Railroad right-of-way. As a result, the majority of open water area of the second mouth was filled. Then, in 1971, more railroad bridge work resulted in a berm being constructed that eliminated virtually all of the second mouth open water area (Ferren, Jr. et al., 1990).

State Park camping facilities completed in 1982 increased human activity in the area and further impacted the Southern Coastal Dune vegetation to the point of elimination. The dunes began to migrate inland as a result. Construction of a recreational vehicle park and an additional parking lot for the nearby fairgrounds increased traffic and use of the area with more impacts to habitat (Ferren, Jr. et al., 1990). The largest U.S. fire of the year, the Wheeler Fire (118,000 acres), occurred in the Los Padres National Forest in July of 1985. Nearly 85 percent of the Casitas and upper Ventura River subwatershed was burned.

1.5 PUBLIC PARTICIPATION AND SCOPING PROCESS

1.5.1 Purpose of Scoping Process

To identify key issues and concerns relevant to the scope of the EIS/EIR, the Corps and VCWPD encouraged participation in the environmental review process from public agencies, special interest groups, and the general public. A major component of this process is public scoping, which is a public process designed to determine the breadth of issues to be addressed in the EIS/EIR.

1.5.2 Notice of Intent and Notice of Preparation

The Corps and VCWPD began the scoping process for the project by distributing the Notice of Intent (NOI) (for NEPA) and the Notice of Preparation (NOP) (for CEQA) to potentially affected agencies and groups. The NOI was published in the *Federal Register* on January 11, 2002. The NOP was distributed on January 16, 2002.

The NOI and NOP provided formal notification that an EIS/EIR would be prepared for this project to all federal, State, and local agencies involved with funding or approval of the project, and other interested organizations, agencies, and members of the public. The NOI and NOP are intended to encourage interagency communication concerning the proposed project and provide sufficient background information so that agencies, organizations and the public can respond with specific comments and questions on the scope and content of the EIS/EIR. A Notice of Availability for this EIS/EIR will be published in the *Federal Register* and local newspapers, which will initiate the 45-day public review period.

No Initial Study was prepared since the Corps and VCWPD decided to proceed to the more comprehensive review of a complete EIS/EIR. Copies of the NOI and NOP are included in Appendix A. Copies of the comment letters received during 30-day review period of the NOI and NOP can be found in Appendix A.

1.5.3 Public Scoping Meeting Information

The Corps and VCWPD held a public scoping meeting on January 31, 2002, at the Ventura County Building in the City of Ventura. The purpose of the meeting was to receive public comments and discuss the feasibility phase of the process. The scoping meeting addressed the history of Matilija Creek and the Matilija Dam. A variety of reasons for removing the dam were presented to the public in the meeting, including the long-term viability of the dam, the dam's obsolescence, the return of blocked sediments to beaches, restoration of impeded migratory steelhead, and the enhancement of outdoor recreation and education. Methods for removing the dam, involving a combination of sediment removal processes, were also presented and the public was solicited for their input on the proposed project.

1.5.4 Public Involvement

The Corps and VCWPD have also incorporated an ongoing public involvement program into the planning and design process of the project. Public involvement activities have included involvement of public representatives in the Working Groups, production of public newsletters, and maintaining the project website at http://www.matilija.org that is available to the public.

A Matilija Dam Alternatives Workshop was held with the public on July 24, 2002, to discuss the different alternatives proposed for the project as well as different factors that should be considered for each alternative, such as sediment removal and disposal, littoral transport, cost implications, concrete structure removal and disposal, NEPA/CEQA, habitat implications, fluvial processes, non-removal options, and regulatory implications.

During the public review period for the Feasibility Study and Draft EIS/EIR, the public is invited to provide comments on the project and its potential environmental impacts. During the public review period, the Corps and VCWPD will conduct a public hearing on the project at which the public will be given an opportunity to provide verbal comments on the project. The Final EIS/EIR will include responses to public and agency comments on the environmental impacts of the project.

2. NEED FOR AND OBJECTIVES OF PROPOSED ACTION

2.1 PURPOSE AND NEED

The primary purpose of the Matilija Dam Ecosystem Restoration Feasibility Study is to investigate options for the ecological restoration of Matilija Creek and Ventura River, with particular attention focused on restoring anadromous fish populations on Matilija Creek and returning natural sand replenishment to Ventura and other southern California beaches (USACE, 2001). The U.S. Army Corps of Engineers (Corps) and the Ventura County Watershed Protection District (VCWPD) have evaluated a range of reasonable alternatives to provide for the restoration of riparian vegetation and habitat for wildlife and fish, particularly sensitive species, such as the endangered steelhead (*Oncorhynchus mykiss*), an anadromous fish. The federally listed endangered steelhead, which historically had abundant runs in the Ventura River system, has been blocked access to over 50 percent of its prime spawning habitat in the upper reaches of Matilija Creek by the 1948 construction of Matilija Dam (Moore, 1980; Chubb, 1997; Capelli, 1999). Riparian habitat has declined 90 to 98 percent throughout the southwestern United States, and many of these habitat areas have disappeared completely (Swift, 1984; Warner and Hendrix, 1985; Knopf et al., 1988; Faber et al., 1989; USDOI, 1994). Much of the decline of riparian habitat in Matilija Creek and the Ventura River is due to the spread of giant reed or arundo (*Arundo donax*), an invasive weed, which in the past 30 to 50 years has displaced many of the dense riparian stands that were once present. Some areas, including large portions of the dam reservoir, now consist of nearly monotypic stands of giant reed. In addition, beaches downstream in Ventura County have narrowed since construction of Matilija Dam, which has blocked an estimated six million cubic yards of sediment. With a diminished supply of river-based sand replenishment (caused by dam construction, watershed improvements, and riverbed sand and gravel mining), beaches in the region are becoming increasingly eroded, causing a suite of environmental and recreational problems (BEACON, 1989).

Agricultural, industrial, and urban development of the Ventura River watershed has degraded the natural environment by adding system-wide stresses such as increased point and non-point pollution, loss of habitat, groundwater depletion, increased water use, over-harvesting of wildlife, invasion of exotic plants and wildlife, and structural alterations of waterways (Chubb, 1997; Moore, 1980; CRWQCB-LA, 2002; Capelli, 1999). Throughout the Ventura River system, flood control and other waterway changes have reduced riparian habitat, altered stream flows, limited access of species (such as the steelhead) to critical habitat, and altered the sediment transport of the rivers and the coastline.

The plight of the endangered steelhead is representative of the environmental degradation of the Ventura River ecosystem. Historically, the Ventura River supported a substantial steelhead run of up to 3,000 spawning fish a year. Currently, the anadromous steelhead population is severely depressed (Chubb, 1997). While it is likely that steelhead pass upstream without detection, it is certain that their numbers are low and below the 200 fish threshold associated with a high risk of extinction (Franklin 1980; Chubb, 1997). Over 50 percent of the primary spawning and rearing habitat is located in the upper reaches of Matilija Creek, upstream of the Matilija Dam, thereby making it inaccessible to steelhead (Moore, 1980; Chubb, 1997; VCWPD, 2003).

Ventura River beaches have been subjected to amplified erosional pressures caused by increased fortification of the coastline and reduced sand renourishment. California coastlines are erosional by nature (BEACON, 1989), but the increased use of "armor" on coastlines, such as beach walls and rock revetments, cause localized amplification of erosion rates. This problem is exacerbated by reduced influxes of renourishing sand, which, under natural conditions, is supplied by sediment-laden rivers and other sources. The construction of dams and other impediments of the natural sediment transport system, however, block much of the sediment that rivers normally would carry from upstream areas to the coastline. For example, an estimated six million cubic yards of sediment have been blocked by the Matilija Dam since its construction in 1948. The end result has been loss of sand on coastal beaches, causing an array of environmental and sand-resources impacts (Chubb, 1997; Brauner et al., 1998; Moore, 1980; BEACON, 1989).

To further explain the need for the Matilija Dam Ecosystem Restoration Feasibility Study, Section 2.1.1 outlines the conditions that led to the decline of steelhead in the Ventura River. Section 2.1.2 summarizes the coastal processes that have led to beach sand depletion.

2.1.1 History of Steelhead (*Oncorhynchus mykiss*) in the Ventura River

Much of the information and references on steelhead in the following section are based on the 1997 *Ventura Watershed Analysis – Focused for Steelhead Restoration* by the Los Padres National Forest, Ojai Ranger District (Chubb, 1997).

Historical Conditions. Historically, steelhead (*Oncorhynchus mykiss*) were common inhabitants of California coastal streams as far south as San Diego. Steelheads are known to occur in the Ventura River system and were estimated to be between 4,000 and 5,000 individuals prior to the development of the Matilija Dam in 1947 (USFWS, 2003). Current estimates of steelhead populations in the river are estimated to be less than 200 individuals utilizing habitat between the Robles Diversion in Reach 5 and the estuary in Reach 1.

Historical accounts do not differentiate between steelhead and rainbow trout, creating difficulty in determining the extent and magnitude of early anadromous runs. Newspaper articles of the late 1800s repeatedly mention the large angler catches from throughout much of the length of the mainstem Ventura River. River-flows were apparently adequate to support both resident and anadromous fish throughout most mainstem reaches except during drought years. Sections of the mid to upper Matilija Creek are thought to have been the primary spawning habitat, representing over half of the historically used habitat (Moore, 1980). Approximately half of the river basin perennial and seasonal flowing streams may have once supported anadromous steelhead.

Chumash Indians have inhabited the Ventura River basin for over 4,000 years. Several large villages were located in the lower coastal portion of the watershed. The primary use of the upper watershed was in dispersed hunting and fishing camps. Prior to the late 1700s, Chumash were known to burn sage scrub and grasslands but not chaparral. It is thought that some of the fires would have escaped into chaparral, perhaps altering vegetation patterns and fire intensities or intervals. Brushfires in the surrounding chaparral habitat would lead to increased sediment load during winter months, which may have had short term affects to local steelhead populations.

Cattle grazing and vineyard productions were the most noticeable alterations associated with the Spanish missions in the 1700s and the Spanish rancheros in the early 1800s. Vineyards and intensive farming rapidly spread throughout the lower Ventura River basin. Both of these activities may affect water quality through diversions of river water for agricultural processes, and razing may have been heavy within portions of the watershed reducing grassland fuel loads. With the decline in the Chumash population, prescribed burning was no longer practiced. Historical accounts of 1793 describe chaparral stands as continuous, heavy, and decadent. It is not clear how fire patterns were affected during this period. Homesteading began in earnest in the late 1800s, as did small hard rock mining operations and oil exploration. Grazing may have declined around the turn of the century, which may have contributed to fuel build up and later major fires increasing potential sediment deposition into the Ventura River during storm events. During this period, ranches and small communities began to divert surface flows from the mainstem Ventura River. As the number and volume of these diversions increased, impacts on steelhead increased by reducing available instream water and habitat, and by the high mortality of young fish diverted into unscreened water conveyance systems. Some of the structures associated with these diversions also may have at least partially blocked upstream steelhead migrations. The Foster Park Diversion in the lower mainstem Ventura River was completed in 1906.

As more people moved into the area and populations grew, over-fishing became a problem. Steelhead were likely taken as bycatch in commercial seining operations within the ocean and lagoon (Ventura Free Press, 1876). Recreational and subsistence fishing also had a noticeable impact; local newspaper accounts bragged about the taking of hundreds of “trout” in a couple hours of fishing (Ventura Free Press, 1878). Matilija Creek and other easily accessible drainages were the first to suffer the consequences of severe overfishing.

Fire suppression activities began in earnest in the 1920s. Thereafter, the first documented major fire occurred in 1932. The Matilija fire of 1983 burned 3,900 acres within the watershed, which resulted in accelerated erosion that continued for at least a decade. Woody debris washed downstream causing log jams that temporarily trapped sediment only to break loose and cause severe down-cutting and lateral stream bank erosion with each successive storm. Fires altered riparian vegetation, often from mid- or late-seral alder and cottonwood to early seral alder or willow thickets.

Inadequate flows became a noticeable problem to steelhead in the 1940s. Increasing agricultural and municipal water demands expanded water diversions. Many water diversion structures were impediments to upstream and downstream steelhead movements. Most water diversions were unscreened causing the loss of countless steelhead juveniles and smolts. From what few accounts that are available, steelhead appeared to begin their most precipitous decline in the late 1950s. The Matilija Dam, completed in 1948, with the Robles Diversion Dam and Casitas Dam completed in 1958, effectively cut-off steelhead access to over 50 percent of their historical spawning habitat. These dams also captured much of the supply of sand and gravels, beginning a process that has drastically altered downstream channels and floodplains.

Road building, maintenance, and use have also had a negative effect on steelhead and stream corridors. Many of the present day access roads were built around the turn of the century. State Route (SR) 33 was constructed in the 1930s. Lengthy highway sections run parallel and impinge upon the North Fork River corridor, greatly influencing riparian habitat, the floodplain, channel morphology, and water quality.

Current Conditions. The construction of the Matilija Dam, and subsequently, the construction of the Robles Diversion Dam, has blocked access of anadromous steelhead to upstream spawning areas. The resulting declines in local steelhead populations have led to a federal listing of steelhead as "endangered" in the Southern California Steelhead Evolutionary Significant Unit (ESU) (VCWPD, 2003). The Ventura River anadromous steelhead population continues to be severely depressed, although the Robles Diversion Fish Passage Facility is being constructed in an effort to restore access to the upper main stem of the Ventura River below Matilija Dam (VCWPD, 2003). While it is likely that steelhead pass as far upstream as possible without detection, it is certain that their numbers are low and well below the 200 fish threshold associated with a high risk of extinction (Franklin, 1980). There have been only a few scattered reports of anadromous adult steelhead in the Ventura River since the 1960s. Moore (1980) estimated steelhead and resident rainbow trout populations within the study for December 1976 and the summer and fall of 1977 and 1978. Populations varied during this period from 943 fish in 1976 to 352 fish in July 1978. The low number of steelhead and rainbow trout identified during the July 1978 survey was attributed to unusually heavy flooding earlier in the year (VCWPD, 2003). During an angling survey of trout populations conducted in the Ventura River below the Robles diversion during an above average rainfall year, 52 trout were caught by angling (CDFG, 1997).

Southern California steelhead and rainbow trout are genetically very similar. As has been observed in other steelhead populations (Shapovalov and Taft, 1954), resident populations may coexist and geographically overlap with the anadromous form. Steelhead and rainbow trout eggs, fry, and juveniles cannot easily be differentiated. However, they can conclusively be identified as "steelhead" when they go through the smoltification process, which physiologically alters their systems for salt water and gives them their characteristic sleek silvery appearance. Smolts move downstream with receding storm flows from April through June (Shapovalov and Taft, 1954).

Southern steelhead have adapted to their unpredictable climate by retaining the flexibility to remain landlocked through many years or generations before returning to the ocean when conditions allow (Titus et al., 1994). Such traits and behaviors appear to be inherited, and there could very well be differences in the extent of anadromy between different river basins and even within a single drainage (Waples, 1991). Research into the movements of inland trout has also shown that different populations have vastly differing degrees of mobility, ranging from a few feet to 50 miles within a year (Schmal and Young, 1994). Both anadromous and resident trout have adapted to periodic flood extremes and droughts through upstream movements.

Genetic analysis of resident rainbow trout from the upper Ventura/Matilija basin indicated that only 2 out of 31 of the sampled fish had clear native ancestry (Nielsen et al., 1997). It is possible, however, that some of the more isolated populations may retain a greater proportion of native steelhead genes. It is not known if the progeny of resident trout will ever be able to smolt and regain the anadromous life-style of their ancestors.

Projecting residential trout populations out across historically accessible reaches within the Ventura River basin, Los Padres National Forest lands could yield roughly 199,500 juvenile trout on the whole, or potentially enough smolts to support an adult steelhead run of approximately 2,800 (Chubb, 1997). A similar estimate of potential steelhead production (2,100 adult spawners) can be derived from the quantity and quality of spawning habitat, which could be made accessible to spawning steelhead within the Los Padres National Forest Service lands. These estimates are comparable to the historical projections of 2,000 to 3,000 steelhead in Matilija Creek (Clanton and Jarvis, 1946).

Habitat Quality – Migration. In a "normal" water year (15 to 40 inches of rainfall), there are adequate peak flows to allow steelhead and rainbow trout to migrate upstream to their spawning grounds if there are not barriers. Several successive winter storms would allow for multiple spawning migrations and would assist with the movements of steelhead smolts downstream to the ocean. However, an average of one out of five years is well below normal precipitation (less than 15 inches over the year), severely limiting steelhead spawning migrations and trapping smolts. Low flow barriers have a greater effect during the dry years, not only for limiting upstream spawning steelhead, but also for limiting movements of steelhead juveniles and wild resident trout into late summer refugia habitats.

Migrating steelhead can generally navigate upstream against flows up to six feet per second and leap over four- to six-foot heights (Evans and Johnston, 1972). Deep water (greater than half of the vertical jump) is necessary to gain the leaping momentum. Resting pools are necessary in long sections of high velocity flows. During low flows, boulder cascades, bedrock slides, and low gradient riffles may become barriers to upstream fish movement. Steelhead may become stranded on their upstream migration if flows rapidly decline. The presence of good deep pools is essential during this period, as fish may need to wait out the period between storms. Swimming and jumping abilities are size-dependant (Evans and Johnston, 1972), so only larger individuals may be able to reach the upper reach spawning beds.

Artificial barriers to steelhead migrations include Casitas Dam on Coyote Creek, the Robles Diversion Dam on the Ventura River, Matilija Dam on Matilija Creek, and Wheeler Gorge Campground road crossing on the North Fork. Removal of these barriers may provide opportunities to open up substantial additional areas of steelhead habitat. However, other natural barriers exist in the upper reaches of the main stem of Matilija Creek, Murrieta Creek, and Upper North Fork Matilija Creek (VCWPD, 2003).

Habitat Quality – Spawning. Steelhead use flowing reaches to spawn. They are not limited to perennial waters and may use intermittent reaches to avoid crowding and potential predators (Carroll, 1985; Everest, 1973). Riffles provide the predominant spawning habitat, although small gravel pockets associated with pool tails may also be utilized. Not all riffle habitat is good spawning habitat, however. Good spawning habitat should have a high percentage of gravels (greater than 20 percent), no more than 15 percent fine sediments, and channel morphology offering good oxygen and silt carrying velocities. Dominant particle sizes should be between 0.5 and 3 inches in diameter, the gravel patches should be at least 20 square feet in area, and cobble should extend no greater than 6 inches above the water surface (VCWPD, 2003).

Habitat Quality – Rearing. Soon after hatching, steelhead fry swim up through the gravel and disperse downstream into shallow slow water stream margins (Bisson et al., 1981). Low gradient riffles, runs, and glides provide the primary rearing habitat into the early summer. The quality of rearing habitat is largely determined by the continuation of water flow of moderate temperatures and the availability of cobble, boulders, and small woody debris for use as cover from predators and protection from high water velocities. Woody debris is important as a refuge from predators and high water velocities (VCWPD, 2003). Instream cover is in low abundance throughout much of the upper Ventura River Basin, but is better in the upper portions of Matilija Creek than downstream (VCWPD, 2003). Smaller sized wood is of importance to rearing juveniles, although it is still an uncommon element in this region.

2.1.2 Beach Sand Depletion in Ventura County

Flows and sediment transport from the Ventura River affect beaches east of the Ventura River estuary by providing sediment input to the Santa Barbara Littoral Cell, an alongshore flow pattern that delivers sediment along beaches in a west-to-east direction from Ellwood in Santa Barbara County to Point Magu in Ventura County (Appendix E). The main sources of natural sand supply are from cliff erosion and episodic delivery of sediment from the streams and rivers that discharge into the river periodically. Beaches in the Ventura region are becoming increasingly eroded due to lack of replenishment from input sources. The region from Emma Wood beach to Point Magu has a wider berm width than the eastern portion of the littoral cell, but is receiving increased erosion stress, leading to greater sand depletion and beach recession. The removal of the Matilija Dam presents a potential to not only return sediment inputs from the Ventura River closer to original levels, but also the opportunity to provide beach replenishment through the transport of sediment that has collected behind the dam (Appendix E).

In the last 80 years, fluvial sand supplies have been markedly reduced by dam construction, watershed improvements, and riverbed sand and gravel mining. In the Ventura River to Ventura Harbor sub-cell, sand delivery from the Ventura River and losses from Pierpont Bay beaches have been identified as the main sources of sediment (Appendix E).

The Comprehensive Sand Management Plan prepared for BEACON in 1989 estimated that the Ventura River produces 80,000 cubic yards (c.y.) of sediment per year between 0.125 to 0.7 mm in size, while beach erosion between Ventura River and the Ventura Harbor resulted in 200,000 c.y. of similar sized sediment lost per year. Current sediment yield estimates for that same size range indicate that only 48,400 c.y. per year are delivered to the ocean (Appendix E). The study by BEACON suggests that the Ventura River in 1989 was producing about 70 percent of its former natural yield. Therefore, a deficit of at least 35,000 c.y. per year may be attributed to dam construction and sand mining. Since 1970, the beaches have eroded at a rate of about 210,000 c.y. per year (Appendix E).

2.2 PROJECT OBJECTIVES

The primary planning objectives are specified as follows, based on a multi-agency consensus effort by the Corps (USACE, 2001):

- To improve aquatic and terrestrial habitat and access to habitat along Matilija Creek and the Ventura River to benefit fish and wildlife species, including the endangered southern California steelhead.

- Restore the hydrologic and sediment transport regime to support downstream coastal beach sand replenishment conditions.
- Enhance recreational opportunities along Matilija Creek and the downstream Ventura River system. It should be noted, the Corps is limited in their ability to participate in recreational opportunities, and recreation benefits do not influence project formulation.

2.3 STUDY AUTHORITY

2.3.1 Feasibility Phase Study Authority

The Corps prepared a Section 905(b) Reconnaissance Study as an initial response to the Resolution of the U.S. House of Representatives Committee on Transportation and Infrastructure (Docket 2593), adopted 15 April 1999, which read:

> Resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives, that the Secretary of the Army is requested to review the report of the Chief of Engineers on the Ventura River, Ventura County, California, published as House Document 323, 77th Congress, 1st Session, and other pertinent reports, with a view to determining whether any modifications of the recommendations contained therein are advisable at this time, in the interest of environmental restoration and protection, and related purposes, with particular attention to restoring anadromous fish populations on Matilija Creek and returning natural sand replenishment to Ventura and other southern California beaches.

The purpose of the reconnaissance phase study was to determine if there was a federal interest in participating in a cost-shared feasibility phase study to evaluate environmental restoration opportunities in the Ventura River in the vicinity of Matilija Dam, with particular attention to restoring anadromous fish populations on Matilija Creek and returning natural sand replenishment to Ventura and other southern California beaches. In response to the study authority, the reconnaissance study was initiated in February 2000. The reconnaissance study found that there was a federal interest; hence, the Corps initiated the Matilija Dam Ecosystem Restoration Feasibility Study.

2.3.2 Previous Environmental Studies

The following reports were reviewed by the Corps as part of the reconnaissance study. Other relevant studies have been cited throughout this EIS/EIR, as they pertain to specific issue areas.

- Matilija Dam Removal Appraisal Report, April 2000. A reconnaissance level investigation focusing on the feasibility of removing Matilija Dam, prepared by the U.S. Bureau of Reclamation (BOR). The major objectives of the study were to: 1) improve aquatic and terrestrial habitat along Matilija Creek and the Ventura River to benefit fish and wildlife species, particularly the endangered southern California steelhead; 2) restore the hydrologic and sediment transport regime to support downstream coastal beach sand replenishment conditions; and, 3) enhance recreational opportunities along Matilija Creek (including U.S. Forest Service land) and the downstream Ventura River system.
- Sediment Loads in the Ventura River Basin, Ventura County, California, 1969-81, dated 1988. Focused on the sediment transport in the Ventura River, from 1969 to 1981; prepared by the U.S. Geological Survey, in cooperation with the California Department of Boating and Waterways.
- Coastal Benefits and Impacts of Dismantling Matilija Dam, 2000. Prepared by James A. Bailard and published in the proceedings of the Sand Rights Conference. The report focused on the benefits of the sediment currently trapped behind the dam as beach nourishment, if the dam were removed.

- Report on the Reconnaissance Investigation, Ventura River Watershed, June 1964. Prepared for the Ojai Soil Conservation District by Boyle Engineering.
- Ventura River Steelhead Survey, 1997. Prepared by M. H. Capelli for the California Department of Fish and Game. The report focused on the existing steelhead migration and potential restoration in the Ventura River.
- Ventura Watershed Analysis, 1997. Prepared by S. Chubb for the Forest Service, Los Padres National Forest. The report focused on steelhead restoration.
- Ventura Marina Reconnaissance Report, 1986. Prepared by the U.S. Army Corps of Engineers, Los Angeles District. The report recommended improvements and modifications to navigation facilities in the Ventura Harbor to reduce maintenance dredging.
- Survey Report for Beach Erosion Control, Ventura County, California, 1980. Prepared by the U.S. Army Corps of Engineers, Los Angeles District.
- Planning Aid Memorandum for the Proposed Matilija Dam Removal Project Appraisal Study, Ventura County, California, 2000. Prepared by the U.S. Fish & Wildlife Service (USFWS) for the BOR's Appraisal Study. The report focused on four topics: (1) existing fish and wildlife resources data for the study area from various sources, (2) Ventura River watershed wildlife, vegetation and habitats, (3) special status species, and (4) comments from other agencies.
- Matilija Dam Decommissioning Appraisal Report Supplement and Preliminary Evaluation of Environmental Impacts, April 2000. Prepared by the U.S. Army Corps of Engineers, Los Angeles District, as a supplement to the BOR's Appraisal Report. The report is located in Appendix G of the BOR's Appraisal Report.

2.4 INTENDED USES OF THE EIS/EIR AND OTHER PUBLIC AGENCY ACTIONS

This EIS/EIR is intended to satisfy the environmental review requirements for the Proposed Action pursuant to the requirements of NEPA and CEQA. Corps and VCWPD decision makers will consider the information contained in the Final EIS/EIR before taking any action to approve the Proposed Action. In addition to these approvals, the Proposed Action would be subject to the agency permits and approvals listed in Table 2-1. The Final EIS/EIR is intended to provide NEPA/CEQA review for all required permits and approvals needed to construct, operate, and maintain the Proposed Action. Compliance with applicable laws, regulations, and executive orders is summarized in Section 5.12.

Table 2-1: Required Permits and Approvals

Agency	Permit/Approval Needed	Legal Citation
California Department of Fish and Game	Streambed Alteration Agreement	Section 1602 of the California Fish and Game Code (§§ 1600 to 1607)
U.S. Fish and Wildlife Service	Biological Opinion	Section 7 of the Endangered Species Act of 1973, as Amended (16 U.S.C. 1531 et seq.)
National Marine Fisheries Service	Biological Opinion	Section 7 of the Endangered Species Act of 1973, as Amended (16 U.S.C. 1531 et seq.)
Regional Water Quality Control Board	NPDES General Construction Activity Stormwater Permit	Section 402 of the Clean Water Act of 1977, as amended (33 U.S.C. 1342 et seq.)
	NPDES permit for Groundwater Discharges Associated with Construction Activity	
	State Water Quality Certification	Section 401 of the Clean Water Act of 1977, as amended (33 U.S.C. 1341)
	Waste Discharge Requirements	Porter-Cologne Water Quality Control Act (Water Code 13260-13274)
California Coastal Commission	Coastal Consistency Determination	Coastal Zone Management Act (16 U.S.C. Sections 1451 et seq.) and California Coastal Act (California Public Resources Code, Division 20, Section 30000 et seq.)
U.S. Army Corps of Engineers, Regulatory Branch	Water Quality Evaluation and Compliance Determination (Future Maintenance)	Section 404(b) (1) of the Clean Water Act of 1977, as amended (33 U.S.C. 1251 et seq.)

Five alternatives have been proposed for the Matilija Dam Ecosystem Restoration Project, including the No Action Alternative and four main alternatives. Of the four action alternatives, three have two sub-alternatives that have been considered for this EIS/EIR. The following lists the alternatives with their associated sub-alternatives:

- No Action Alternative
- Alternative 1 – Full Dam Removal/Mechanical Sediment Transport - Dispose of Fines, Sell Aggregate
- Alternative 2 – Full Dam Removal/Natural Sediment Transport
  - Alternative 2a – Slurry “Reservoir Area” Fines Off Site
  - Alternative 2b – Natural Transport of “Reservoir Fines”
- Alternative 3 – Incremental Dam Removal/Natural Sediment Transport
  - Alternative 3a – Slurry “Reservoir Area” Fines Off Site
  - Alternative 3b – Natural Transport of “Reservoir Fines”
- Alternative 4 – Full Dam Removal/Long-Term Sediment Transport
  - Alternative 4a – Long-Term Transport Period
  - Alternative 4b – Short-Term Transport Period

3.1 OVERVIEW OF ALTERNATIVES

As described in Section 2.3, several project objectives have been set forth to be accomplished by the Proposed Action. To meet these objectives, a wide range of project features has been considered. Features were considered and combined in different manners before being screened. Multiple iterations of alternative screenings were conducted to develop and refine the remaining alternatives presented in this section. As all of the alternatives have the same set of objectives, some project features are shared by all of the alternatives and other features, though having analogous roles, perform their functions in different ways. To achieve the objectives described in Section 2.3, each of the action alternatives include the following project activities:

- Removal of Matilija Dam;
- Removal of material from behind the dam;
- Implementation of downstream flood protection;
- Removal of giant reed beginning in Reaches 7, 8, and 9, then continuing with eradication activities downstream;
- Modification of downstream water supply facilities to maintain water quantity and quality;
- Revegetation and restoration.

The following describes methodologies for these project activities that are common to all of the alternatives presented.

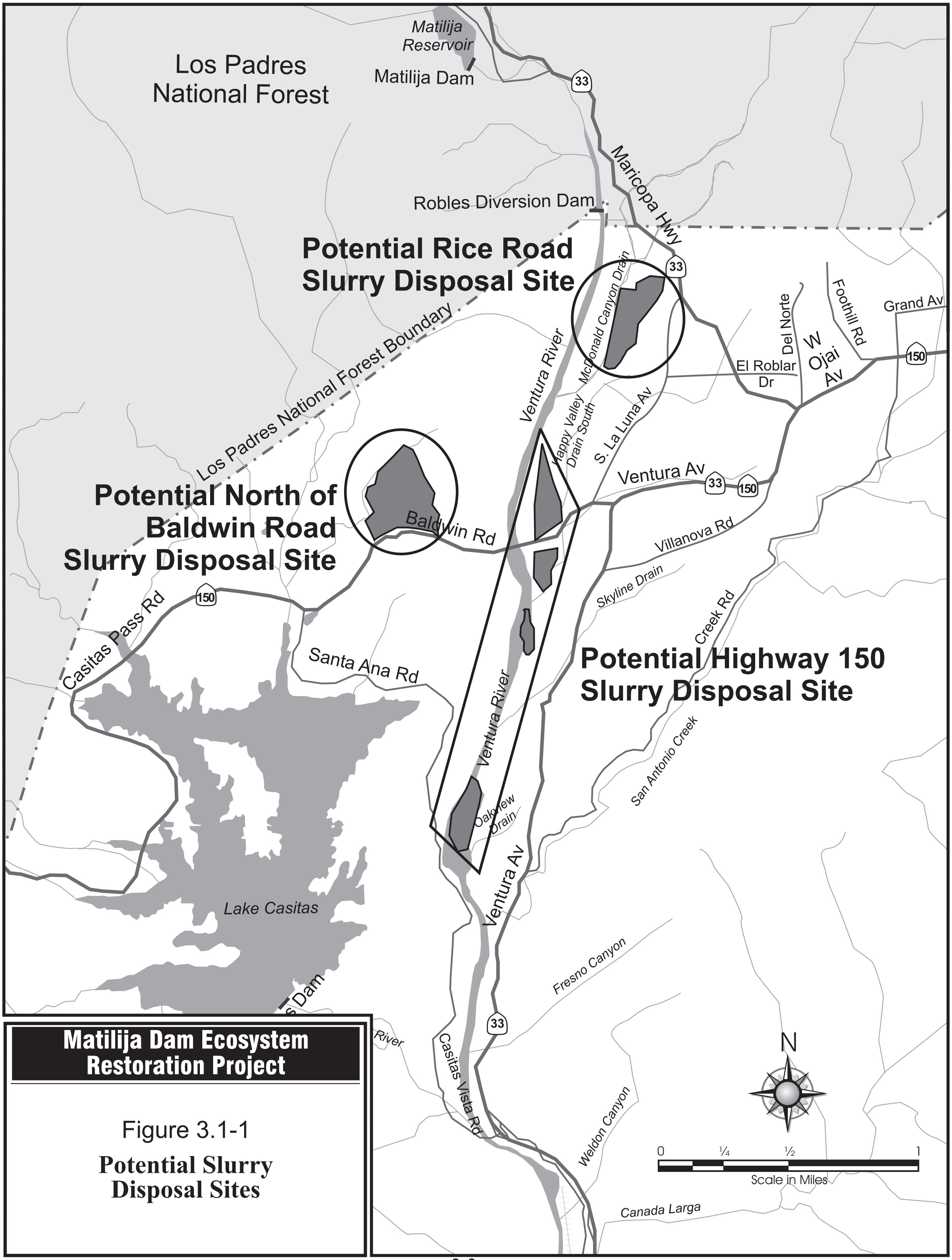
Removal of Matilija Dam. A central feature of all of the action alternatives is the removal of Matilija Dam, which would enhance aquatic and terrestrial habitat and access to habitat along Matilija Creek and the Ventura River and restore a more natural hydrologic and sediment transport regime for the Ventura River. Controlled blasting would allow the removal of the dam in a relatively short period of time. Excavation of sediments behind the dam would be necessary to access the back face of the dam for removal operations, making the duration of the dam removal dependent on the removal of the sediments behind the dam. Because sediment removal activities vary by alternative, the time required for dam removal also varies under each alternative. The dam would be removed in 15-foot increments by placing explosives at proper distances along horizontal plains of the dam face. Most of the dam would be removed in 11 of these 15-foot increments. Removal of the dam abutment would require additional blasting. After blasting, the concrete blocks would be prepared for hauling with a hoe-ram, broken to a maximum diameter of two feet with all reinforcement cut flush with the concrete. Disposal of the concrete depends on the alternative; methods include hauling off site for recycling, crushing for reuse and sale as aggregate, use as riprap slope protection in the project, and burial in fill sites within Matilija Canyon.

Removal of sediment behind Matilija Dam. Reservoir area sediments would be removed from behind the dam using cutter head suction dredges (in Alternatives 1, 2a, 3a, 4a, and 4b) or clamshell dredges (in Alternatives 2b and 3b). Sediment would then be excavated to construct a pilot channel, no greater than ten feet deep, to initially convey flows through the reservoir basin. The material excavated for the pilot channel differs greatly from alternative to alternative, both in its quantity as well as how it is disposed and stabilized.

For Alternatives 1, 2a, 3a, 4a, and 4b. Sediment removal using the suction dredges would require two 12-inch cutter head suction dredges working 24 hours a day, seven days a week for approximately nine months to slurry the material to a downstream disposal site. An eight-mile long carbon steel pipeline and pumping system would be constructed to convey fresh water from Lake Casitas (4,500-acre feet to) to be used as a slurry media. A 90,000-gallon fresh water storage tank would be placed on the left dam abutment to provide surge capacity. The slurry pipeline would be constructed of high-density polyethylene and would run from the reservoir area to the 94-acre disposal site off of Rice Road, approximately 0.5 mile downstream of the Robles Diversion. The slurry would pass through a stationary screen to eliminate coarse material and then would enter a thickener. The thickener would serve to increase the solids concentration of the slurry and recycle water for the dredging operations, where a pump would send this water back to the dredges. A make-up water pump would be required to pump water back to the dredges. A single 400-horsepower pump would maintain slurry velocity in the pipeline.

The slurry would then be transported via a high-density polyethylene (HDPE) pipeline to a disposal site. A pump would be required at the dam to maintain slurry velocity in the pipeline. Additionally, an eight mile-long carbon steel fresh water pipeline and pumping system would be needed from Lake Casitas. A water storage tank would also be required to provide surge capacity. The thickener overflow could be fed directly into the storage tank if sufficient elevation difference between the thickener and storage tank was available.

As shown in Figure 3.1-1, three potential sites downstream of the Matilija Dam have been selected as being feasible locations to dispose of the slurried material:



Matilija Dam Ecosystem Restoration Project

Figure 3.1-1

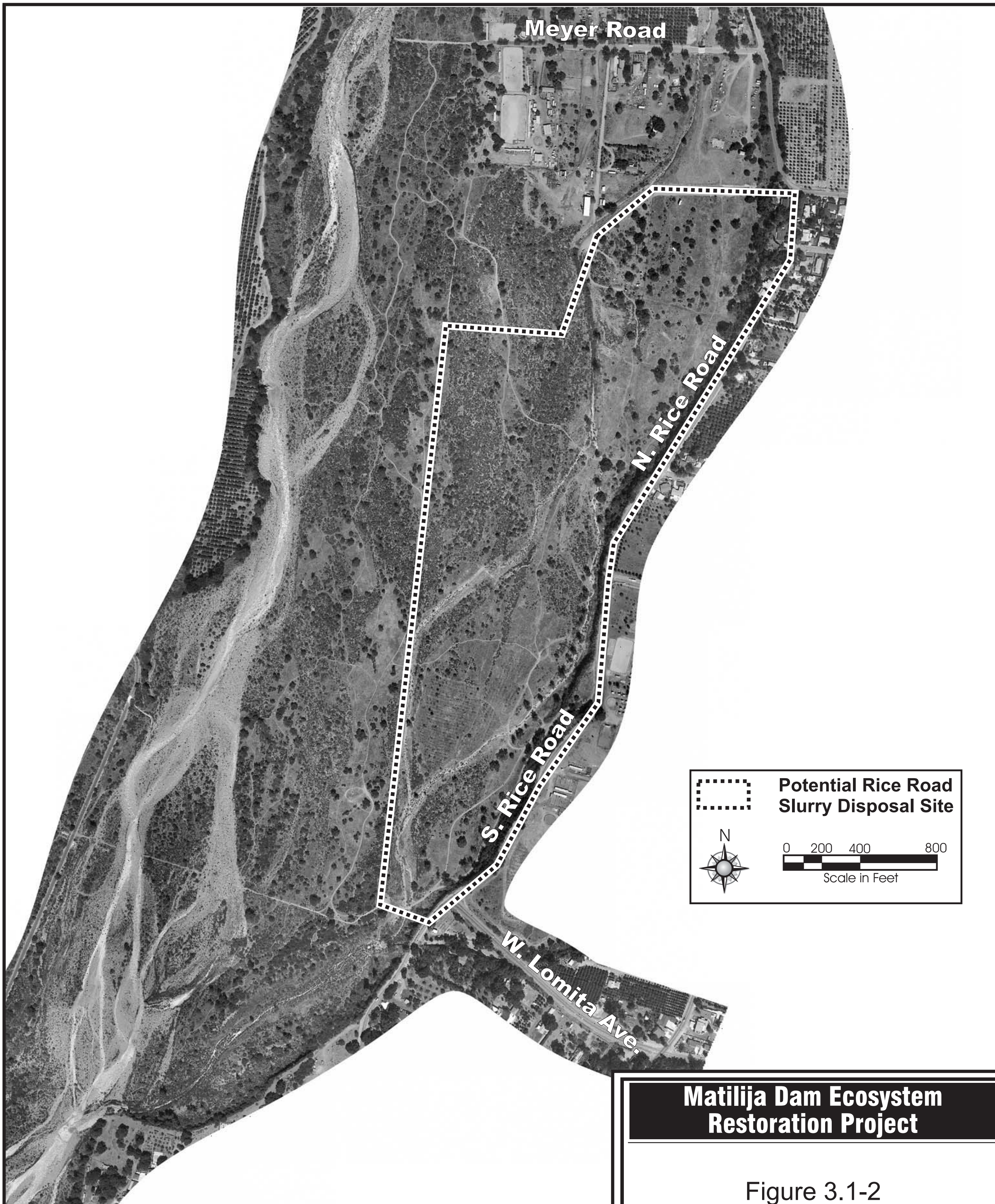
Potential Slurry Disposal Sites

- Rice Road: Figure 3.1-2 shows the 90-acre Rice Road slurry disposal site's location approximately 2.5 miles downstream of the Matilija Dam on the east side of the river, downstream of Robles Diversion. Located at the bottom of a 60-foot cliff in the Ventura River floodway, approximately 5,000 feet of earth levee 15 feet high would need to be constructed along the Ventura River. The average depth of the stockpile at this location would be 15 feet, which would be suitable for slurry operations and de-watering.
- Highway 150: The Highway 150 slurry disposal area, as shown in Figure 3.1-3, consists of four non-contiguous sites totaling approximately 118 acres and would range from 3.6 to 6.3 miles downstream of Matilija Dam. One sub-site, measuring 50 acres, would be located immediately upstream of the Highway 150 bridge. The three remaining sub-sites would all be located downstream of the Highway 150 bridge. The second sub-site would be immediately downstream of the Highway 150 bridge and be 25 acres. The first two sub-sites would be built against the side of the floodplain and armored to resist 2- to 5-year interval storm events. The third sub-site would be located approximately 0.5 mile downstream of the Highway 150 bridge, be 11 acres, be constructed in the middle of the floodplain, and also need to be armored to resist flooding. The fourth sub-site would be 36 acres and be approximately 1,000 feet downstream of the Santa Ana Bridge. This sub-site would be built in an open space area. Dikes ranging from 6 to 15 feet in height would be constructed for all sub-sites to contain the slurried materials.
- North of Baldwin Road: The North of Baldwin Road site, as shown in Figure 3.1-4, be located 3.6 miles downstream of the Matilija Dam, to the west of the Ventura River, north of Baldwin Road. Approximately 95 acres of this 200 acre parcel would be used for slurry disposal.

Of these three disposal areas, only one would be chosen for use as the disposal site. As a decision has not yet been reached on which disposal site would be used for the project, all three disposal areas are analyzed in this document. Regardless of which site is chosen, construction and operation of the disposal site would be similar. The dikes for containing the slurried materials would be constructed of sands and gravels excavated from the site and compacted. Slopes on the interior of the disposal basin would be compacted to a 2H:1V (horizontal:vertical) ratio and slopes on the outside of the dike walls would be 4H:1V and would be stabilized with willows and native vegetation. Interior dikes within the disposal basin would be constructed during slurry operations to enhance stability and separate fines from the water. Prior to slurry operations, the area would be cleared of vegetation to enhance percolation. Additional engineered details (such as collection systems, settlement ponds, observation and pumping wells) could be added to enhance collection of water and return it to Lake Casitas. Slurried materials would be an average of 15 feet thick once placed in the disposal basin.

For Alternatives 2b and 3b. Sediments behind the dam would be removed using clamshell dredges, requiring four months of dredging. Approximately 0.5 million cubic yards of dredged sediment would be stockpiled upstream within the basin and allowed to be naturally eroded by fluvial processes with the other trapped sediment.

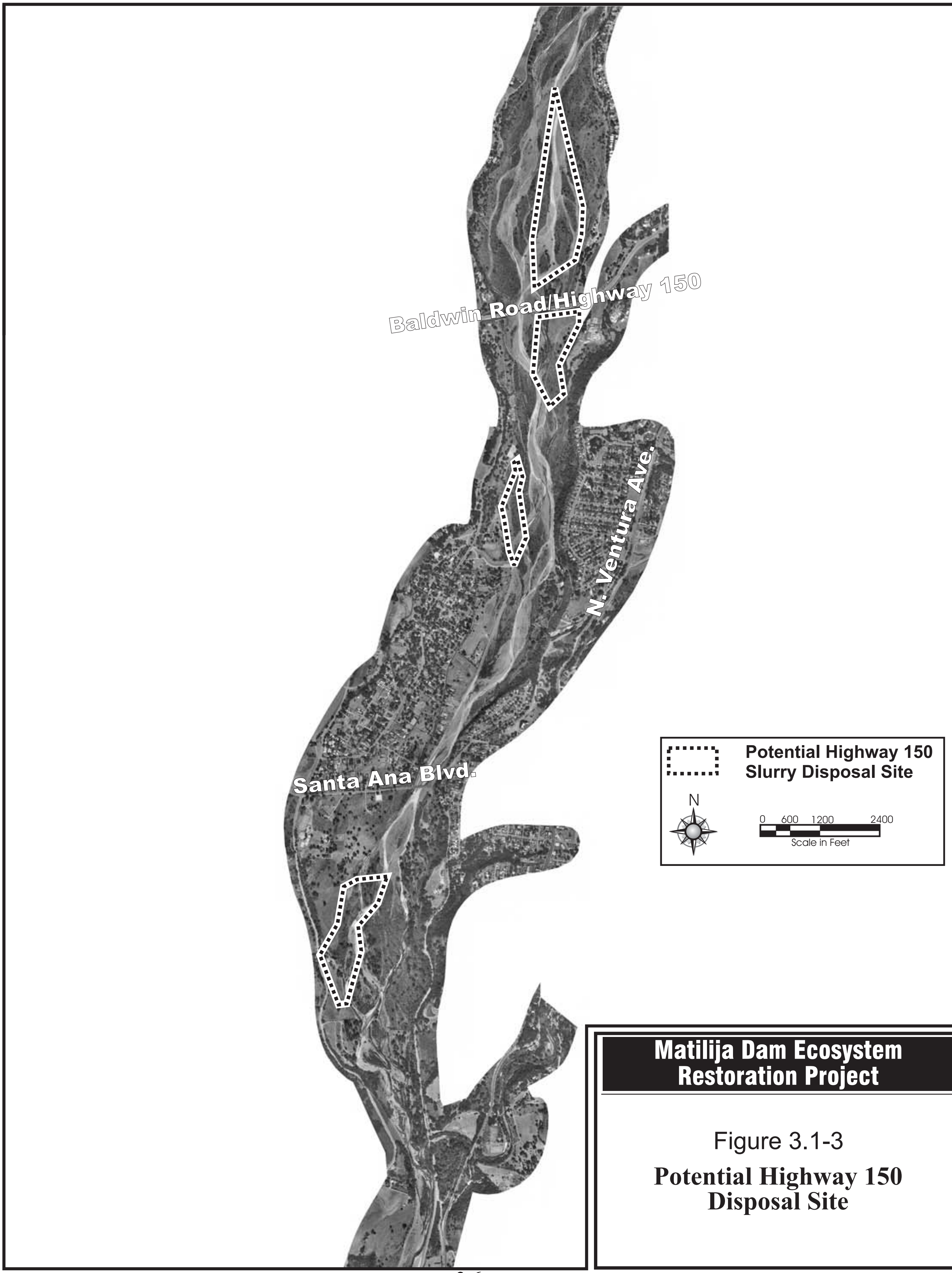
Implementation of downstream flood protection. Since there is some increased risk to downstream flooding with the removal of the dam and movement of sediment behind the dam downstream, flood protection measures have been developed for the proposed action. These measures include modifications to all the existing levees, modifications or replacement of bridges, and the acquisition of some properties. Improvements were based on offering a 100-year level of protection even though there is currently not a 100-year level of protection within the existing levees. Because of the differing risk involved in the release of sediments under different alternatives, two different levels of improvements have been proposed: a "high level" and "low level."



Matilija Dam Ecosystem Restoration Project

Figure 3.1-2

Potential Rice Road Slurry Disposal Site



Matilija Dam Ecosystem Restoration Project

Figure 3.1-3

Potential Highway 150 Disposal Site

Matilija Dam Ecosystem Restoration Project

Figure 3.1-4

Potential North of Baldwin Road Disposal Site

Both the high and low levels of flood control protection would include the purchase and removal of the Matilija Hot Springs retreat facility, two houses at Camino Cielo, and nine cabins at Camino Cielo. The Camino Cielo Bridge would also need to be removed.

Under both levels of flood control protection, the Santa Ana Road Bridge would need to be replaced with a higher structure to allow 100-year flood flows to pass underneath. The Santa Ana Road Bridge would be completely closed during bridge replacement activities, which would occur between June and October. As the riverbed is generally dry during this season, a temporary road over the Ventura River is proposed to maintain traffic capacity. The road would cross the riverbed approximately 250 feet downstream of the existing bridge on an elevated roadway built with four 60-inch culverts to convey low flows (see Figure 3.1-5). During normal dry season conditions, traffic would be detoured to the temporary road and the speed limit would be established to account for the relatively small radius curves required for the temporary roadway. The temporary road would be equipped with gates and warning signs to close the road in case of a storm event. The temporary road and riprap protected side slopes would be designed to allow flow to occur over the road during such an event. Traffic would be detoured to Highway 150 during any closures.

Material required for construction and modification of levees, estimated to be a maximum of 200,000 cubic yards of material, would be excavated and brought from the reservoir area to the levees or levee construction sites. Additional riprap stone protection would be placed on any new or modified levees.

For Alternatives 1 and 4a – Low Level Flood Protection. Because of the sediment removal/stabilization methods used in Alternatives 1 and 4a, the low level downstream flood protection would be required as a part of the project. Under these alternatives, new levees and floodwalls would be constructed at Meiners Oaks and the Robles Diversion as well as Camino Cielo, and the Live Oaks and Casitas levees would be raised and floodwalls would be added at these locations. Levees and floodwalls at these locations would be constructed to the following heights:

- SR 33 Camino Cielo Protection – Floodwall 0.1 to 6.6 feet
- Meiners Oaks, Robles Diversion – Levee 0.0 to 1.4 feet, Floodwall 1.4 to 12.0 feet, Levee 12.0 to 5.1 feet
- Live Oaks – Floodwall 0.0 to 6.8 feet
- Casitas Springs – Levee 6.7 to 5.5 feet, Floodwall 5.5 to 7.4 feet, Levee 7.4 to 1.2 feet
- Canada Larga – Levee to 3.0 feet.

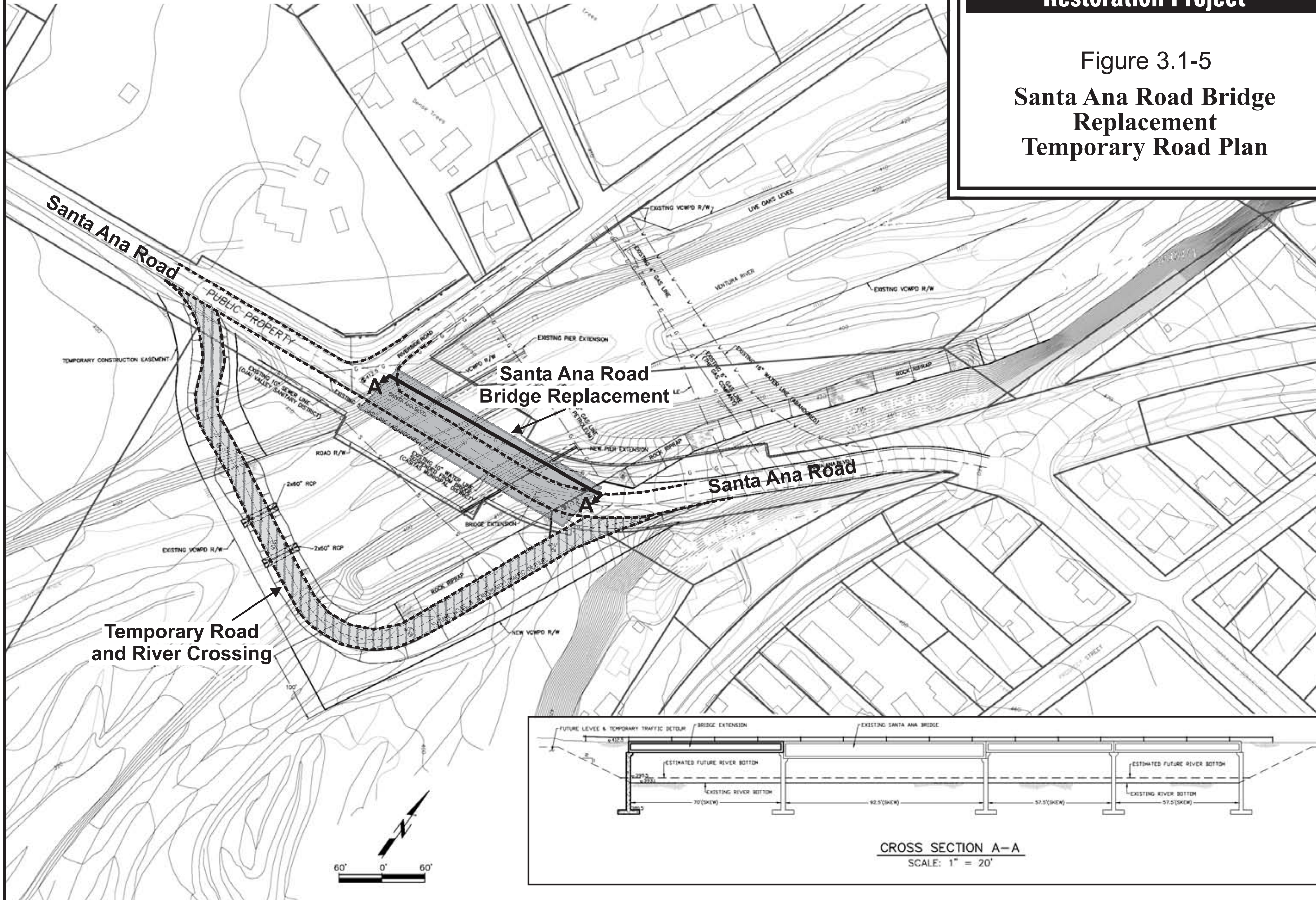
For Alternatives 2a, 2b, 3a, 3b, and 4b – High Level Flood Protection. High-level flood protection for Alternatives 2a, 2b, 3a, 3b, and 4b would require the construction of new levees and floodwalls at Meiners Oaks and the Robles Diversion, Camino Cielo, and Cañada Larga. Levees and floodwalls would be modified at Live Oaks and Casitas. Levees and floodwalls at these locations would be constructed to the following heights:

- SR 33 Camino Cielo Protection – Floodwall 4.1 to 10.6 feet
- Meiners Oaks, Robles Diversion – Levee 0.0 to 6.4 feet, Floodwall 6.4 to 17.0 feet, Levee 17.0 to 10.1 feet

Matilija Dam Ecosystem Restoration Project

Figure 3.1-5

Santa Ana Road Bridge Replacement Temporary Road Plan



- Live Oaks – Levee 5.2 to 4.3 feet, Floodwall 4.2 to 12.8 feet
- Casitas Springs – Levee 12.7 to 11.5 feet, Floodwall 11.5 to 13.4 feet, Levee 13.4 to 7.2 feet.

Removal of giant reed. Giant reed eradication activities would extend upstream beyond the influence of the reservoir limits into Reaches 8 and 9, through the reservoir and dam area in Reach 7, then along the Ventura River from Reach 6 consecutively through the other reaches downstream through Reach 1. Since giant reed propagules are transported fluvially from upstream areas to infest areas downstream; eradication efforts would need to start in the uppermost reaches and work downstream. Eradication activities in Reaches 7, 8, and 9 would be completed prior to the commencement of dam removal and reservoir material excavation. Giant reed removal would be accomplished with the use of a flail mower. The biomass would then be removed, chipped, and dried. An EPA-approved foliar herbicide with a high concentration of glyphosate or similar compound, such as Rodeo™, would be sprayed over the cut areas. Periodic follow-up treatment would be required for at least five years, and additional monitoring and eradication efforts would be necessary throughout the life of the project to prevent re-establishment. A watershed-wide giant reed management plan would need to be in place to control giant reed in areas adjacent to the 100-year floodplain and along Ventura River tributaries not included in the study area, such as Coyote and San Antonio Creeks.

Modification of downstream water supply facilities to maintain water quantity and quality. With all of the alternatives increasing sediment moving downstream, Casitas Municipal Water District facilities at Robles and City of Ventura water supply facilities at Foster Park would require modifications to help control water quality impacts caused by the sediments. Modifications to Robles Diversion Dam would include an expansion of the sediment debris basin, installation of radial gate sediment bypass structures in the dam, and construction of a desilting basin contributed by the local sponsor as an improvement. Water diversion operations from Robles to Lake Casitas could be interrupted for up to a year if more than 40,000 cy of sediment deposits in Robles sediment basin. Under Alternatives 2b and 3b, approximately 48,000 acre-feet of water would need to be procured to replace missed water diversions caused by sediment blocking water diversion. At Foster Park, two wells would be drilled to make up for expected shutdowns in City of Ventura diversion operations, which could more than triple for the first one to three years following dam removal.

Each of the alternatives and sub-alternatives are described in the sections that follow.

3.2 THE NO ACTION ALTERNATIVE (FUTURE WITHOUT-PROJECT)

Under the No Action Alternative, neither the Corps nor the VCWPD would initiate any action to restore the Matilija Creek riverine ecosystem, including removal of Matilija Dam. By 2020, Matilija Reservoir is expected to have less than 50 acre-feet of water storage capacity due to sedimentation. An estimated additional 3,500,000 cubic yards of sediment, beyond what currently is trapped, could continue to accumulate in the reaches behind Matilija Dam, leading to further alteration of upstream habitat and channel areas. As the structure becomes less efficient in trapping material during storm events, more sediment will pass over the dam eventually being deposited along the mainstem of the Ventura River and then carried by river flows to the coast.

Because Matilija Dam would stay in place under the No Action Alternative, the dam would continue to block upstream passage for steelhead, denying them access to spawning areas in upper Matilija Creek and its tributaries, which comprises up to 50 percent of the steelhead's prime spawning habitat in the Ventura River system (Moore, 1980). In addition, the dam would continue to act as a barrier for wildlife movement for other terrestrial and aquatic species.

At an unspecified future date, probably at least 50 years from now, Matilija Dam would need to be demolished due to age and structural deterioration. At that time, methods for removal of the sediment behind the dam would need to be investigated.

3.3 ALTERNATIVE 1 – FULL DAM REMOVAL/MECHANICAL SEDIMENT TRANSPORT - DISPOSE OF FINES, SELL AGGREGATE

For Alternative 1, the majority of the sediment behind the dam would be removed mechanically with the majority of fines being slurried to a disposal area off site and the remainder disposed of at the Toland Road Landfill. Commercially marketable material would be sold as aggregate. Alternative 1 is designed to fully remove the dam in one continuous process while roughly 2.1 million cubic yards of fine sediments are excavated and slurried to one of the three potential disposal sites. Of the remaining 3.8 million cubic yards of sediment, 3.0 million cubic yards of sand and gravel would be stockpiled upstream of the reservoir area on the east side of the channel and sold from the site for use as aggregate. Residual fine sediment (770,000 cubic yards) would be trucked to the slurry disposal area. Concrete rubble from the dam would be crushed and sold as aggregate. Metal debris would be hauled from the site and salvaged. Non-recyclable debris would be sent to the Toland Road Landfill. Potentially, the dam could be deconstructed in a single season.

Steps to complete the full dam removal process would include: (1) constructing low level downstream flood protection measures; (2) removing fine material against the dam by sluicing material through low-level outlets during high flows (greater than 400 cfs), which generally occur in the winter months when the river flows, and/or dredging by either mechanical or hydraulic means; (3) constructing a temporary diversion for low flows; (4) removing the entire dam; (5) regrading sediments and constructing a low flow channel through the sediments; (6) waiting for a substantial flow; and (7) monitoring downstream impacts during and after a substantial flow.

As described above in Section 3.1, Overview of Alternatives, Alternative 1 would require the low level flood control measures and modification of downstream water supply facilities. During slurry operation, the reservoir basin would be stripped of all vegetation and giant reed. Material behind the dam would be excavated and slurried to one of the three proposed disposal sites.

The approximate time to process and sell the marketable materials is ten years. The material would be marketed and sold throughout Ventura County and southern Santa Barbara County from behind the dam, thereby reducing the need to import material from other regions. Aggregate purchasers would buy directly from the site. Truck routes have been identified along major state and local roads. The anticipated truck routes are Highway 33 – Highway 101 – local roads, and/or Highway 33 – Highway 150 – Highway 126 – local roads. Thus, the radius of influence for anticipated truck routes would be throughout Ventura County and southern Santa Barbara County communities.

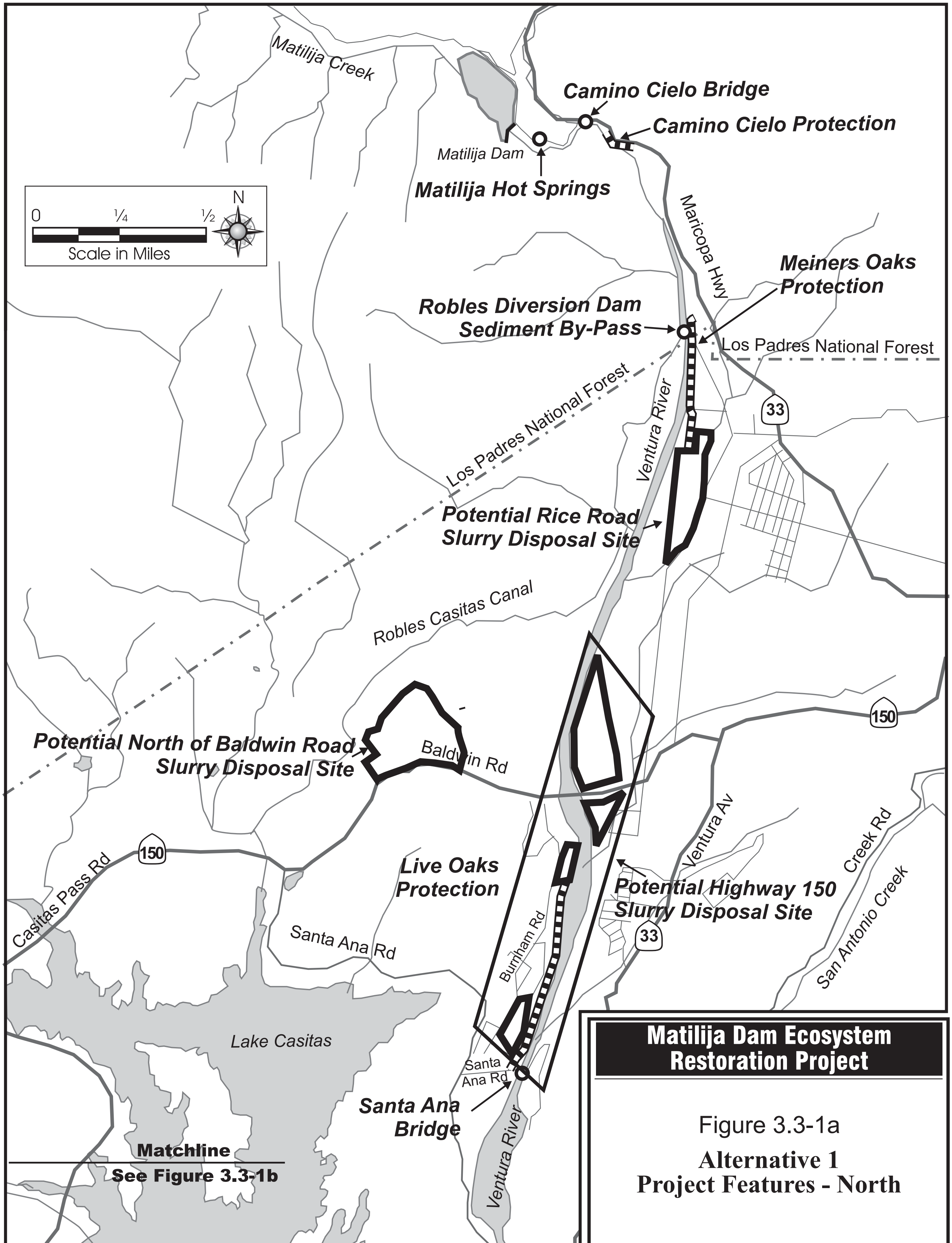
A 60-foot wide channel with 3:1 (horizontal to vertical) side slopes would be excavated to convey flows through the reservoir basin. The alignment of the channel would be excavated along the southern side of the reservoir as adjacent as feasible to the canyon wall. The channel's streambed elevation would be similar to the pre-dam elevation, but would be straighter and slightly steeper. Aggregate would be stockpiled on the northern side of the reservoir basin for sale activities. A soil cement revetment, constructed utilizing on-site aggregate and extending 13 feet above the channel invert and 5 feet below, would be constructed to protect sand and gravel operation during 100-year storm events. This revetment would be a temporary structure, which would be removed and recycled following completion of the aggregate sale operation. After the removal of this structure, the channel alignment and configuration would be allowed to move freely within the reservoir basin.

Graded areas, including the slurry disposal area, would be re-vegetated with locally native stock or sterile annual grasses to control erosion.

Dam removal and slurry operations would require approximately two years to complete, but sale of the aggregate material is assumed to take approximately ten years. Table 3-1 summarizes the components of Alternative 1. Figures 3.3-1a and 3.3-1b show the project components associated with Alternative 1.

Table 3-1: Alternative 1 – Full Dam Removal/Mechanical Sediment Transport: Dispose of Fines, Sell Aggregate

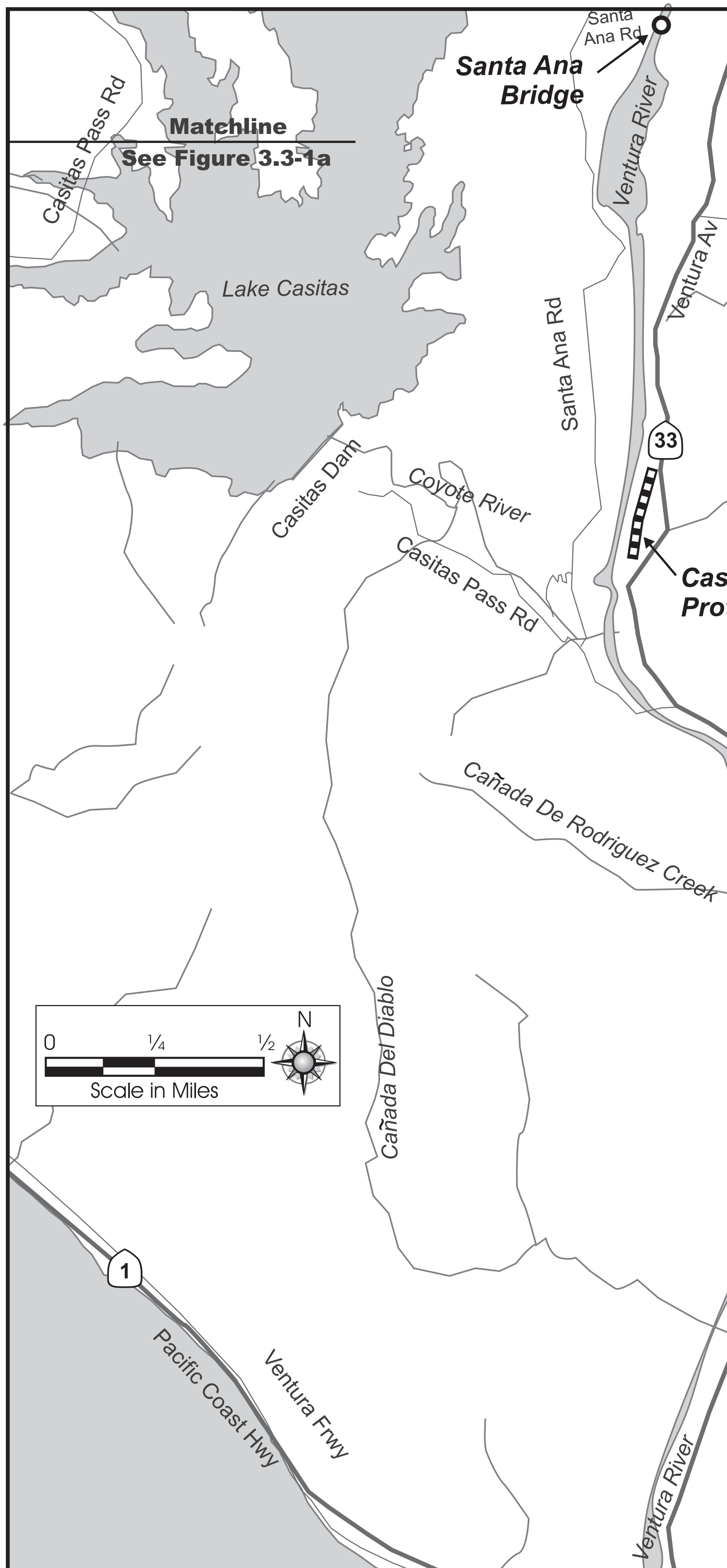
Components		Details
Dam Removal	Process	Full
	Time Required	12 months
Reservoir Area Fine Sediment Removal	Amount Excavated	2.1 million c.y. (770,000 c.y. more following aggregate extraction)
	Method of Transport	Slurry (2.1 million c.y.), Truck (770,000)
	Length of Transport Period	9 months
Coarse Sediment Removal	Amount Excavated	3.8 million c.y.
	Method of Transport	Truck (3.0 million c.y.)
	Number of Truck Trips	Approx. 135,000
	Length of Transport Period	10 years (truck); Dependent on Hydrology (natural)
	Sale of Aggregate	Yes (3.0 million c.y.)
Downstream Improvements	Matilija Hot Springs	Purchase and Vacate Structures at Complex
	Camino Cielo Structures (11)	Purchase and Remove 2 Houses and 9 Cabins
	Camino Cielo Bridge	Remove Bridge and Restore Channel Section. Construct New Bridge
	Meiners Oaks, Robles Levee, Floodwall/Levee	Add Levee/Floodwall Along East Bank. Levee: 2.8 ft. avg., Floodwall: 2.8 ft avg., Levee: 2.8 ft. avg., Floodproof Robles
	Live Oaks, Levee/Floodwall	Raise Existing (West) Levee: 2.0 ft. avg.
	Santa Ana Bridge	Widen channel and extend bridge
	Casitas Springs, Levee/Floodwall/Levee	Increase Existing (East) Levee Height. Levee: 2.4 ft. avg., Floodwall: 2.4 ft. avg., Levee 2.4 ft. avg.
Other	Slurry Disposal	Yes
	Land Acquisition	Yes
	Sediment Stabilization	No
	Exotic Species Removal	Yes
	Revegetation and Clean-up	Yes
Habitat Value	Total Average Annual Habitat Units	609



Matilija Dam Ecosystem Restoration Project

Figure 3.3-1a

Alternative 1
Project Features - North



Matilija Dam Ecosystem Restoration Project

Figure 3.3-1b

Alternative 1
Project Features - South

3.4 ALTERNATIVE 2 – FULL DAM REMOVAL/NATURAL SEDIMENT TRANSPORT

Alternative 2 is designed to fully remove the dam in one continuous process and allow removal of sediment using river hydraulic forces to move trapped sediment to locations more suitable for natural river functions, thereby reducing cost and impacts associated with mechanical means of relocating sediment. Dam removal techniques would determine to some extent how the sediment is released from the reservoir. Water levels can be lowered prior to full dam removal through a low-level outlet or water levels can be set by the dam elevation during the removal process. In either case, work would be conducted continuously until the dam is removed. Concrete rubble from the dam would be processed for transportation and transported to Hanson Aggregates. Non-recyclable debris would be sent to the Toland Road Landfill. Downstream sediment concentrations would be controlled only by river flow. The advantages of the removing the dam in one continuous process would be speed of removal and overall cost. Potentially, the dam could be deconstructed in a single season.

Steps to complete the full dam removal process would include: (1) constructing downstream flood protection measures; (2) removing fine material against the dam by sluicing material through low-level outlets during high flows (greater than 400 cfs), which generally occur in the winter months when the river flows, and/or dredging by either mechanical or hydraulic means; (3) constructing a temporary diversion for low flows; (4) removing the entire dam; (5) regrading sediments and constructing a low flow channel through the sediments; (6) waiting for a substantial flow; and (7) monitoring downstream impacts during and after a substantial flow.

Within Alternative 2, there are two major sub-alternatives, which differ in how fine sediments are transported. In Alternative 2a (Slurry “Reservoir Area” Fines Off Site), the 2.1 million cubic yards of fine sediment in the reservoir area would be excavated and slurried to an off-site disposal area. In Alternative 2b (Natural Transport of “Reservoir Fines”), approximately 0.5 million cubic yards of material immediately behind the dam is excavated and stockpiled upstream. All sediment is then eroded by storms and naturally transported downstream. Both sub-alternatives would require the high level flood control protection as described in Section 3.1, above. Graded areas, including the slurry disposal area, would be re-vegetated with locally native stock or sterile annual grasses to control erosion. The two sub-alternatives are described in greater detail below.

3.4.1 Alternative 2a – Full Dam Removal/Natural Sediment Transport - Slurry “Reservoir Area” Fines Off Site

The site behind the dam would be stripped of vegetation and giant reed as described in Section 3.1. Alternative 2a calls for two suction dredges to work 24 hours a day, seven days a week to slurry 2.1 million cubic yards of fine sediment from behind the dam to one of the three potential disposal sites downstream over the course of nine months. A small pilot channel, no greater than 10 feet deep, would be excavated to initially convey flows through the reservoir basin. The excavated material would be processed and slurried to one of the downstream disposal sites, as described in Section 3.1.

The remaining 3.8 million cubic yards of sediment trapped behind the dam would be allowed to erode within the original reservoir limits. Although the remaining sediment would be stockpiled in the excavated reservoir area of the dam, Alternative 2a does not include any additional landscaping, stabilization, or armoring for the stockpiled sediment. Leaving the stockpiles unarmored would allow the sediment to be carried downstream in storm events of any size and would not restrict this erosion to occur only during storm events greater than a certain intensity. It is expected that storm flows would eventually return the Matilija Canyon area to a more-natural condition resembling the pre-dam contours of the canyon.

Alternative 2a also includes a desilting basin, requiring between 11 and 14 acres of land, located on one of two identified sites within approximately 0.5 mile of Robles Diversion. The desilting basin, an off-line structure to the Robles-Casitas canal, functions by allowing diverted flows from the Ventura River to settle out fine sediment (silts, clays) prior to conveyance of the flows via the canal to Lake Casitas. The intake structure to the canal would be modified and canal waters would be diverted through the desilting basin, reducing the velocity of the flows and allowing the fines to settle in the basin. The proposed basin would require excavation and levee construction to contain the diverted flows. To prevent infiltration losses, a geofabric liner would be installed. Fine sediment would be settled out by the addition of a flocculating polymer. The resulting sludge would require periodic removal and disposal to a nearby storage site.

Although it is unknown how long it would take for this sediment to be moved downstream out of the canyon, it is anticipated that the majority of the sediment would be scoured from the canyon in two- to five-year storm events. The expected duration for dam removal and slurry activities under Alternative 2a is two years. Table 3-2 summarizes the components of Alternative 2a. Figures 3.4-1a and 3.4-1b show the project components associated with Alternative 2a.

3.4.2 Alternative 2b – Full Dam Removal/Natural Sediment Transport - Natural Transport of "Reservoir Fines"

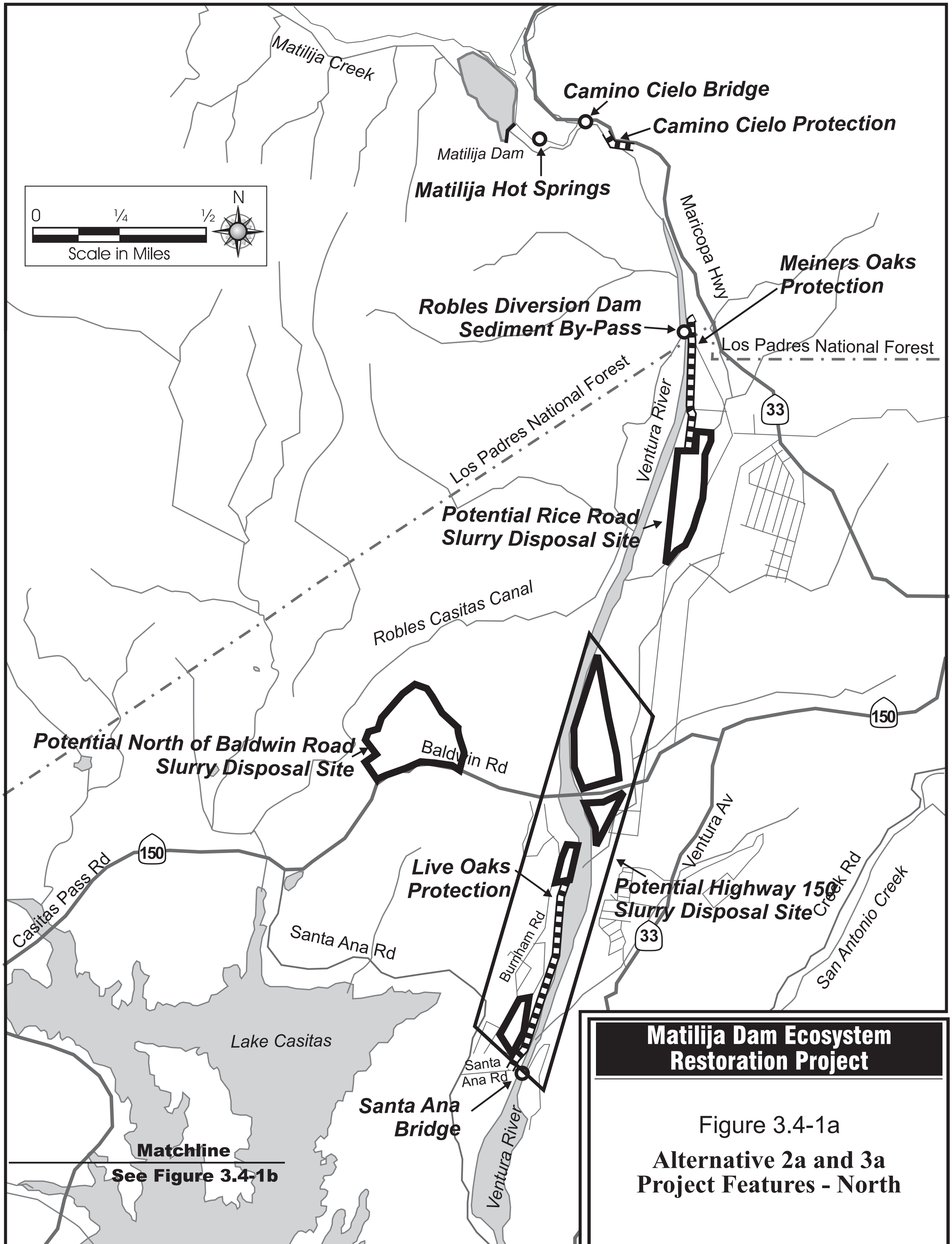
Giant reed would be treated as discussed in Section 3.1 under Alternative 2b. Instead of the sediment behind the dam being slurried downstream, approximately 520,000 cubic yards of sediment would be excavated and stockpiled on the eastern half of the existing reservoir area by clam shell dredges and land-based clamshells. The sediment would be placed upstream within the basin and allowed to erode naturally. Following removal of the dam, all sediment would be eroded by storms and transported downstream. Increased impacts at the Robles Diversion Dam resulting in missed water diversion opportunities to Lake Casitas necessitates the procurement of up to 48,000 acre-feet of water for Casitas Municipal Water District from other water purveyor sources.

Similar to Alternative 2a, the remaining 5.2 million cubic yards of sediment trapped behind the dam would be allowed to erode over time to a condition resembling the pre-dam contours of the canyon. The remaining sediment would be stockpiled in the excavated reservoir area of the dam, but, as with Alternative 2a, would not include any additional landscaping, stabilization, or armoring so that storm events of any size may carry the sediment downstream. By relying on storm flows to convey the sediment out of the canyon, eventually Matilija Canyon would be returned to a more-natural condition resembling the pre-dam terrain contours of the area.

Table 3-2: Alternative 2a – Full Dam Removal/Natural Sediment Transport - Slurry "Reservoir Area" Fines Off Site

Components		Details
Dam Removal	Process	Full
	Time Required	12 months
'Reservoir Area' Fine Sediment Removal	Amount Excavated	2.1 million c.y.
	Method of Transport	Slurry
	Length of Transport Period	9 months
Coarse Sediment Removal	Method of Transport	Natural Transport
Downstream Improvements	Matilija Hot Springs	Purchase and Vacate Structures at Complex
	Camino Cielo Structures (11)	Purchase and Remove 2 Houses and 9 Cabins
	Camino Cielo Bridge	Remove Bridge and Restore Channel Section. Construct New Bridge
	Meiners Oaks, Robles Levee, Floodwall/Levee	Add Levee/Floodwall Along East Bank. Levee: 5.0 ft. avg., Floodwall: 5.0 ft avg., Levee: 5.0 ft. avg., Floodproof Robles
	Live Oaks, Levee/Floodwall	Raise Existing (West) Levee: 6.0 ft. avg.
	Santa Ana Bridge	Widen channel and extend bridge
	Casitas Springs, Levee/Floodwall/Levee	Increase Existing (East) Levee Height. Levee: 5.0 ft. avg., Floodwall: 5.0 ft. avg., Levee 5.0 ft. avg.
Other	Slurry Disposal	Yes
	Land Acquisition	Yes
	Sediment Stabilization	No
	Exotic Species Removal	Yes
	Revegetation and Clean-up	No
Habitat Value	Total Average Annual Habitat Units	678

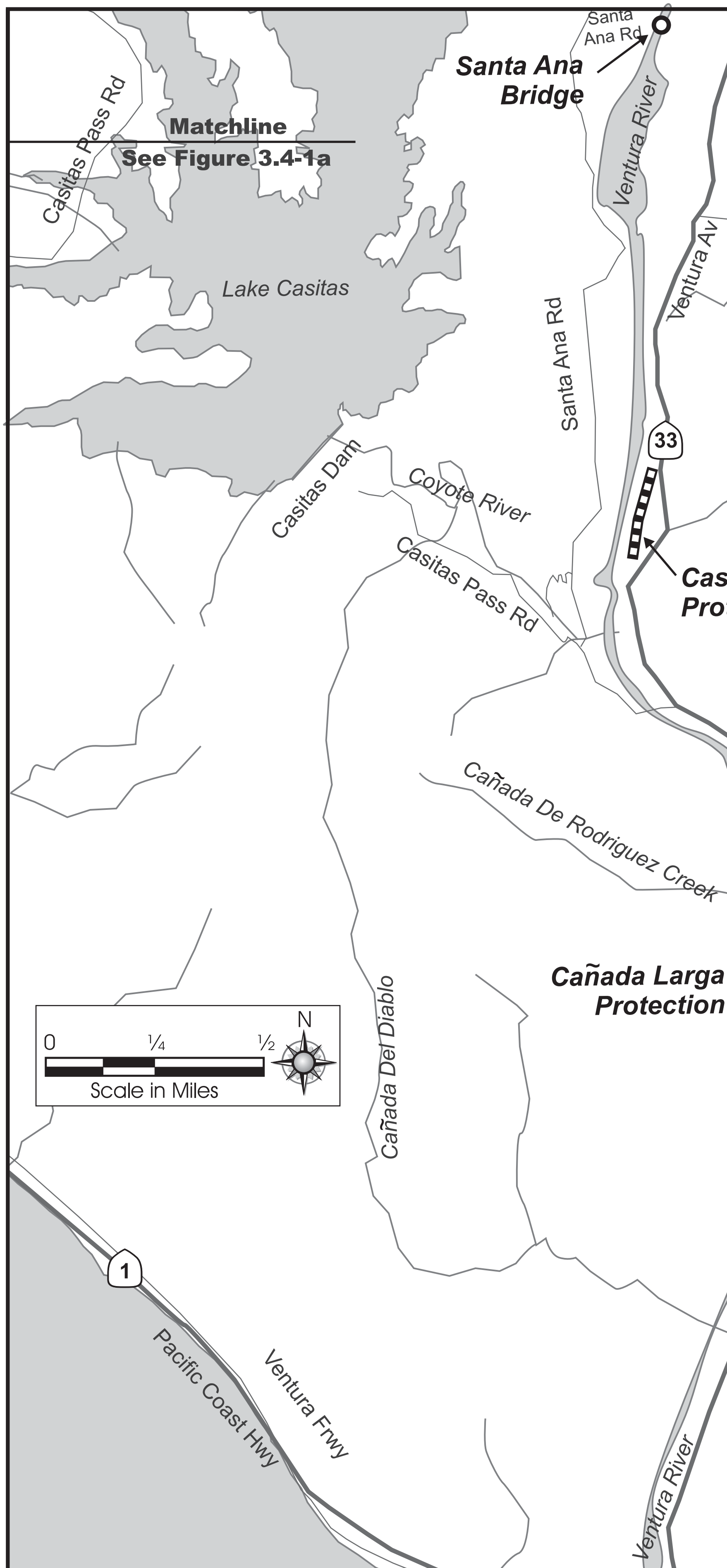
The expected duration for Alternative 2b is variable dependent upon the hydrology. It is anticipated that the majority of the sediment would be scoured from the canyon in few two- to five-year storm events. While dam removal activities would be complete within two years, it is estimated that this alternative would require approximately seven years for excavated sediment to be transported from the canyon. Table 3-3 summarizes the components of Alternative 2b. Figures 3.4-2a and 3.4-2b show the components of Alternative 2b.



Matilija Dam Ecosystem Restoration Project

Figure 3.4-1a

Alternative 2a and 3a Project Features - North



Matilija Dam Ecosystem Restoration Project

Figure 3.4-1b

Alternatives 2a and 3a Project Features - South

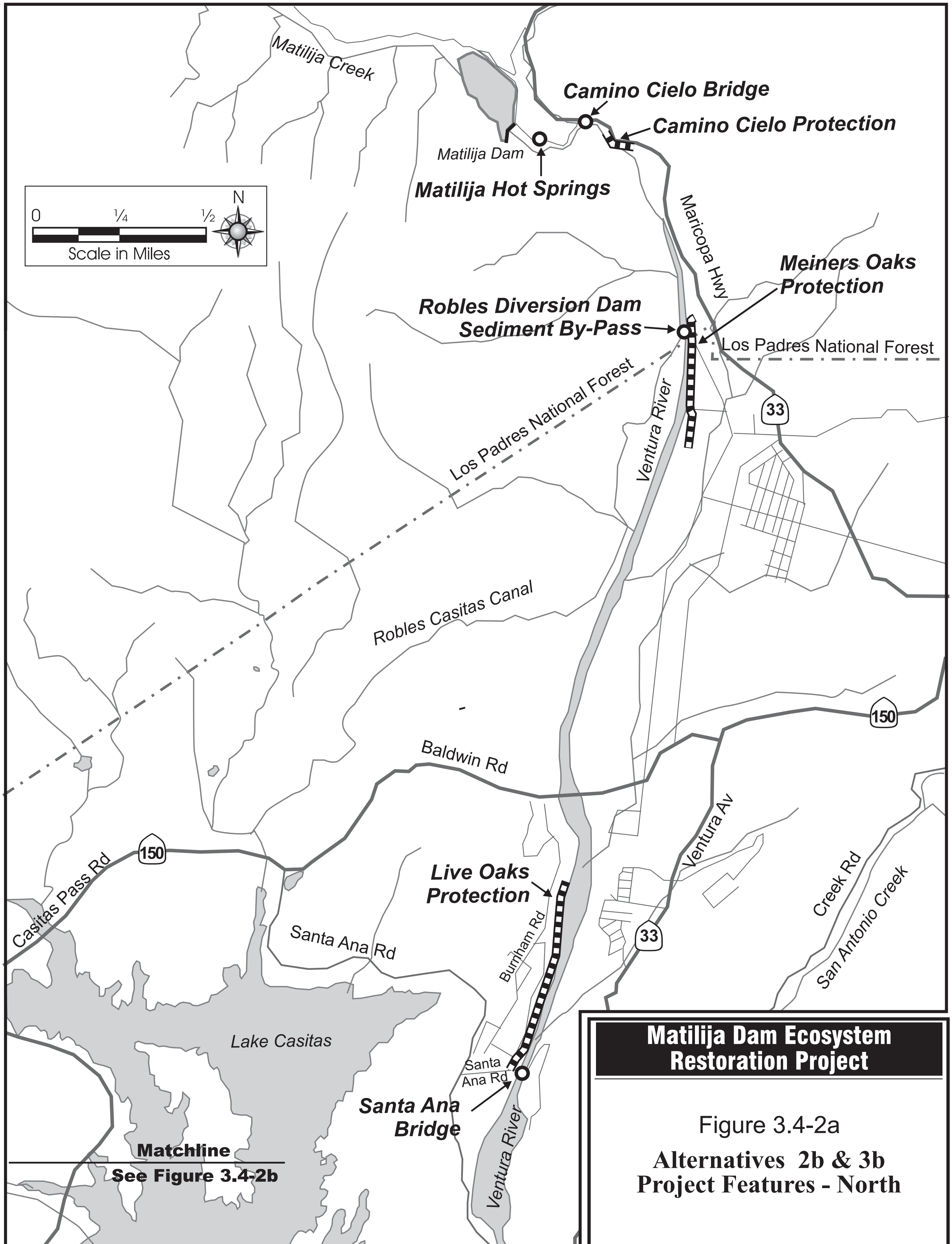
Table 3-3: Alternative 2b – Full Dam Removal/Natural
Sediment Transport-Natural Transport of "Reservoir Fines"

Components		Details
Dam Removal	Process	Full
	Time Required	12 months
'Reservoir Area' Fine Sediment Removal	Amount Excavated	520,000 c.y.
	Method of Transport	Stockpile upstream for natural erosion
Coarse Sediment Removal	Method of Transport	Natural Transport
Downstream Improvements	Matilija Hot Springs	Purchase and Vacate Structures at Complex
	Camino Cielo Structures (11)	Purchase and Remove 2 Houses and 9 Cabins
	Camino Cielo Bridge	Remove Bridge and Restore Channel Section. Construct New Bridge
	Meiners Oaks, Robles Levee, Floodwall/Levee	Add Levee/Floodwall Along East Bank. Levee: 5.0 ft. avg., Floodwall: 5.0 ft avg., Levee: 5.0 ft. avg., Floodproof Robles
	Live Oaks, Levee/Floodwall	Raise Existing (West) Levee: 6.0 ft. avg.
	Santa Ana Bridge	Widen channel and extend bridge
Other	Slurry Disposal	No
	Land Acquisition	Yes
	Sediment Stabilization	No
	Exotic Species Removal	Yes
	Revegetation and Clean-up	No
Habitat Value	Total Average Annual Habitat Units	678

3.5 ALTERNATIVE 3 – INCREMENTAL DAM REMOVAL/NATURAL SEDIMENT TRANSPORT

In this alternative the dam would be removed in several stages and impacts from sediment downstream of the dam would be monitored. The advantage of the incremental dam removal alternative would be a greater measure of control over the rate of sediment release. Dam and sediment removal techniques for this alternative would be similar to those described in Alternative 2a, but the incremental dam removal is distinguished from the full dam removal by the interruption of the dam demolition process at one stage of the demolition. This interval of interruption is assumed to be two years, although may require more time to allow erosion of a sufficient quantity of impounded sediments. Interruption of demolition would allow eroded reservoir sediments to stabilize downstream of the dam and provide the river with an opportunity to adjust to sediment inflows. Concrete rubble from the dam would be processed for transportation and hauled to Hanson Aggregates. Non-recyclable debris would be sent to the Toland Road Landfill.

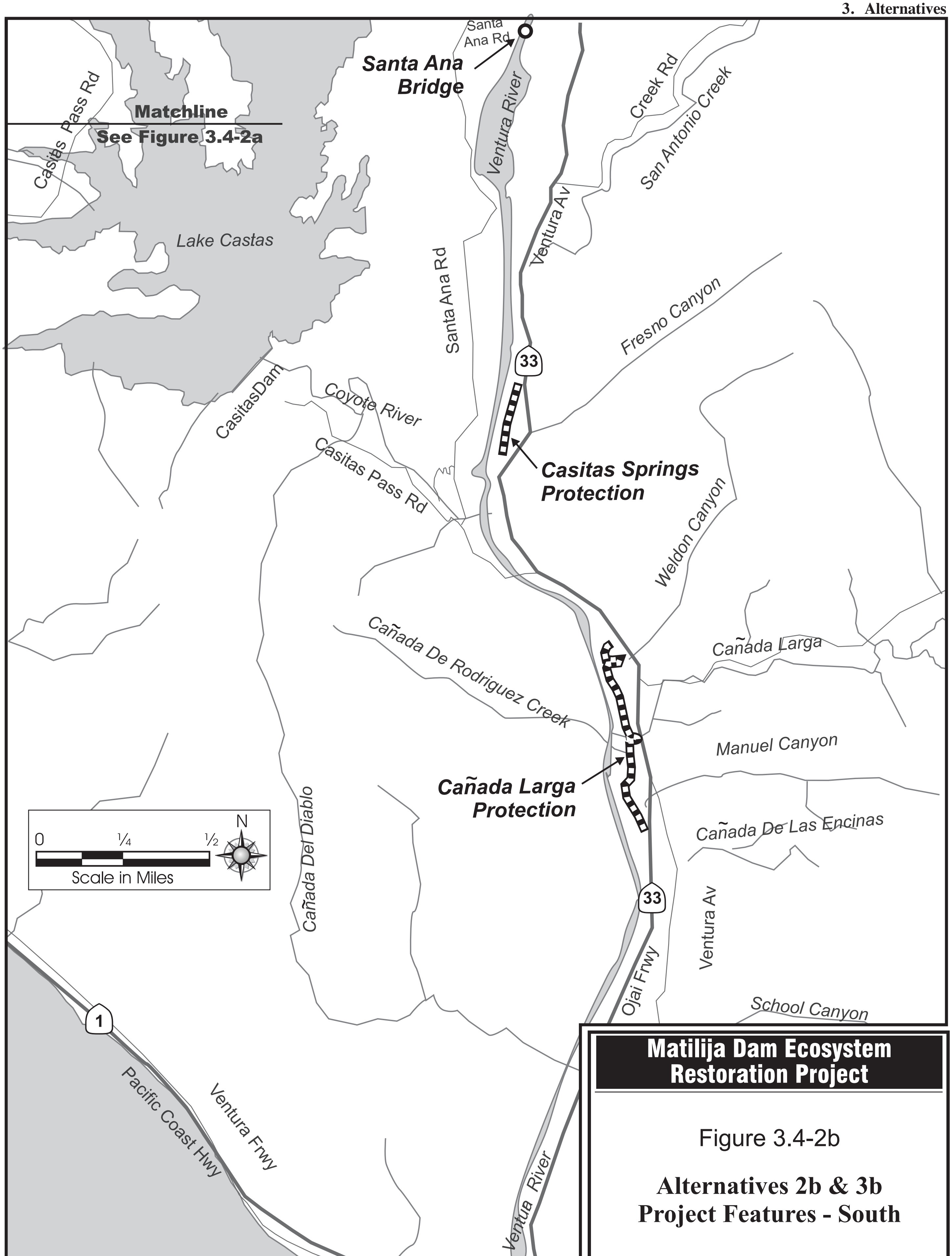
Steps to complete the incremental dam removal process include: (1) constructing downstream flood protection measures; (2) removing fine material against the dam (to the elevation of the last phase) by sluicing material through low-level outlets during high flows (greater than 400 cfs), which generally occur in the winter months when the river flows, and/or dredging by either mechanical or hydraulic means; (3) constructing a temporary diversion for low flows; (4) regrading sediments and constructing a low flow channel through sediments as necessary; (5) incremental removal of the dam; (6) waiting for a flow that moves a substantial amount of sediment; (7) monitoring downstream impacts during and after a substantial flow; (8) revising modeling estimates based on monitoring results; and (9) repeating Steps 2 through 7 to remove the remainder of the dam.



Matilija Dam Ecosystem Restoration Project

Figure 3.4-2a

Alternatives 2b & 3b
Project Features - North



Matilija Dam Ecosystem Restoration Project

Figure 3.4-2b

Alternatives 2b & 3b Project Features - South

Within Alternative 3, there are two major sub-alternatives, which differ in how fine sediments are transported. In Alternative 3a (Slurry "Reservoir Area" Fines Off Site), the fine sediment in the reservoir area would be excavated and slurried to an off site disposal area. In Alternative 3b (Natural Transport of "Reservoir Fines"), a quantity of material immediately behind the dam would be excavated and stockpiled upstream. All sediment would then eroded by storms and naturally transported downstream. Flood control protection measures under both sub-alternatives would be as described above in Section 3.1. The two sub-alternatives are described in greater detail below.

3.5.1 Alternative 3a – Incremental Dam Removal/Natural Sediment Transport Slurry "Reservoir Area" Fines Off Site

Alternative 3a would be similar in dam and sediment removal technique to Alternative 2a, but would be accomplished over a longer time period. Sediments from behind the dam would be slurried to one of the three potential disposal sites as discussed in Alternatives 1 and 2a. The dam structure above elevation 1,000 feet would be removed, and a small pilot channel, no greater than 10 feet deep, would be excavated to initially convey flows through the reservoir basin. All downstream dam structures, with the exception of the outlet works, would be removed during the first construction phase. Approximately 39,100 cubic yards of concrete would be removed from the dam at this time. Excavated sediment would be stockpiled behind the dam, but would not be stabilized or protected from storm flows. The sediment trapped behind the dam would be allowed to erode by natural processes to equilibrium with the modified dam height. This first phase of construction (Phase I) is estimated to take approximately 18 months.

An additional 12,000 cubic yards of material would be removed along with the outlet works in the second phase of the project. The remaining sediment would be excavated as described above, and would again be stockpiled to be conveyed downstream by storm flows. Removal of the remaining sediments would be variable and dependent upon the hydrology, although it is assumed that the second construction phase (Phase II) would be initiated two years after completion of Phase I. As no armoring or protection would be used to stabilize the excavated sediments in the canyon, storm flows would be allowed to create natural meanders and eventually return the canyon to a condition resembling the pre-dam canyon contours.

Alternative 3a also includes a construction of a desilting basin near Robles Diversion, similar to that described for Alternative 2a.

Following Phase II dam removal, the remaining trapped sediment would be allowed to erode by natural fluvial processes. Table 3-4 summarizes the components of Alternative 3a. Figures 3.4-1a and 3.4-1b show the project components associated with Alternative 3a.

Table 3-4: Alternative 3a – Incremental Dam Removal/Natural
Sediment Transport-Slurry "Reservoir Area" Fines Off site

Components		Details
Dam Removal	Process	Incremental
	Time Required	Phase I – 8 months, Phase II – 5 months
'Reservoir Area' Fine Sediment Removal	Amount Excavated	2.1 million c.y.
	Method of Transport	Slurry
	Length of Transport Period	9 months
Coarse Sediment Removal	Method of Transport	Natural Transport
Downstream Improvements	Matilija Hot Springs	Purchase and Vacate Structures at Complex
	Camino Cielo Structures (11)	Purchase and Remove 2 Houses and 9 Cabins
	Camino Cielo Bridge	Remove Bridge and Restore Channel Section. Construct New Bridge
	Meiners Oaks, Robles Levee, Floodwall/Levee	Add Levee/Floodwall Along East Bank. Levee: 5.0 ft. avg., Floodwall: 5.0 ft avg., Levee: 5.0 ft. avg., Floodproof Robles
	Live Oaks, Levee/Floodwall	Raise Existing (West) Levee: 6.0 ft. avg.
	Santa Ana Bridge	Widen channel and extend bridge
Other	Slurry Disposal	Yes
	Land Acquisition	Yes
	Sediment Stabilization	No
	Exotic Species Removal	Yes
	Revegetation and Clean-up	No
Habitat Value	Total Average Annual Habitat Units	678

3.5.2 Alternative 3b – Incremental Dam Removal/Natural Sediment Transport Natural Transport of "Reservoir Fines"

Alternative 3b would be similar in dam and sediment removal technique to Alternative 2b, but would be accomplished over a longer time period. In Phase I, the dam would be lowered to elevation 1,030 feet and approximately 27,100 cubic yards of concrete would be removed. Approximately 300,000 cubic yards of sediment immediately behind the dam would be excavated by a barge-mounted clamshell dredge and stockpiled along the eastern half of the existing reservoir area as described in Alternative 2b. Fluvial processes would naturally erode this sediment. The remaining sediment trapped behind the dam would be allowed to erode by natural processes to equilibrium with the modified dam height. A small pilot channel, no greater than 10 feet deep, would be excavated to initially convey flows through the reservoir basin. No armoring or riprap protection would be used to stabilize the excavated sediments and allow storm flows to scour these materials downstream.

An additional 24,000 cubic yards of material would be removed in Phase II of the project to complete the dam removal. In Phase II, 320,000 cubic yards of sediment would be excavated using a combination of clamshell excavation from the top of the remaining dam and a truck-mounted dragline. The project's duration is estimated to require 18 months for the first phase of construction. Removal of the remaining sediments would be variable and dependent upon the hydrology, although it is assumed that the second construction phase would be initiated two years after completion of Phase I. Following Phase II dam removal, the remaining trapped sediment would be allowed to erode by natural fluvial processes. Storm flows, unconstrained by hardened channels, armoring, or riprap, would be allowed to create natural meanders and eventually return the canyon to a condition resembling the pre-dam canyon contours.

Increased impacts at the Robles Diversion Dam resulting in missed water diversion opportunities to Lake Casitas necessitates the procurement of up to 48,000 acre-feet of water for Casitas Municipal Water District from other water purveyor sources. Table 3-5 summarizes the components of Alternative 3b. Figures 3.4-2a and 3.4-2b show the project components associated with Alternative 3b.

Table 3-5: Alternative 3b – Incremental Dam Removal/Natural
Sediment Transport-Natural Transport of "Reservoir Fines"

Components		Details
Dam Removal	Process	Incremental
	Time Required	Phase I – 4 months, Phase II – 5 months
'Reservoir Area' Fine Sediment Removal	Amount Excavated	620,000 c.y.
	Method of Transport	Stockpile upstream for natural erosion
Coarse Sediment Removal	Method of Transport	Natural Transport
Downstream Improvements	Matilija Hot Springs	Purchase and Vacate Structures at Complex
	Camino Cielo Structures (11)	Purchase and Remove 2 Houses and 9 Cabins
	Camino Cielo Bridge	Remove Bridge and Restore Channel Section. Construct New Bridge
	Meiners Oaks, Robles Levee, Floodwall/Levee	Add Levee/Floodwall Along East Bank. Levee: 5.0 ft. avg., Floodwall: 5.0 ft avg., Levee: 5.0 ft. avg., Floodproof Robles
	Live Oaks, Levee/Floodwall	Raise Existing (West) Levee: 6.0 ft. avg.
	Santa Ana Bridge	Widen channel and extend bridge
Other	Slurry Disposal	No
	Land Acquisition	Yes
	Sediment Stabilization	No
	Exotic Species Removal	Yes
	Revegetation and Clean-up	No
Habitat Value	Total Average Annual Habitat Units	678

3.6 ALTERNATIVE 4 – FULL DAM REMOVAL/LONG-TERM SEDIMENT TRANSPORT

In this alternative, a channel would be excavated through the sediments upstream of the dam. There are two options under consideration for this alternative: long- and short-term transportation periods for the sediments. Both Alternatives 4a and 4b are designed to fully remove the dam in one continuous process while roughly 2.1 million cubic yards of fine sediment are excavated and slurried to a disposal site downstream. For Alternative 4a (Long-Term Transport Period), remaining sediments would be stabilized to be eroded by storm events over a 50- to 100-year time period. In Alternative 4b (Short-Term Transport Period), the remaining sediments would be stabilized in a manner that would allow sediments to erode naturally, but at a rate controlled so as to minimize downstream impacts. All giant reed would be removed from the reservoir and Reaches 8 and 9 as described in Section 3.1.

For Alternative 4, the entire concrete dam structure above the original streambed would be removed. Metal debris would be hauled from the site and salvaged when possible. Non-salvageable items would be sent to the Toland Road landfill. The concrete left in place below the streambed would be shaped to ensure fish passage and to simulate the natural pre-dam streambed configuration. A 100-foot wide channel would be excavated along the reservoir basin, following an alignment similar to the 1947 pre-dam alignment. Side slopes would be excavated to a 3:1 (horizontal to vertical) slope. This alternative is estimated to take two years to complete, including slurrying the reservoir area sediment, removal of the dam, channel excavation, riprap stone protection placement, and re-vegetation.

3.6.1 Alternative 4a - Full Dam Removal/Long-Term Sediment Transport - Long-Term Sediment Transport Period

The excavated channel would be designed to convey the 100-year recurrence-level flood. Materials excavated from the channel would be used as fill along the channel. Slope protection, consisting of ungrouted riprap stone, would be placed along the channel, extending 11 feet above channel invert and 5 feet below to prevent undercutting of the slope. Slope protection would be designed to be overtopped by 50- to 100-year floods, to allow sediment to be transported downstream over a longer time period. Sediment excavated from the channel would be placed in storage locations within the original reservoir limits. Concrete blocks from the deconstructed dam structure, in acceptable sizes, would be buried in the fill. The alignment of the stream channel would be relatively straight under this alternative and with riprap protection would be inflexible to natural meanderings. With the protection used to stabilize the excavated material under Alternative 4a, scouring of the excavated material from the canyon and a return to a natural stream contour is anticipated to take 100 years or more.

Graded areas, including the slurry disposal site, would be re-vegetated to control erosion. Alternative 4a would require the low level flood control protection described above in Section 3.1. The expected duration for construction activities under Alternative 4a is three years.

Table 3-6 summarizes the components of Alternative 4a. Figures 3.6-1a and 3.6-1b show the components associated with Alternative 4a.

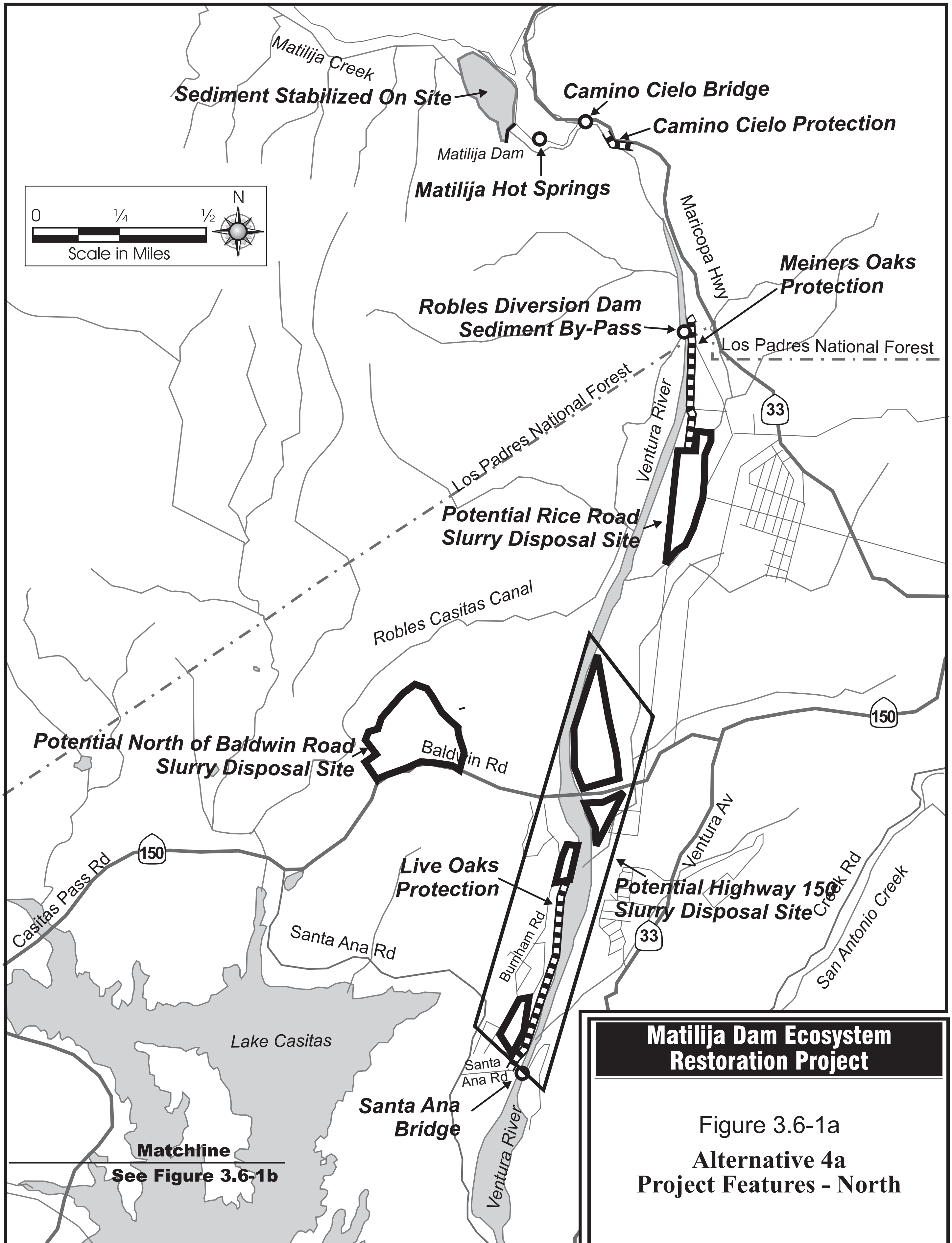
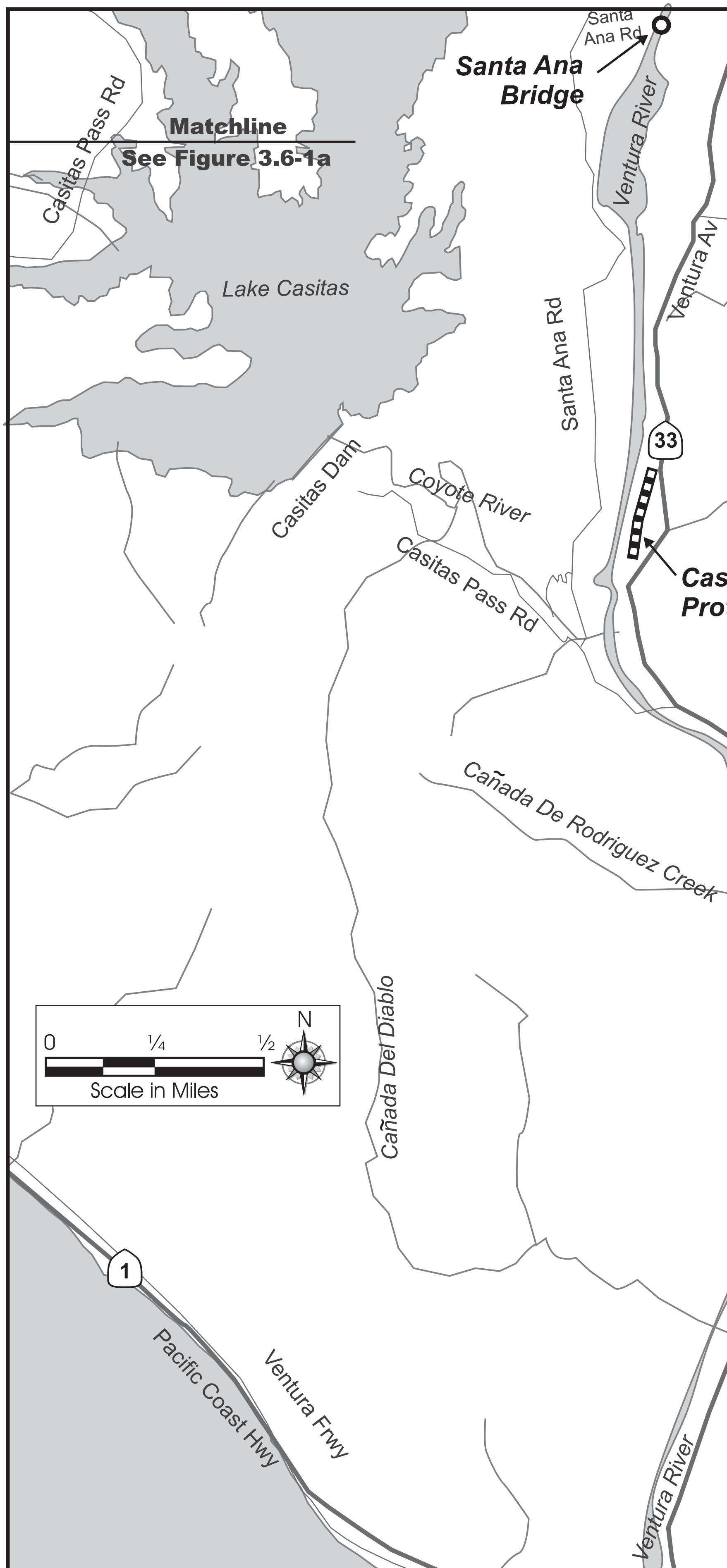


Figure 3.6-1a

Alternative 4a
Project Features - North



Matilija Dam Ecosystem Restoration Project

Figure 3.6-1b

Alternative 4a
Project Features - South

Table 3-6: Alternative 4a – Full Dam Removal/Long-Term Sediment Transport - Long-Term Transport Period

Components		Details
Dam Removal	Process	Full
	Time Required	12 months
'Reservoir Area' Fine Sediment Removal	Method of Transport	Slurry (2.1 million c.y.)
Coarse Sediment Removal	Amount Excavated	1.2 million c.y.
	Method of Transport	Long-Term Natural Transport
Downstream Improvements	Matilija Hot Springs	Purchase and Vacate Structures at Complex
	Camino Cielo Structures (11)	Purchase and Remove 2 Houses and 9 Cabins
	Camino Cielo Bridge	Remove Bridge and Restore Channel Section. Construct New Bridge
	Meiners Oaks, Robles Levee, Floodwall/Levee	Add Levee/Floodwall Along East Bank. Levee: 2.8 ft. avg., Floodwall: 2.8 ft avg., Levee: 2.8 ft. avg., Floodproof Robles
	Live Oaks, Levee/Floodwall	Raise Existing (West) Levee: 2.0 ft. avg.
	Santa Ana Bridge	Widen channel and extend bridge
Other	Slurry Disposal	No
	Land Acquisition	Yes
	Sediment Stabilization	Yes – Long-Term Transport
	Exotic Species Removal	Yes
	Revegetation and Clean-up	Yes
Habitat Value	Total Average Annual Habitat Units	554

3.6.2 Alternative 4b – Full Dam Removal/Long-Term Sediment Transport - Short-Term Transport Period

As described for Alternatives 1, 2a, and 3a, the site would be stripped of all vegetation and reservoir-area sediments would be slurried to one of the three potential disposal sites downstream. A channel would be excavated through the remaining sediments. Sediment excavated from the channel would be temporarily placed in storage locations within the original reservoir limits. Erosion of trapped sediment by natural fluvial processes would be allowed to occur in areas along the active channel, except in areas in the vicinity of the storage areas. A soil cement revetment varying from three to seven feet above channel invert and five feet below would protect storage areas. The lower soil cement revetment would be designed such that flows of 3,000 to 7,500 cubic feet per second, the equivalent of a two- to five-year storm event, would overtop the revetment and be allowed to erode material from the storage locations. The higher revetment height would be overtopped by flows exceeding 12,500 cubic feet per second, the equivalent of a ten-year storm event.

Some segments of the reach would also not have to be protected with any revetment to allow for selected areas to be eroded under the smallest flow events. Revetment heights would be selected to offer the higher level of protection within portions of the reservoir basin where the remaining trapped sediments contain higher proportions of fines (i.e., the Delta area). Revetment would be constructed of soil cement, utilizing aggregate available on site. All soil cement revetment would be removed from the site following sufficient evacuation of trapped sediment from the reservoir basin. This could occur in less then ten years in some segments of the reach, and up to 20 years in other segments, and would depend on adaptive management of sediment evacuation and effects downstream. With the soil cement required for stabilization of the materials, natural river meandering would be possible between the sediment storage areas, but would be limited until the soil cement had been removed.

After a large percentage of the sediments have eroded and the soil cement removed, the site would be re-vegetated as in Alternative 1. Alternative 4b would require the high level flood control protection described above in Section 3.1. For this alternative it is assumed that the re-vegetation activities would occur approximately ten years after notice to proceed. The expected duration for Alternative 4b is two years.

A desilting basin, similar to that described for Alternatives 2a and 3a, is included as a locally preferred betterment for Alternative 4b.

It is estimated that this alternative would require approximately two years to complete the slurrying operation of the Reservoir Area sediment, removal of the dam, excavation of the channel, and construction of the soil cement revetment. Table 3-7 summarizes the components of Alternative 4b. Figures 3.6-2a and 3.6-2b show the components associated with Alternative 4a. Figure 3.6-3 shows the general alignment of the channel that would be excavated through the remaining sediments behind the dam and the locations of the sediment storage areas.

Table 3-7: Alternative 4b – Full Dam Removal/Long-Term Sediment Transport – Short-Term Transport Period

Components		Details
Dam Removal	Process	Full
	Time Required	12 months
'Reservoir Area' Fine Sediment Removal	Method of Transport	Slurry (2.1 million c.y.)
Coarse Sediment Removal	Method of Transport	Short-Term Natural Transport
Downstream Improvements	Matilija Hot Springs	Purchase and Vacate Structures at Complex
	Camino Cielo Structures (11)	Purchase and Remove 2 Houses and 9 Cabins
	Camino Cielo Bridge	Remove Bridge and Restore Channel Section. Construct New Bridge
	Meiners Oaks, Robles Levee, Floodwall/Levee	Add Levee/Floodwall Along East Bank. Levee: 5.0 ft. avg., Floodwall: 5.0 ft avg., Levee: 5.0 ft. avg., Floodproof Robles
	Live Oaks, Levee/Floodwall	Raise Existing (West) Levee: 6.0 ft. avg.
	Santa Ana Bridge	Widen channel and extend bridge
Other	Slurry Disposal	Yes
	Land Acquisition	Yes
	Sediment Stabilization	Yes - Temporary
	Exotic Species Removal	Yes
	Revegetation and Clean-up	Yes
Habitat Value	Total Average Annual Habitat Units	731

3.7 THE NATIONAL ECOSYSTEM RESTORATION PLAN ALTERNATIVE

The National Ecosystem Restoration (NER) Plan Alternative is the alternative developed that contributes most to protection of the nation's environment and restoration of its ecosystems, while maximizing benefits compared to costs. The NER contributions to the nation's ecosystems are measured by changes in the amounts and values of habitat. The Habitat Evaluation Procedure (HEP), prepared by the Environmental Working Group (EWG)[1], is the analysis used for this study to identify NER outputs. Appendix E includes more information on the methodology and results of the HEP. Primary ecosystem restoration benefits associated with the final array of alternative plans considered for this study are presented in non-monetary outputs (habitat units). The NER plan is the alternative with the greatest net ecosystem restoration benefits.

As described in Appendix E, Alternative 4b provides the most net benefits to the ecosystem based on the HEP analysis, but the outputs for Alternative 2a, 2b, 3a, and 3b are relatively close. There is a more distinct separation in benefits going to the next lower, Alternative 1, followed by Alternative 4a. Alternative 2a has the lowest average annual cost per habitat unit.

From a cost effectiveness perspective, an alternative is cost effective if there are no other alternatives that provide the same output at a lower cost. Alternative 3a is therefore eliminated from a cost effectiveness perspective since it provides the same output as Alternative 2a but has a higher cost. The next most cost effective alternative is 4b, and provides the greatest output. As described in the Feasibility Study, incrementally, the last five units of Alternative 4b output are 8 times more costly per unit than for Alternative 2a.

The Feasibility Study indicates that Alternative 4b offers two advantages over Alternative 2a. From an environmental perspective, Alternative 4b provides immediate fish passage restoration with the completion of construction activities. The duration for achieving successful fish passage restoration for Alternative 2a is uncertain and is entirely dependent on hydrology. From a water supply perspective, the upstream revetments proposed as part Alternative 4b would prevent migration of fines during storm events of less than a 10-year recurrence period. Thus, Alternative 4b would not impact the Robles Diversion with turbidity levels greater than the No Action alternative, therefore not compromising the quality of water diverted to Lake Casitas. Alternative 2a conversely does not allow for any decrease to turbidity levels with any storm event.

As a result of these advantages, the Corps has recommended that Alternative 4b be considered the NER plan.

[1] The Environmental Working Group (EWG) is a subcommittee of the Matilija Dam Ecosystem Restoration Feasibility Study Team. The subcommittee is co-chaired by the Corps and the VCWPD. Other members of the subcommittee include NMFS, USFWS, CDFG, BOR, Casitas MWD, Matilija Coalition, and others.

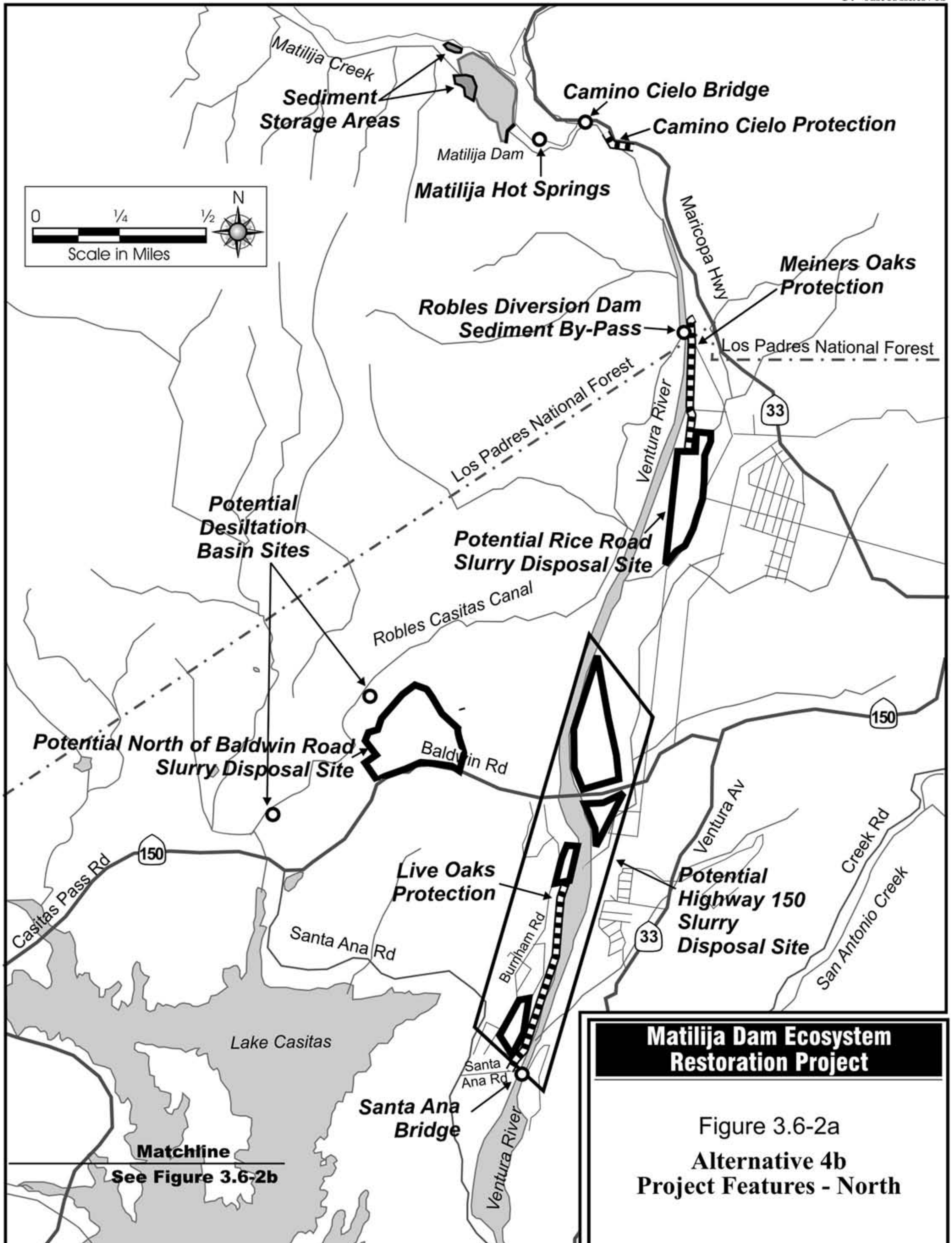
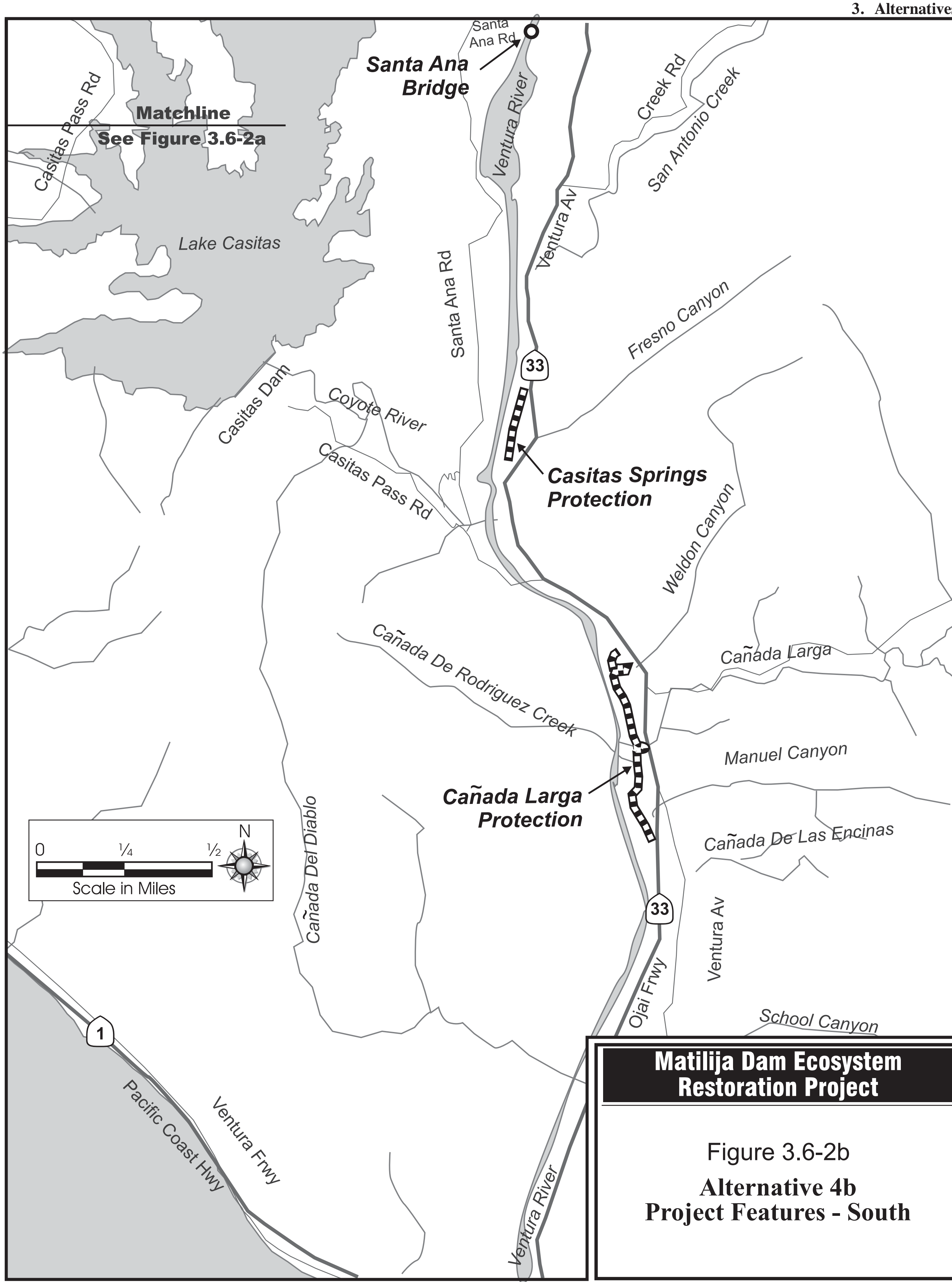


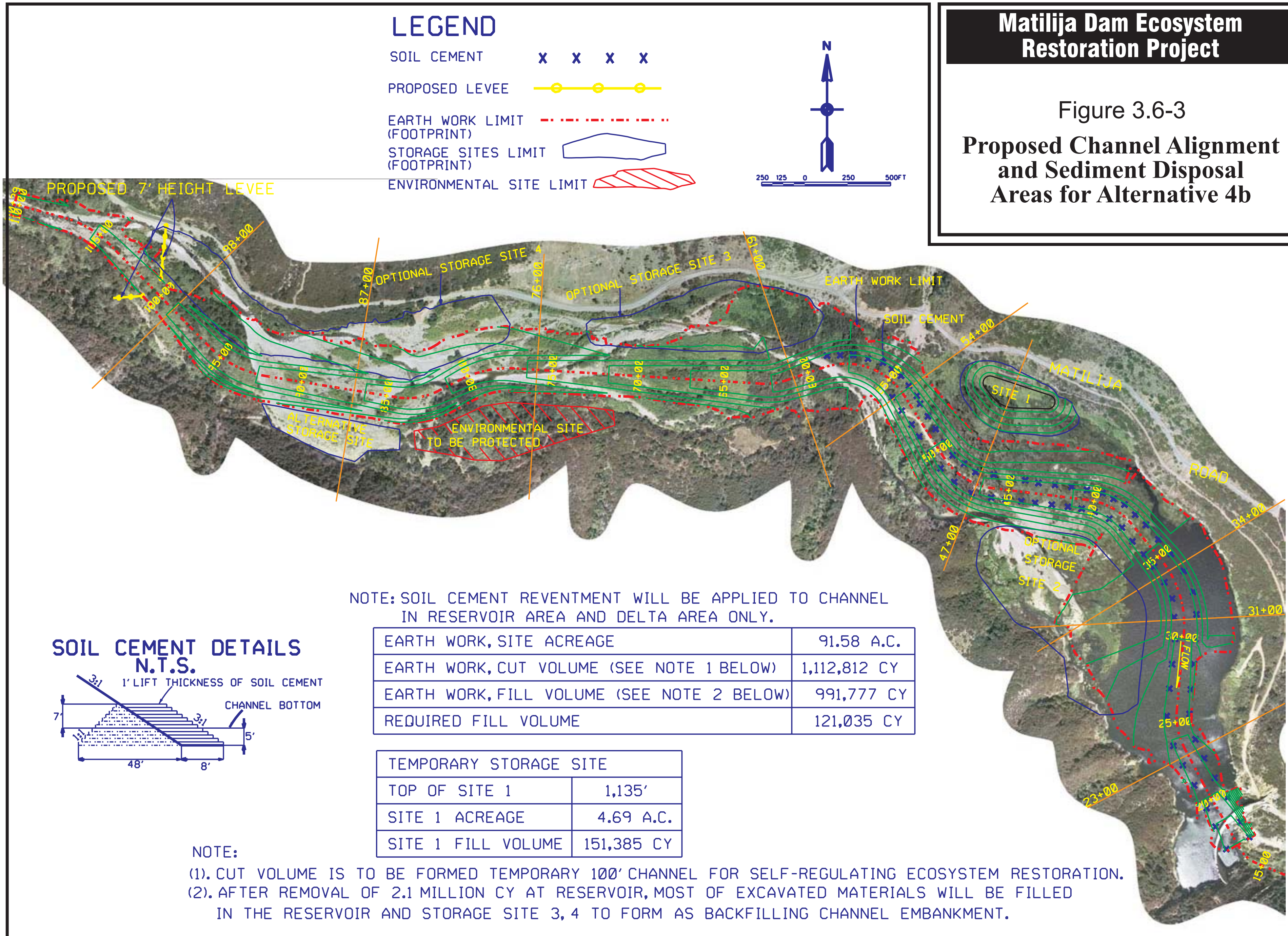
Figure 3.6-2a
Alternative 4b Project Features - North



Matilija Dam Ecosystem Restoration Project

Figure 3.6-2b

Alternative 4b
Project Features - South



Matilija Dam Ecosystem Restoration Project

Figure 3.6-3

Proposed Channel Alignment and Sediment Disposal Areas for Alternative 4b

NOTE: SOIL CEMENT REVENTMENT WILL BE APPLIED TO CHANNEL IN RESERVOIR AREA AND DELTA AREA ONLY.

EARTH WORK, SITE ACREAGE	91.58 A.C.
EARTH WORK, CUT VOLUME (SEE NOTE 1 BELOW)	1,112,812 CY
EARTH WORK, FILL VOLUME (SEE NOTE 2 BELOW)	991,777 CY
REQUIRED FILL VOLUME	121,035 CY

TEMPORARY STORAGE SITE	
TOP OF SITE 1	1,135'
SITE 1 ACREAGE	4.69 A.C.
SITE 1 FILL VOLUME	151,385 CY

NOTE:
(1). CUT VOLUME IS TO BE FORMED TEMPORARY 100' CHANNEL FOR SELF-REGULATING ECOSYSTEM RESTORATION.
(2). AFTER REMOVAL OF 2.1 MILLION CY AT RESERVOIR, MOST OF EXCAVATED MATERIALS WILL BE FILLED IN THE RESERVOIR AND STORAGE SITE 3, 4 TO FORM AS BACKFILLING CHANNEL EMBANKMENT.

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3.8 THE RECOMMENDED PLAN

Following formulation of the action alternatives and their initial evaluation for feasibility, the Corps proceeds by choosing an alternative for further development as the Recommended Plan. The Corps evaluated the alternatives using a variety of methodologies and over a range of variables, examining hydrologic input, downstream sediment and turbidity, flooding, flood protection improvements, beach nourishment and ocean sediment yield, environmental resources, topography, groundwater impacts, completeness, effectiveness, efficiency, acceptability, costs, benefits, and, as discussed above, NER contributions. The results of these comparative analyses led the Corps to choose Alternative 4b as the Recommended Plan for the Proposed Action.

The Plan Formulation Group (PFG)[2] met in January 2004 to discuss the alternatives analyses, and the identification of a Locally Preferred Plan. The consensus of the group identified Alternative 4b as the Locally Preferred Plan. The Casitas Municipal Water District General Manager deferred to committing to Alternative 4b until further discussions of any remaining issues was possible with the CMWD Board of Directors.

3.9 ALTERNATIVES ELIMINATED FROM FURTHER STUDY

In addition to the alternatives presented above, the following seven alternatives were also developed for screening:

- Full Dam Removal/Pool and Riffle System/Removal of full dam above streambed – Sediment would be stabilized into incremental steps for fish passage. The majority of reservoir sediment would remain; only fine sediments would be removed from the site or stabilized upstream. The creek gradient would be reshaped to a new slope.
- Partial Dam Removal/Restoration, with Fish Ladder – The dam would be partially removed, the remaining structure would be stabilized, and all sediment would be mechanically removed or released naturally downstream of dam. The alternative would restore dam water supply/storage function. A fish ladder would be constructed as part of the project.
- Partial Dam Removal/No Restoration, with Fish Ladder – The dam would be partially removed, the remaining structure would be stabilized, and sediment would be removed to the top of the new dam height. Sediment may be removed by mechanical or natural transport. A fish ladder would be constructed as part of the project.
- Partial Dam Removal with "V" Notch – A vertical cut (V-notch) would be made in the center of dam from top to bottom and the remaining sections of dam structure would be stabilized. Some sediment would be removed/displaced to facilitate notching and the reservoir would be regraded. Trapped sediment would be removed by natural transport.
- No Dam Removal/Fish Ladder/No Sediment Removal – No sediment removed under this alternative. A fish ladder would be constructed, but can only be operable under a specific range of flows and may be overwhelmed by flood flows at times.
- No Dam Removal/Fish Tunnel/Bypass to N. Fork Matilija – A tunnel, 600 ft long, would connect from upstream of the dam to North Fork Matilija Creek. The tunnel would be 72 in. diameter pipe, would divert some/all of flows from upstream of dam, and would allow for fish passage. The tunnel would require lights.

[2] The Plan Formulation Group is a subcommittee of the Matilija Dam Ecosystem Restoration Feasibility Study Team. The subcommittee is co-chaired by the Corps and the VCWPD. Other members of the subcommittee include Ventura County Board of Supervisors, NMFS, BOR, Casitas MWD, and Matilija Coalition among others.

The majority of trapped sediments would remain in-place. Sediment maintenance and removal from tunnel and approach would be necessary. The tunnel would also allow natural release of sediment.

- Restoration of Dam with Fish Ladder – This would restore the dam to circa 1960 state, providing water supply and limited flood control, and would include a fish ladder. Trapped sediment may be removed mechanically from the site or sluiced through the dam and released downstream through natural transport.

The screening of the alternatives, conducted by the Plan Formulation Group, was accomplished by evaluating the measures against the following criteria supporting the study objectives: habitat, fish passage, and beach nourishment. With the exception of the Full Dam Removal/Pool and Riffle System, which was initially carried forward, the other six alternatives listed above were eliminated as they did not adequately support the criteria established from the study objectives. Most were eliminated as they failed to present effective means of allowing for steelhead migration, but structural feasibility and the unwillingness by the sponsor to fully or partially restore the dam were also crucial factors in elimination. The Full Dam Removal/Pool and Riffle System alternative was eliminated as it would only marginally improve habitat and, given the dynamic nature of Matilija Creek, would potentially be ineffective in improving steelhead migration conditions.

3.10 COMPARISON OF ALTERNATIVES

The potential environmental impacts of the alternatives are discussed in detail in Section 5. A brief comparison of the impacts of the alternatives is provided below by issue area and summarized in Table 3-9 at the end of this section.

Earth Resources

For all alternatives, implementation of mitigation measures would ensure that any erosion impacts from construction would be less than significant. Earth resource impacts under Alternatives 2a and 2b would be greater than the other alternatives because these alternatives would remove the dam in one continuous process, do not include the stabilization of sediments, and would rely upon storm events and natural flows to erode the trapped sediment and to transport sediment downstream. However, with the greatest amount of sediment transported downstream under Alternative 2b (approximately 2.0 million cubic yards in the first year), beneficial impacts of sediment replenishment to the Ventura River and local beaches would also be the greatest. The depositional effects downstream would be similar between Alternatives 2a and 4b (slightly less than Alternative 2b).

There would be a reduced potential for impacts associated with erosion for Alternatives 3a and 3b because the dam would be removed in stages, allowing for a more gradual erosion of trapped sediment and a greater measure of control over the rate of sediment release. By removing the dam in two phases under Alternatives 3a and 3b, the effects downstream would be evaluated between construction phases so that any deleterious effects could be minimized through additional mitigation measures if necessary. Erosion impacts would be kept to a minimum under Alternative 4a, due to the stabilization of sediments and would be less than those under Alternatives 2a, 2b, and 4b. However, because the majority of sediment would be stabilized on site under Alternative 4a, beneficial impacts from replenishment to the Ventura River and local beaches would be minimal. Similar to Alternative 4a, Alternative 1 would also have minimal erosion impacts initially because all of the trapped sediment would be mechanically removed from the riverine system and the return of pre-dam conditions would take approximately 50 years. Beneficial replenishment impacts would also be less than with Alternatives 2a, 2b, 3a, 3b, and 4b.

Soil contamination impacts from unknown contamination or from accidental spills of hazardous substances would be largely similar between the alternatives. However, Alternative 1 would have a slightly greater potential for a soil contamination from a spill of hazardous substances than the other alternatives due to a greater duration of construction activity, the mechanic removal of trapped sediment, and from the off-site trucking of aggregate materials over a ten-year period. For all of the alternatives, soil contamination impacts would be expected to be potentially significant, but mitigable to a less-than-significant level with the implementation of mitigation measures.

Hydrology and Water Resources

Under each alternative, downstream sediment deposition resulting from removal of the dam would provide hydrologic benefits where deposition would fill riverbed areas scoured and eroded since the installation of the dam. Oversupply of sediment and the transport of fine sediment, however, would result in impacts under all of the action alternatives. Alternatives 2b and 3b would introduce the largest amounts of sediment, particularly fine sediment, into the Matilija Creek and Ventura River system. These would result in the greatest water quality, sediment aggradation, flood hazard, and water supply impacts, all of which could be reduced to less-than-significant levels. Alternatives 2a and 3a, with the sediment being carried by natural transport and the fines being slurried to a downstream disposal site, would result in less severe impacts, although would still require the high level of flood protection. Impacts resulting from Alternatives 2a and 3a could also be reduced to a less-than-significant level with mitigation. Because Alternative 4b would slurry the fine sediments to the disposal site and temporarily stabilize the remaining sediments on site, impacts would be less under this alternative than Alternatives 2 and 3. Alternative 4b would require the high level of flood protection, but all impacts under it would be reduced to less-than-significant levels with mitigation. Alternatives 1 and 4a would result in the least impacts as sediments would largely be removed from the river system (in Alternative 1) or stabilized on site for gradual transport downstream over a long time period (in Alternative 4b). Without these sediments entering the river system, these alternatives would have the least water quality, erosion and sediment aggradation, flood hazard, and water supply impacts.

Biological Resources

All of the proposed action alternatives would eventually provide ecological benefits to the Ventura River and Matilija Creek. Short-term significant impacts to riparian and wetland vegetation would occur with all alternatives. By removing vegetation from the Matilija Reservoir and draining lacustrine habitat, potential significant impacts to sensitive wildlife would occur without mitigation. Mitigation measures specifically designed to trap and relocate species as well as schedule initial vegetation clearing outside the breeding season would minimize impacts to sensitive species for all alternatives. The permanent loss of lacustrine habitat in the Matilija Reservoir would occur with all alternatives and would be considered adverse but less than significant, as this habitat would eventually be eliminated as sediment continues to fill in the existing reservoir, as would occur under the No Action Alternative.

All action alternatives would eventually provide beneficial impacts to existing wildlife corridors. Under Alternatives 1, 2a, 2b, 4a, and 4b, demolition of the dam would occur in one continuous process and could increase passage and wildlife movement within a short period of time. Conversely, Alternatives 3a and 3b would involve incremental dam removal, blocking wildlife passage for up to seven years. However, construction activities associated with Alternative 1, including the sale and transport of reservoir sediment, would occur for up to ten years. While it is expected that some wildlife would acclimate to a certain level of disturbance, construction activities may limit the short-term value of the corridor in Alternative 1. Likewise, on-site sediment stabilization for Alternatives 4a, and 4b may also limit the short-term use of the now open wildlife corridors.

Downstream impacts to aquatic resources, particularly steelhead, would be greater for Alternatives 2a, 2b, 3a, and 3b because the dam would be removed and sediment would be transported downstream during storm events. Because most sediment would not be stabilized onsite or removed from the project area after dam removal for Alternatives 2a, 2b, 3a, and 3b, large volumes of sediment would be transported downstream after storm events and disturb or bury sensitive aquatic organisms or their habitat. The level of downstream sediment transport is lower in Alternatives 3a and 3b because the dam would be removed in phases, minimizing the amount of sediment available for downstream transport. In addition, while reservoir fines would be transported to an off site slurry disposal site for Alternatives 2a and 3a, large amounts of sediment would still have the potential for downstream travel. Impacts to aquatic organisms from downstream sediment impacts would be adverse but less than significant. Potential impacts to aquatic organisms would be reduced with Alternatives 1, 4a, and 4b. All reservoir sediment would be transported off site in Alternative 1, reducing the potential for impacts to aquatic organisms downstream. Similarly, Alternative 4a would stabilize sediment on-site, which would minimize erosion and downstream sediment transport. The preferred Alternative, 4b, would utilize a combination of off site sediment transport and stabilization of remaining material on site. Sediment would be transported downstream only during considerable storm events when water-elevated sediments loads would occur naturally.

Cultural Resources

With the exception of the No Action Alternative, all alternatives have similar potential effects on regional cultural resources. While the No Action Alternative would avoid all immediate impacts to identified and potential historical or cultural sites, future regional development or future dam activity could endanger these sites in the future. Under the alternatives proposed here, all impacts to cultural resources could be mitigated to a less-than-significant level. Matilija Dam itself, which would be removed under all proposed alternatives, is not itself a cultural or historic resource. No alternative would affect sites or structures listed on or eligible for listing on the National Register of Historic Places (NRHP), substantially damage identified cultural sites COE #1 or COE #2, or substantially damage any undiscovered historic or prehistoric resources. In their potential effects on regional cultural resources, the alternatives are essentially identical.

Aesthetics

All alternatives include some components that would result in beneficial aesthetic impacts and other components that would result in significant adverse impacts. All of the alternatives would provide similar long-term benefits to aesthetic resources in Matilija Canyon and along the Ventura River. Alternatives 4a and 4b would return Matilija Canyon to a more natural state in a relatively short time, with storm events and removal of slope protection over time returning the canyon close to its pre-dam state. Alternatives 2a, 2b, 3a, and 3b would return the Matilija Canyon to the most natural state, but the time frame for this return is not as reliable as for the other alternatives. Project activities under Alternative 1 would bring the canyon to a more natural state in around ten years, but hauling the aggregate from behind the dam in trucks creates a massive, long-term aesthetic impact for travelers of Matilija Road, constituting a significant, unmitigable impact. Although the flood control protection required for all of the alternatives would result in significant, unmitigable impacts to the Live Oaks and Casitas Springs communities, the higher level of flood control protection under Alternatives 2a, 2b, 3a, 3b, and 4b would result in greater impacts than the lower level of protection under Alternatives 1 and 4a. The trucking of marketable aggregate from the reservoir area for approximately 10 years under Alternative 1 also constitutes another significant impact that could not be mitigated to a less than significant level. Alternative 4a would likely provide the greatest aesthetic benefits in the shortest time, with the least significant impacts. Alternative 4b would be marginally inferior to this, but superior to the other alternatives. Alternatives 2a, 2b, 3a, and 3b would all result in similar aesthetic benefits and adverse impacts, but would be better than Alternative 1.

Air Quality

There are no substantial differences in the categorization of impacts for the different action alternatives, and all of the action alternatives have emission impacts that would require the implementation of maximum feasible NO_x and PM_{10} mitigation; however, the duration and magnitude of their respective impacts would differ greatly. From an air pollutant emissions estimate perspective the alternatives can generally be ranked by the amount of material that would be required to be removed from the dam site and/or moved to or moved around on other project areas. Therefore, Alternative 1, which would remove over 5 million cubic yards from the dam site, is predicted, by a wide margin, to have the highest 12-month emission impacts followed by Alternatives 4b, 4a, 3a, 2b, 2a, and 3b. Alternative 1 has higher impacts due to the over 3.7 million tons of aggregate and fines that would have to be trucked from the behind the dam to customers or the slurry disposal area. Alternative 3b has the lowest emission impact because it requires a substantially smaller amount of materials (earth, concrete, etc.) to be moved by physical air polluting means (i.e., heavy construction equipment and semi-trailer trucks) and instead relies on non-air polluting fluvial forces to move sediment downstream. Table 3-8 provides the estimated worst-case 12-month emissions for each action alternative. The emissions for Alternatives 1, 2a, 4a, and 4b would be primarily spread out over a 24-month project schedule, with an additional 8-year of aggregate handling and shipping from the dam site under Alternative 1. The emissions for Alternatives 2b, 3a and 3b would occur over a shorter 18-month project schedule. Therefore, while the overall project emissions from initiation to dam removal (1st phase of dam removal for 2b and 3b) are lower for Alternatives 2b and 3b than the other action alternatives, their compressed schedule means that their maximum annual emissions are more similar to the other action alternatives.

Table 3-8: Estimated Maximum 12-Month Emissions for Action Alternatives

Alternative	Emissions (tons)				
	NOx	CO	ROC	SOx	PM_{10}
1	197.7	89.7	11.5	0.3	136.6
2a	56.0	36.1	5.8	0.1	25.0
2b	61.3	39.3	6.6	0.1	50.5
3a	65.6	40.4	6.4	0.1	31.3
3b	51.2	34.7	5.9	0.1	46.1
4a	69.7	41.0	6.5	0.1	39.0
4b	76.6	44.2	6.8	0.1	35.3

Noise

For all alternatives, construction-related noise impacts would be significant. Alternative 4a would be expected to have the lowest noise-related impact compared to all other alternatives due to fewer off-site heavy duty vehicle trips (truck trips), the need for smaller and fewer downstream flood control protection measures, and no requirement for additional groundwater wells at Foster Park or a desilting basin. Additionally, construction activities would be completed in approximately 24 months thereby reducing long-term impacts to residences of Matilija Canyon. Alternative 4b would have greater noise impacts as construction and revegetation activities would occur over approximately 10 years, require higher levees and floodwalls as well as raising the Canada Larga Levee, and require the addition of groundwater wells at Foster Park and a desilting basin. Noise impacts associated with Alternative 2a would be most similar to Alternative 4b, although less due to reduced construction activities that would occur at the main project site (only a small pilot channel and no soil cement), reduced off-site trucking, and reduced activities associated with operations and maintenance. Alternative 2b would have reduced construction noise impacts compared to Alternative 2a, as a result of natural erosion of sediment (i.e., no impacts along the slurry and fresh water pipeline alignments and nearby the disposal site, as well as reduced truck trips). For Alternative 3a, it is expected that the transportation of construction equipment to and from the project site between phases, as well as the longer period of time involved to complete the dam removal (i.e., construction workers commuting to the main project site over a longer period of time), would cause increased noise impacts compared to Alternative 2a. Noise impacts associated with Alternative 3b are expected to be greater than Alternative 2b due to phasing of the project; however, it is expected to have less noise impacts compare to Alternatives 2a and 3a as a result of natural erosion of sediment. Sales of aggregate materials associated with Alternative 1 would substantially increase the duration and extent of noise associated with off-site trucking, and would therefore cause Alternative 1 to have the greatest noise-related impacts compared to all other alternatives.

Socioeconomics

Socioeconomic impacts for the alternatives analyzed are largely identical. None of the alternatives would result in regional labor shortages. None of the alternatives would require workers to relocate to the area and need new housing for them. None of the alternatives would result in environmental justice impacts to residents in the study area. Under all the alternatives, the Matilija Hot Springs facility and Camino Cielo structures would need to be purchased and removed, necessitating the relocation of their occupants. The only substantial socioeconomic differences between the alternatives are related to the disposal of the reservoir area sediment, the location of the locally preferred desilting basin, and the duration of project activities. The sale of the aggregate behind the dam in Alternative 1 would be beneficial to the local economy, but this would be countered by the disruption to local businesses over the period necessary to sell the marketable aggregate. Alternative 4b would have fewer disruptions to local businesses, but the location of the desilting basin could displace commercial agriculture operations. Alternatives 2a, 2b, 3a, 3b, and 4a would not include trucking the aggregate from behind the dam and would not include the desilting basin and so would result in fewer impacts than Alternatives 1 and 4b. While all of these alternatives would require maintenance after their completion, Alternative 4a would require active maintenance behind the dam for the longest period, and so would support continued employment for its maintenance well after the project is completed. Alternative 4b would also require long-term maintenance akin to that described for Alternative 4a, but would be for a shorter period.

Transportation

None of the action alternatives would result in impacts related to the direct closure of public roads or parking areas. Traffic-related impacts associated with all of the action alternatives would result from short-term daily worker-commute trips and from heavy truck trips required to haul equipment and materials to and from the dam site and the downstream flood control protection sites. Impacts associated with daily worker-commute patterns would be less than significant under all of the action alternatives. However, construction related traffic impacts associated with heavy truck hauling would be significant for each of the action alternatives. Traffic impacts resulting from replacement of the Santa Ana Boulevard Bridge would be the same for all alternatives. Alternative 4a would require the least amount of daily and peak hour truck trips compared to all of the other action alternatives. Therefore, between all of the action alternatives, Alternative 4a would involve the least amount of traffic impacts. Alternative 4b would have slightly greater impacts than Alternative 4a because it would require additional heavy haul trips associated with higher levees and floodwalls for the downstream flood protection. Traffic impacts associated with heavy haul trips would be progressively greater for Alternatives 2a, 3a, 3b, and 2b. Although, by far the greatest amount of daily and peak hour haul trips would occur under Alternative 1 compared to the other action alternatives. Alternative 1 would potentially require thousands of heavy truck trips a month hauling marketable aggregate materials along the Highway 33 corridor for a period of up to ten years. Therefore, between all of the action alternatives, Alternative 1 would involve the greatest amount of traffic impacts.

Land Use

No significant land use impacts were identified for any of the alternatives analyzed. All of the alternatives were consistent with land use plans, regulations, and policies. All alternatives would result in an adverse impact to the disruption of a community as each requires the purchase and removal of the Matilija Hot Springs and the Camino Cielo residences. With the higher level of flood control protection, Alternatives 2a, 2b, 3a, 3b, and 4b would also have a greater potential for division of an established community than Alternatives 1 and 4a, but these impacts would be less than significant. Additionally, the inclusion of the locally preferred desilting basin under Alternative 4b would also increase the potential for the conversion of farmland to non-agricultural uses. Although all land use impacts identified under Alternative 4b would be less than significant, this alternative would result in greater impacts than any of the others. Alternatives 2a, 2b, 3a, and 3b would all have the same land use impacts and would be marginally inferior to Alternatives 1 and 4a, which would also have the same impacts.

Recreation

All of the alternatives presented for analysis include benefits to recreational resources in the region, but also include significant impacts. Under all alternatives, the restoration of Matilija Canyon and the creation of recreation trails and interpretive areas provides a substantial benefit. The use of the Rice Road slurry disposal site in Alternatives 1, 2a, 3a, 4a, and 4b would result in significant, unmitigable impacts due to the closure of the Ojai Valley Land Conservancy trails on the site for between one or more years. Long-term impacts due to the Rice Road slurry disposal site, however, could be mitigated by the eventual creation of a new trail system over the site. Alternatives 2b and 3b would have the least impacts to recreation resources as neither would require the use of a slurry disposal site. Flood control protection would result in significant impacts to all alternatives as levees and floodwalls would restrict access to or degrade the recreation value of some trails. Although Alternatives 1 and 4a would require lower level flood control protection than Alternatives 2a, 2b, 3a, 3b, and 4b, impacts due to levees and floodwalls would be similar under all the alternatives. Alternatives 3a and 3b would have slightly greater impacts as they have more potential for restricting recreation access under the multiple phases. Alternative 2b would be slightly superior to Alternatives 2a, 3a, 3b, and 4b because it would not require a slurry disposal site and would have the shortest total construction period and so fewer opportunities for facility closures. Alternative 1 would have a greater potential for recreation access restrictions above the dam due to the number of truck trips required to haul the aggregate from behind the dam. Although the alternatives would result in similar recreation impacts, Alternative 2b would result in the fewest impacts, while Alternative 1 has the greatest potential for impacts.

Environmentally Superior Alternative

Section 15126.6 of the CEQA Guidelines states that an EIR must identify the environmentally superior alternative among the alternatives evaluated. If the environmentally superior alternative is the "no project" alternative, the EIR must also identify an environmentally superior alternative among the other alternatives.

The No Action alternative (i.e., "no project" alternative) is not environmentally superior. While the No Action alternative would avoid the various short-term demolition and construction impacts associated with the action alternatives, it would not result in the substantial environmental benefits of the Proposed Action, including restoring steelhead populations on Matilija Creek, improving riparian habitat conditions along Matilija Creek and the Ventura River, and restoring a more natural hydrologic and sediment transport regime in the watershed.

Of the alternatives other than No Action, Alternative 4b (the Recommended Plan) is environmentally superior. Alternative 4b would result in the largest overall increase in habitat value (731 average annual habitat units) when measuring benefits to steelhead habitat, riparian habitat, and natural hydrologic and sedimentation processes. Alternative 4b would also return a greater amount of sediment to the Ventura River and Ventura County beaches than the other alternatives. The rate of sediment aggregation under Alternative 4b would be faster than Alternative 4a, and so would return the Matilija Canyon to a more natural condition more rapidly, but because of the stabilization provided in Alternative 4b, the sediment would be released at a rate less likely to create erosional or depositional hazards than Alternatives 2a, 2b, 3a, and 3b. Alternative 4b provides more benefits to beach nourishment and river bottom replenishment over a shorter time than Alternatives 1 and 4a.

Alternative 4b would have less impact on aquatic organisms due to movement of sediments than Alternatives 2a, 2b, 3a, and 3b. Additionally, steelhead access to the upper watershed would be delayed seven years longer under Alternatives 2a, 2b, 3a, and 3b than under Alternative 4b.

Alternatives 2a, 2b, 3a, and 3b would return the Matilija Canyon area to the most natural state of all the alternatives, but, like Alternative 1, would be disturbed by construction activities for a much longer period than Alternatives 4a and 4b. Alternative 4b would be superior to Alternative 4a as it would eventually return the canyon to a more natural state.

Alternatives 2a, 2b, 3a, 3b, and 4b would have marginally greater land use impacts due to the greater flood protection compared to Alternatives 1 and 4a. The differences in these impacts, however, are minor compared to the differences between the biological benefits provided by Alternative 4b over Alternatives 1 and 4a.

Alternative 4b has the least amount of daily truck trips of all of the action alternatives except Alternative 4a. Alternative 4b would have a slightly greater traffic impact than Alternative 4a due to transport of additional material necessary for the increased flood protection, but would be have less impact than the other alternatives. While Alternative 4b would have slightly greater short-term traffic impacts due to the increased flood protection, it would provide more long-term benefit in terms of returning the river to a more natural hydrologic condition.

Alternatives 2a, 2b, 3a, and 3b would have similar short-term noise and air quality impacts and would be superior to Alternatives 1, 4a, and 4b as they would require less construction and maintenance. Although Alternative 4b is not superior from a noise and air quality perspective, the difference in short-term noise and air quality impacts between Alternatives 2a, 2b, 3a, and 3b compared to Alternative 4b would be outweighed by the long-term biological, hydrologic, and sediment benefits provided by Alternative 4b.

While Alternative 4b does not have the least impacts across all issue areas, it also does not have substantially greater impacts than the other action alternatives and most of its adverse impacts are short term in nature. In addition, it produces the largest amount of long-term environmental benefit.

Table 3-9: Comparison of Alternatives

Issue Area	Impact	Alt. 1	Alt. 2a	Alt. 2b	Alt. 3a	Alt. 3b	Alt. 4a	Alt. 4b
		Classification						
Earth Resources	Temporary erosion impacts during construction.	III	II	II	II	II	II	II
	Restoration of the more natural topography in Matilija Canyon and replenishment of sediment to the Ventura River.	IV	IV	IV	IV	IV	IV	IV
	Potential for encountering unknown soil and/or groundwater contamination during grading or excavation.	II	II	II	II	II	II	II
	Spills of hazardous materials during construction (vehicle fuels, oils, and other maintenance fluids) could cause soil or groundwater contamination.	II	II	II	II	II	II	II
Hydrology and Water Resources	Violate water quality standards or waste discharge requirements or otherwise substantially degrade water quality.	III	II, III	II, III	II, III	II, III	III	III
	Cause lateral erosion, streambed scour, or long-term channel aggradation/degradation resulting in damage to private property, utility lines, or structures	III, IV	III, IV	III, IV	III, IV	III, IV	III, IV	III, IV
	Increase flood hazards	III	III	III	III	III	III	III
	Deplete groundwater or surface water supplies or interfere with groundwater flow or recharge.	III	III	III	III	III	III	III
Biological Resources	Short-term disruption of wildlife movement during project construction	I	I	I	I	I	I	I
	Temporary and permanent loss of lacustrine, riverine, and palustrine habitats at Matilija Dam	II, III	II, III	II, III	II, III	II, III	II, III	II, III
	Temporary loss of sensitive vegetation communities associated with the 94-acre slurry disposal site	II	II	III	II	III	III	II
	Degradation of riparian habitats and sensitive species impacts associated with downstream flood control improvements	III	III	III	III	III	III	III
	Short-term downstream sedimentation and temporary or localized loss of sensitive habitats and species	III	I	I	I	I	III	III
	Long-term restoration of ecosystem functions and connectivity for steelhead and other species	IV	IV	IV	IV	IV	IV	IV
Cultural Resources	Project construction could affect sites or structures listed on or eligible for listing on the National Register of Historic Places (NRHP).	II	II	II	II	II	II	II
	Erosion after removal of sediment may undermine the stability of sites COE#1 and COE#2, and damage any cultural deposits present.	II	II	II	II	II	II	II
	Removal of sediment by natural and mechanical means would have an adverse effect on any undiscovered buried historic and prehistoric resources that may be present beneath sediment behind Matilija Dam.	II	II	II	II	II	II	II
Aesthetics	Improvement of the scenic value of Matilija Canyon by returning it to a more natural state.	IV	IV	IV	IV	IV	IV	IV
	Obstruction or degradation of views of ridgelines from the Ojai Valley Trail due to construction of levees and floodwalls.	III	III	III	III	III	III	III
	Obstruction or degradation of views of the Ventura River due to construction of levees and floodwalls.	III	III	III	III	III	III	III
	Enhancement of unique and historically significant landmarks, such as Hanging Rock in Matilija Canyon.	IV	IV	IV	IV	IV	IV	IV

Issue Area	Impact	Alt. 1	Alt. 2a	Alt. 2b	Alt. 3a	Alt. 3b	Alt. 4a	Alt. 4b
		Classification						
	Temporarily obstruct views to the Ventura River and temporarily deteriorate the aesthetic value of the project area during project construction.	I	II	II	II	II	II	II
Air Quality	Conflict with or obstruct implementation of the VCAPCD Air Quality Management Plan.	III	III	III	III	III	III	III
	Result in direct violation or substantially contribute to existing NAAQS/CAAQS violation.	I	I	I	I	I	I	I
	Result in NOx/ROC emissions above 5 lbs/day in the Ojai Planning Area or 25 lbs/day elsewhere.	II	II	II	II	II	II	II
	Expose sensitive receptors or project workers to substantial pollutant concentrations, or expose a substantial number of people to objectionable odors.	II	II	II	II	II	II	II
	Result in non-conformance with the federal General Conformity Rule.	II	II	II	II	II	II	II
Noise	Noise generated from construction and operation and maintenance activities.	I	I	I	I	I	I	I
	Noise generated by trucking of aggregate materials off site.	I	I	I	I	I	I	I
	Noise generated by giant reed (*Arundo donax*) removal activities.	I	I	I	I	I	I	I
Socioeconomics	Construction could require a labor force greater than is available locally, spurring unintended growth	III	III	III	III	III	III	III
	Construction could require production of additional housing to accommodate workers	III	III	III	III	III	III	III
	Benefit the local economy by employing local workers and using local nurseries for restoration	IV	IV	IV	IV	IV	IV	IV
	Displace businesses, such as Matilija Hot Springs	III	III	III	III	III	III	III
	Construction and/or operation could unduly burden a disadvantaged economic or social group	III	III	III	III	III	III	III
Transportation	Construction commuter work trips would affect roadway level of service levels in the project area.	III	III	III	III	III	III	III
	Heavy construction haul truck trips would affect roadway level of service levels in the project area.	I	I	I	I	I	I	I
	Construction activities could physically damage public roads, sidewalks, mediums, etc.	II	II	II	II	II	II	II
Land Use	Purchase of the Matilija Hot Springs retreat center and 11 residences along Camino Cielo and the relocation of the occupants.	III	III	III	III	III	III	III
	Divisions or disruptions to communities caused by project construction or improvements of the levees and floodwalls.	III	III	III	III	III	III	III
	Conversion of farmland (orchard) at one of the possible desilting basin sites to a non-agricultural use.	III	III	III	III	III	III	III
Recreation	Permanently degrade or displace existing recreational facilities	III, IV	III, IV	III, IV	III, IV	III, IV	III, IV	III, IV
	Impair the safety of recreational users	II	II	II	II	II	II	II
	Close a public recreational facility for an extended period of time	II	II	II	II	II	II	II

Class I: Significant unavoidable impact
Class II: Significant but mitigable impact
Class III: Less-than-significant impact
Class IV: Beneficial impact.

4.1 EARTH RESOURCES

4.1.1 Geology and Seismicity

4.1.1.1 Regional Geology and Topography

The Ventura River Basin forms part of the Transverse Range of southern California, an east-west trending mountain range. The Transverse Range is being uplifted almost 25 feet per 1,000 years, while the maximum erosion rate only causes a 7.5 feet decline per 1,000 years, making them the fastest rising anticline in the United States with a net uplift of 17.5 feet per 1,000 years (Scott and Williams, 1978; Brauner et al., 1998). Steep coastal mountains and narrow canyons that converge to form a comparatively broad, level central valley characterize the Ventura River Basin (Moore, 1980). Rugged topography, narrow valleys, little or no alluvial deposits and steep streambed gradients typify the watershed upstream of the Matilija Dam (Entrix, 1997; Brauner et al., 1998). Elevations rise to a high point of 7,570 feet on Reyes Peak (LPNF, 2002).

The majority of the area is composed of tertiary sedimentary rocks, consisting of cemented sandstones, siltstones, conglomerates, and shales with low permeability relative to the alluvium in the main valleys (Entrix, 1997; Brauner et al., 1998). The streambed of the lower two-thirds of the Ventura River widens to a relatively broad plain composed of pervious material that is subject to high percolation. These materials consist of alluvial deposits of silt, sand, gravel, cobbles, and boulders common to southern California coastal streams (Moore, 1980).

4.1.1.2 Seismic and Other Geologic Hazards

Regional Seismicity. Southern California is a seismically active region, dominated by the intersection of the northwest trending San Andreas and the east-west trending Transverse Ranges fault systems. Both systems are responding to strains produced by the relative motions of the Pacific and North American tectonic plates. The effects of this deformation include mountain building, basin development, deformation of Quaternary marine terraces, widespread regional uplift, and generation of earthquakes. Active faults of the San Andreas system are predominantly strike-slip faults accommodating translational movement. The Transverse Ranges fault system consists primarily of blind reverse and thrust faults accommodating tectonic compression stresses in the region. Blind faults have no surface expression and have been located using subsurface geologic and geophysical methods. This combination of translational and compressive stresses gives rise to the region's widespread seismicity.
Table 4.1-1 describes some of the common geologic/seismic phenomena that have a potential to impact the study area.

Local Seismicity. The Ventura Basin is seismically active. In the basin, the Oak Ridge fault accommodates high rates of oblique crustal strain and, along with several other major faults such as the San Cayetano fault, is considered a significant seismic hazard to a large urban population (ICS, 2002). The 1994 Northridge earthquake occurred beneath the San Fernando Valley on a blind, south-dipping fault that is considered part of the same active fault and fold system that extends westward into the

Table 4.1-1: Description of General Seismic Hazards

Phenomena	Brief Description of Hazard
Earthquakes	Seismic activities, or earthquakes, are sometimes violent vibrations of the Earth's surface that follow a release of energy in the Earth's crust. This energy can be generated by a sudden dislocation of segments of the crust or by a volcanic eruption.
Seismic Deformation	When an earthquake fault ruptures, it causes two types of deformation: static and dynamic. *Static deformations* are the permanent displacement of the ground. *Dynamic deformations*, or seismic waves, are essentially sound waves radiated from the earthquake. While static deformation takes up most of the plate-tectonic energy, up to 10 percent may dissipate immediately in the form of seismic waves.
Ground Shaking	Body and surface seismic waves cause ground shaking. The severity of ground shaking is directly related to the magnitude of the earthquake (i.e., ground shaking increases with increasing magnitude) and indirectly related to the distance to the epicenter (i.e., ground shaking decreases with increasing distance from the epicenter). Ground shaking can be explained in terms of body waves (compressional waves) and surface waves (shear waves). Body waves propagate through the Earth, while surface waves travel slower (arrive next) and cause a structure to vibrate from side to side. Because buildings are more easily damaged from horizontal motion, surface waves are the most damaging waves.
Faults	A fault is a fracture of the earth's crust that has moved one side of a fissure relative to another, parallel to the fracture. *Strike-slip faults* are vertical (or nearly vertical) fractures where the blocks have mostly moved horizontally. If the block opposite an observer looking across the fault moves to the right, the slip style is termed right lateral; if the block moves to the left, the motion is termed left lateral. *Dip-slip faults* are inclined fractures where the blocks have mostly shifted vertically. If the rock mass above an inclined fault moves down, the fault is termed *normal*, whereas if the rock above the fault moves up, the fault is termed *reverse (or thrust)*. *Oblique-slip faults* have substantial components of both slip styles.
Landslides	Several types of landslides take place in conjunction with earthquakes. The most abundant type of earthquake-induced landslides is rock slides from steep slopes. Less abundant are shallow debris slides on steep slopes, along with slumps and block slides on moderate to steep slopes.
Liquefaction	Liquefaction is the phenomenon in which saturated granular sediments temporarily lose their shear strength during periods of strong, earthquake-induced ground shaking, resulting in the sediments behaving as a liquid and able to support structures. The susceptibility of a site to liquefaction is a function of the depth, density, and water content of granular sediments, and the magnitude and frequency of earthquakes in the surrounding region. Saturated, unconsolidated silt, sand, and silty sand within 50 feet of the ground surface are most susceptible to liquefaction. Liquefaction often results in the loss of ground bearing capacity and/or lateral spreading, both of which can result in damage to engineered structures. During loss of ground bearing capacity, large deformations occur within the soil mass, allowing structures to settle and tilt. Damage caused by liquefaction phenomena is generally most severe when liquefaction occurs within 15 to 20 feet of the ground surface.
Seismically induced Settlement	Seismically induced settlement is often caused by loose to medium-dense granular soils densified (compacted) during ground shaking. Uniform settlement beneath a given structure would cause minimal damage. However, since soil distributions vary in density and composition, seismically induced settlement is generally non-uniform and can therefore cause serious structural damage. Dry and partially saturated soils as well as saturated granular soils are subject to seismically induced settlement. Generally, differential settlements induced by ground failures such as liquefaction, flow slides, and surface ruptures would be much more severe than those caused by densification alone.
Tsunamis	Tsunamis are water waves caused by the sudden vertical movement of a large area of the sea floor during an undersea earthquake. Once the wave is formed, its height is typically about 1 foot, but the distance between wave crests can be over 60 miles. As a tsunami reaches shallow water around an island or continental shelf, its height increases dramatically, sometimes reaching 80 feet.

central Ventura Basin. Assessing the nature, geometry, and seismic potential of these active subsurface faults is difficult because many of these structures are blind or buried and do not crop out where they can be easily characterized and many of these structures have a complicated history of tectonic deformation.

The California Department of Conservation, Division of Mines and Geology Special Publication 42 (revised in 1992) shows that Alquist-Priolo Special Studies Zones exist in the area south of the City of Ojai, east of the Ventura River. In addition, another Alquist-Priolo Special Studies Zone runs parallel to the coast in the western portion of the City of San Buenaventura. According to Section 2.3.3 of the Hazards Appendix of the Ventura County General Plan, ground shaking hazards exists throughout Ventura County and can increase considerably wherever there is ground material that could substantially amplify the ground waves caused by earthquakes (County of Ventura, 1998).

Important faults in the vicinity of northern Ventura County area are at the Big Pine, San Gabriel, and Frazier Mountain Thrust, all of which converge at the northeast corner of Ventura County. Geologic and survey evidence indicates stress is building up along the San Andreas Fault to the north. It is just a question of time until the fault again displaces, resulting in a potentially severe earthquake within the next 100 years, according to Section 2.3.3 of the Hazards Appendix of the Ventura County General Plan (County of Ventura, 1998). See Figure 4.1-1 for an illustration of major faults in the vicinity of the project.

Table 4.1-2 describes other geologic hazards, as defined by Section 2.3.5 of the Hazards Appendix of the Ventura County General Plan, that may occur in the project area.

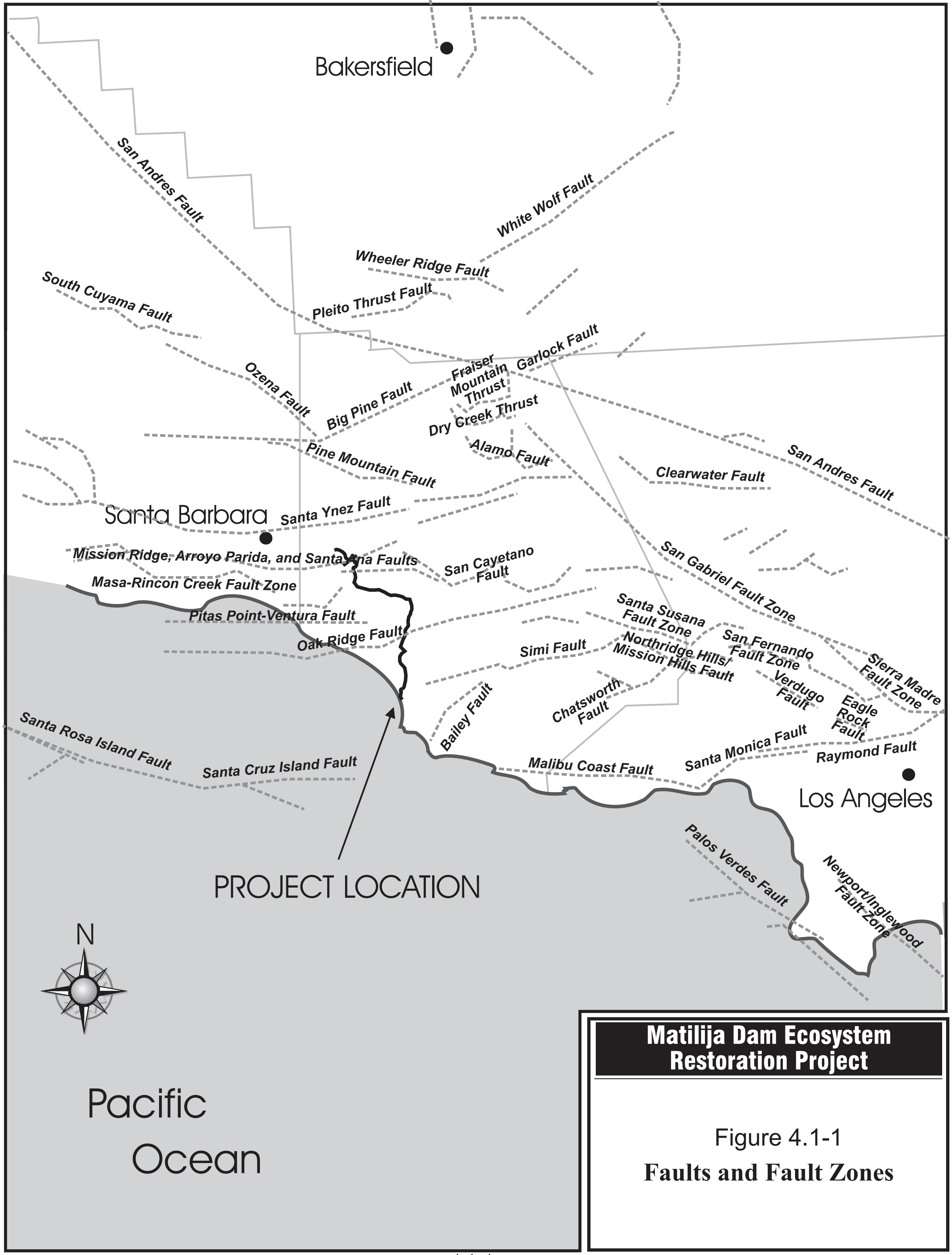
Table 4.1-2: Description of Potential Seismic Hazards in the Area

Hazard	Description*
Ground Shaking	The project area is not in a zone with the highest ground shaking amplification potential, but areas around the Ventura River and Ojai Valley are within zones of potential increased ground shaking amplification. The boundaries of the “ground shaking hazards zones” are partly determined by the thickness of the alluvium or unconsolidated material overlying relatively firm bedrock or consolidated earth material, and the depth of the groundwater.
Liquefaction	A liquefaction threat may exist in the vicinity of the Ventura River and Matilija Creek. Liquefaction has occurred in this area and can be expected to potentially occur again whenever an earthquake of sufficient intensity occurs. Areas with high liquefaction potential have had water table levels within 15 feet of the ground surface some time in the last 50 years.
Landsliding	Landsliding has not occurred in such a widespread manner in northern Ventura County as to be classified as a significant hazard. However, the region is extremely mountainous with steep lopes and high local relief. Faulting and tilting of the bedrock is common. The relative stability of the older bedrock throughout the region, in spite of the rugged physiography, has been the prime factor resisting the incidence of more widespread landsliding. However, many hillsides and existing landslide features are only marginally stable and small changes in existing environmental conditions, such as would result from grading or irrigation, could trigger massive landsliding. In other words, the stability of many slopes is critically fragile and would, upon geologic investigation, be shown to be inadequately stable for most development. The area around the Ventura River and Matilija Creek has a moderate to high landslide potential risk.
Soil Expansion	Expansive soils have caused substantial damage in Ventura County. Areas around the Ojai Valley have some high risk for soil expansion
Flood Hazard	Historically, flooding has caused substantial damage to life and property in Ventura County. A major flood occurred in 1862 and, on average, a major flood has happened once every five years since. Floodplain delineations are determined by the Federal Emergency Management Agency (FEMA) using the best topographical, hydrological, and hydraulic information available. The Ventura County Flood Control District has the authority to construct and maintain flood control facilities. Further regulation is provided by the Ventura County Floodplain Management Ordinance and by other Ventura County regulatory agencies.

* Based on Section 2.3.5 of the Hazards Appendix of the Ventura County General Plan (County of Ventura, 1998)

4.1.1.3 Matilija Dam Safety

The statutes governing dam safety in California (Division 3 of the Water Code) place the supervision of non-federal dams and reservoirs under the jurisdiction of the Department of Water Resources' Division of Safety of Dams (CDSD) (CDSD, 2002). CDSD reviews plans and specifications for the construction of new non-federal dams within California or for the enlargement, alteration, repair, or removal of



Matilija Dam Ecosystem Restoration Project

Figure 4.1-1
Faults and Fault Zones

existing dams and must grant written approval before construction may proceed. Operating dams are periodically inspected to ensure adequate maintenance and to correct any deficiencies (CDSD, 2002).

Section 2.13 of the Ventura County General Plan Hazards Appendix states that potential dam inundation areas occur near Matilija Creek and the Ventura River. However, according to the Ventura County Flood Control District, Matilija Dam has been monitored regularly, and showed no substantial signs of deficiency the last time portions of the dam were removed (Pratt, 2002).

4.1.2 Bed Materials and Trapped Sediment

4.1.2.1 Stream and River Bed Material

The U.S. Bureau of Reclamation (BOR) completed an analysis of the Ventura River bed material on December 4, 2001, titled *Summary of Bed Material Sampling in the Ventura River Basin, Matilija Dam Ecosystem Restoration Project* (BOR, 2001). The BOR study characterized the bed material of the Ventura River from one mile upstream of Matilija Dam downstream to the ocean for the purpose of sediment transport calculations and monitoring changes. A total of 18 bed material samples were collected in Ventura River and Matilija Creek, the results of which are briefly summarized below.

Bed material in the Ventura River generally becomes coarser with increasing elevation. Near the ocean, the average material diameter is approximately 70 to 80 mm, but near Matilija Dam it increases to over 300 mm. Based on the calculated critical diameter of bed material (the diameter below which sediment is activated by a given flood), the 2.33-year flood is a reasonably accurate predictor of the d_{50} (diameter of material that 50 percent of the material is finer than) of the surface bed material in the lower part of the river (river-mile 0 to 7). Further upstream, at river-mile 7 through 12, the 5-year flood is a better predictor of d_{50}. For river-mile 12 to 16, a flood somewhere between the 5-year and 100-year return period is the best predictor of d_{50}. This indicates that the material in the lower part of the river is probably moved more frequently than the material in the upper portion of the river near the dam. In summary, the BOR study indicates that the average annual flood mobilizes the d_{50} in the lower portion of the river, whereas a 5-year flood is required to mobilize the d_{50} in the middle part of the river, and a 5-year to 100-year flood is required to mobilize the d_{50} in the upper parts of the river to the dam.

4.1.2.2 Geotechnical Investigations of the Sediment Trapped Behind Matilija Dam

BOR and the Corps began coordinating the geotechnical requirements of the Matilija Dam Ecosystem Restoration Study in the fall of 1999. In the winter of 2001, the Corps took responsibility for the materials testing and toxicity analyses, while BOR took the task of sampling. The California Coastal Conservancy provided funding for the geotechnical analysis in mid 2001.

This section represents the textual section of the *Matilija Dam Ecosystem Restoration Feasibility Study Geotechnical Field Investigations* prepared by BOR based on field work completed between July 30 and September 15, 2001. The Matilija study site was divided into three major areas: (1) Reservoir, (2) Delta, and (3) Upstream Channel (BOR, 2002). The primary basis for demarcating these three areas was the gradation of sediment packages, as determined by drilling.

Three boundary lines separating the tree areas were determined by examining the gradation of sediment within drill holes, and the lines were designated based on major changes in volumes of sediment gradation (BOR, 2002), as follows:

- **Reservoir** – The Reservoir area starts at the upstream side of Matilija Dam and continues upstream for about 1,400 feet. The Reservoir area hosts approximately 1.51 million cubic yards of sediment, about 25 percent of the total sediment package behind the dam. Sediment in this area is characterized by thick sequences of silt with minor amounts of silty sand and gravel.
- **Delta** – The Delta area extends from about 1,400 feet upstream of the dam to about 2,900 feet. This area hosts approximately 2.63 million cubic yards of sediment, about 44 percent of the total sediment behind the dam. Sediment in this area is characterized by complexly interfingered beds of sand, silty sand, silt, and gravel with and without cobbles.
- **Upstream Channel** – The Upstream Channel extends from about 2,900 feet upstream from the dam, to more than 6,000 feet upstream. The Upstream Channel host approximately 1.86 million cubic yards of sediment, about 31 percent of the total volume of sediment behind the dam. A large volume of gravel and cobbles with minor sand and silt dominates the sediment area.

The following sections describe BOR's findings on the Reservoir, the Delta, and the Upstream Channel investigations. For a complete review of BOR's geotechnical investigations, including all photographs, logs, lab data, drawings, and appendices, see the complete *Matilija Dam Ecosystem Restoration Feasibility Study Geotechnical Field Investigations*, which is included as an appendix to the Feasibility Study. Please note that all figures, photographs, tables, and references are found in that study.

Reservoir

General Description. This area contains approximately 23 percent (1.38 million cubic yards) of the total sediment package behind the dam. Even though the boundary between the Reservoir and Delta areas is based on a major change in sediment gradation, the present-day pond elevation also roughly marks the boundary between the two areas. The Reservoir area is about 1,100 feet wide on its upstream side and narrows to approximately 350 feet just upstream of the dam. The thickness of reservoir sediment varies from about 60 feet on the upstream end to about 72 feet thick near the dam.

Topography on both sides of the Reservoir is very steep, and pre-dam topography shows steep canyon walls to continue below the Reservoir sediment package. Cross sections show the pre-dam canyon topography and the present-day sediment wedge. Both sides of the reservoir pond are covered in thick vegetation, composed of bulrush, giant reed, brush, and small trees. Travel through this thick vegetation is difficult, and is often limited to existing trails. The steep canyon walls along both sides of the pond host a moderately dense to dense growth of trees and brush. The upstream transition area between the reservoir pond and land hosts a lush growth of water plants and reeds.

Investigations. Four holes were successfully drilled in the Reservoir to characterize sediment gradation, distribution of sediments, and sediment toxicity. Drill holes ranged in depth from 33 to 91 feet.

Geology. In the Reservoir area, pre-dam alluvium is composed primarily of coarse-grained gravel, cobbles, and boulders. Reservoir sediment overlying this alluvium is predominantly fine-grained, non-plastic sediment deposited in the slack water environment behind the dam for about 1,400 to 1,800 feet upstream. Silt control lines (included in BOR's February 2000 report) indicate that the majority of sediment behind the dam was transported during large flood events and was probably deposited very rapidly.

Subsurface Conditions. Continuous sediment samples recovered from drill holes show subsurface geologic conditions to be comprised of thick layers of non-plastic fines and clay punctuated by thin, discontinuous beds of silt-with-sand or sandy-silt, and very thin beds of silty sand. Based on drill holes, the following generalizations can be made about the reservoir sediments:

- Each drill hole intercepted 11 to 15 individual beds of sediment;
- Silt and clay beds are more frequent and thickest near the dam (up to 23 feet thick) and become fewer and thinner (up to 9.5 feet thick) upstream;
- Drill holes closest to the dam contain 72 to 78 percent fines with 1 to 15 percent silty sand;
- Drill holes near the upstream end of the Reservoir area contain 67 to 69 percent fines with 11 to 14 percent silty sand. Even though the sand content of the reservoir sediment increases upstream, drilling intercepted one bed of pure sand (95 percent sand), which was 0.7 feet thick;
- Beds of silty sand generally contain 30 to 40 percent silt and, throughout the Reservoir area, are only 1 to 3 feet thick; and
- No substantially thick beds of clean sand were encountered during drilling, and the beds of silty sand present are too thin to be separated out by normal excavation methods. When drilling encountered pre-dam alluvium, the contact was abrupt and easy to determine. Core of the pre-dam alluvium frequently encountered cobble-to-boulder size sediment with some gravel (Core Photograph MDH-05-01; 49.0 to 78.8 feet).

Surface Conditions. At the time of the geotechnical investigations, the reservoir ranged in depth from about 2 to 18 feet, with an average depth of about 10 feet. The interface between the reservoir pond and the reservoir sediments is one of thick water-weed growth. The upper few feet of reservoir sediment is composed of unconsolidated silt and silty sand and is difficult to sample, even with sand-fingers in the sample core barrel.

Pressurized Methane Gas. Reservoir drilling encountered pockets of pressurized methane gas. Pressurized methane gas covered approximately 500 feet by 1,000 feet of the upstream half of the Reservoir area.

Preliminary test results indicated the methane formed from rotting vegetation. The presence of thick beds of silt and clay overlying sandy beds acts to cap the methane.

The exact horizontal and vertical limits of methane gas in the Reservoir area are unknown, as is the total quantity of methane. An estimate of the area of methane accumulation is shown on Figure 1A of the *Matilija Dam Ecosystem Restoration Feasibility Study Geotechnical Field Investigations*. Other areas of the reservoir are likely to contain methane.

Geotechnical Considerations. The volume of silt/clay and silty sand throughout the Reservoir area changes from the area near the dam, which contains 72 to 79 percent silt/clay and 1 to 15 percent silty sand, to the upstream end of the reservoir, which contains 67 to 69 percent silt/clay and 11 to 14 percent silty sand. Approximate percentages of the various size fractions of reservoir sediment are: 70 percent silt/clay, 9 percent silt with sand, 11 percent sandy silt, and 10 percent silty sand.

Most of the silty sand encountered contained 20 to 40 percent silt. The only potential use identified for sediment from the Reservoir area is agricultural purposes. The Corps is studying the suitability of this use separately.

Delta

General Description. The Delta area extends from about 1,400 to 2,900 feet upstream of Matilija Dam between the Reservoir and Upstream Channel areas. The boundaries of these areas are based on sediment gradation, as discussed above. The Delta area is about 1,100 feet wide (ranging between 950 and 1,200 feet). Since construction of the dam in 1947, sediment accumulated to a depth of 50.5 feet to 68.8 feet. Post-dam sediment deposition is roughly wedged-shaped and decreases in volume upstream. Approximately 44 percent (2.63 million cubic yards) of the total volume of sediment impounded behind the dam is contained in this area.

Steep canyon walls define the limits of the river channel and the entire study area. Pre-dam topography illustrates the narrow and steep nature of the sediment-choked Matilija Creek Canyon. Nearly 90 percent of the Delta area is covered by dense vegetation composed primarily of giant reed, which is a non-native plant. Proliferation of the giant reed hinders the growth of other reeds, small trees (willows), and brush native to the canyon.

Investigations. Four holes were drilled in the Delta area for the purpose of characterizing sediment gradation, toxicity, and distribution.

Geology. Sediments deposited by floods and meandering river channels are characteristic of this area and deltaic environments in general. Migrating channel deposits and prograding delta morphology characterize the area.

Subsurface Conditions. Continuous soil samples recovered from drill holes show subsurface geologic conditions in the Delta area to be heterogeneous and layered, characteristics common to deltaic deposition. Core recovered from these holes showed very thick zones of silty sand up to 23 feet thick, with intervals of silt, sandy silt, and silt with sand that range in thickness from 0.1 to 5.0 feet. Gravel lenses, ranging in thickness from one to eight feet, also occurred in these holes. Gravel lenses were mostly encountered near the top of the drill holes. The percentage of gravel increased as the investigations moved upstream.

Silty sand comprises approximately 65 percent of the total volume of sediment in the Delta area. Silt, including sandy silt and silt with sand, comprises approximately 13 percent of the total volume of sediment in this area. Gravelly soil comprises about 22 percent of the total volume of sediment in the Delta area. Based on field and laboratory analyses, major soil types are approximately 70 percent sand and 30 percent fines (silt). This represents an approximate average. Silty sand encountered in this area is variable with percent sand ranging from 50 to 95 percent.

Geotechnical Considerations. Based on volume extrapolations from the drill holes in the Delta area, roughly 1.72 million cubic yards (65 percent) of sediment is silty sand, 344,500 cubic yards (13 percent) is silt, and 571,000 cubic yards (22 percent) is gravel. According to the Unified Soil

Classification System (USCS), the soil classification used by BOR and others, silty sand is defined as a coarse grained sediment containing of 50 to 89 percent sand and 11 to 49 percent fines. The largest concentration of sandy material upstream of Matilija Dam is in the Delta area. An estimated 90 percent of the sandy material in the Delta is silty sand with a fines (silt) content ranging between 5 and 50 percent, and averaging approximately 30 percent. An estimated 10 percent of the sandy material in the Delta is clean sand with less than 10 percent fines.

Upstream Channel

General Description. The Upstream Channel extends from about 2,900 feet upstream of the dam to more than 6,000 feet upstream. The Upstream Channel hosts approximately 1.86 million cubic yards of sediment, about 31 percent of the total volume of sediment behind the dam. A large volume of gravel and cobbles with minor sand and silt dominates the sediment in this area. The Upstream Channel area ranges from about 500 to 1000 feet wide. Sediment deposited since construction of the dam in 1947 ranges in thickness from 25 to 41 feet and eventually to zero at the upstream limit of the original reservoir.

The topography on both sides of the Upstream Channel area is very steep. Most of the Upstream Channel area is covered by dense vegetation except near the active creek channel. Adjacent to the active creek channel is an open area where coarse material has been deposited over time as the channel meandered and high flows transported gravel- and cobble-size material. The thick vegetation is primarily giant reed with some small willow trees, brush, and bulrush.

Investigations. Three holes were drilled in the Upstream Channel area to characterize sediment gradation, toxicity, and distribution.

Geology. The upstream end of the Upstream Channel demarcates the approximate high water mark of the original 7,000 acre-feet reservoir. Gravel and cobbles with minor sand and silt dominate the sediment in this area.

Surface Conditions. Sediments in the Upstream Channel area were deposited in a relatively high energy, fluvial environment. Coarse sediments, primarily cobbles and boulders up to four feet across and probably transported during major flood events, characterize the present-day stream channel. Adjacent to the channels are stream bar deposits consisting mainly of sand, gravel, and cobbles (alluvial sediments) deposited by a decrease in stream velocity. Upstream Channel area deposits are similar to sediments exposed in the creek channel and flood plain of Matilija Creek upstream of the original 7,000-acre-feet reservoir.

Subsurface Conditions. Subsurface geologic conditions in the Upstream Channel area consist primarily of coarse-grained material. Gravel and cobbles with boulders accounted for nearly all the recovered sediment.

Based on field visual and laboratory analyses, the major soil types in the Upstream Channel area have the following compositions:

- Well-graded gravel with sand: 75 percent gravel, 20 percent sand, 5 percent fines

- Silty sand with gravel: 70 percent sand, 20 percent gravel, and 10 percent fines.

Gradation results from the laboratory are slightly skewed because coarse-grained material in the gravel to cobble range was under represented in samples sent to the lab, because sample bags are limited in size and amount of material supported.

Geotechnical Considerations. Based on volume extrapolations from the three drill holes in the area, roughly 1.49 million cubic yards (80 percent) of the sediment is gravel, 279,000 cubic yards (15 percent) is silty sand, and 93,000 cubic yards (5 percent) is fines. This is basically identical to the sediment upstream of the original 7,000-acre-feet reservoir.

4.1.3 Regulatory Setting

4.1.3.1 Federal

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). CERCLA, commonly known as Superfund, provides the U.S. Environmental Protection Agency (USEPA) with the authority to identify and clean up contaminated hazardous waste sites. CERCLA also contains enforcement provisions for the identification of liable parties, details the legal claims that arise under the statute, and provides guidance on settlements with the USEPA (Arbuckle et al., 1993). Section 120 of this Act addresses hazardous waste cleanups at federal facilities and requires the creation of a Federal Agency Hazardous Waste Compliance Docket, which lists facilities that have the potential for hazardous waste problems. In addition, a Hazardous Substance Superfund was established to pay USEPA's cleanup and enforcement costs and certain natural resource damages. This fund also pays certain private party claims.

Resource Conservation and Recovery Act (RCRA). RCRA gave USEPA the authority to control hazardous waste from the cradle to the grave; i.e., from production through disposal and eventual permanent storage (USEPA, 2004). Individual states may implement hazardous waste programs under RCRA with USEPA approval. California has not yet received this USEPA approval. Instead, the California Environmental Protection Agency (Cal/EPA) administers the California Hazardous Waste Control Law (HWCL) to regulate hazardous wastes. While the HWCL is generally more stringent than RCRA, until the USEPA approves the California program, both State and federal laws apply in California. The HWCL:

- Lists approximately 790 chemicals and about 300 common materials that may be hazardous;
- Establishes criteria for identifying, packaging and labeling hazardous wastes;
- Prescribes the management controls;
- Establishes permit requirements for treatment, storage, disposal and transportation; and
- Identifies some wastes that cannot be disposed of in landfills.

4.1.3.2 State

Alquist-Priolo Earthquake Fault Zoning Act (PRC Section 2621.5). This Act provides policies and criteria to assist cities, counties, and state agencies in the development of habitable structures across the trace of active faults. The intention is to minimize the loss of life by facilitating seismic retrofitting to strengthen buildings.

Uniform Building Codes (UBC). UBC define criteria to be used in construction of structures based on the level of seismic activity in the region. All of western California is within the area defined as UBC Seismic Zone 4, which is the most active seismic zone in the country.

Hazardous Material Worker Safety. The Department of Occupational Safety and Health (DOSH, formerly California Occupational Safety and Health Administration or Cal/OSHA) is the primary agency responsible for worker safety in the handling and use of chemicals in the workplace. DOSH standards are generally more stringent than federal regulations. The employer is required to monitor worker exposure to listed hazardous substances and notify workers of exposure (CCR Sections 337-340). The regulations specify requirements for employee training, availability of safety equipment, accident-prevention programs, and hazardous substance exposure warning.

California Division of Safety of Dams. Division 3 of the Water Code gives to the Department of Water Resources' Division of Safety of Dams responsibility for the safety of non-federal dams and reservoirs. CDSD reviews plans and specifications for the construction of new dams or for the enlargement, alteration, repair, or removal of existing dams and must grant written approval before construction may proceed. CDSD periodically inspects operational dams to ensure adequate maintenance and correction of any safety deficiencies.

4.1.3.3 Local

City of San Buenaventura. The City of San Buenaventura Comprehensive Plan (City of San Buenaventura, 1989) contains a Safety Element, which describes the City of San Buenaventura's safety goals, objectives and policies. Several recreation policies pertain to the study area and the proposed project, as described in Table 4.1-3.

Table 4.1-3: City of San Buenaventura Safety Element Policies

Policy Number	Description of Policy
8.1	Requires new development to pay a fee to mitigate cumulative impacts to existing drainage facilities.
12.1	Develops and maintains a dam inundation warning plan to alert affected governmental agencies, residents, and businesses located in the potential hazard area.
21.1	Continues implementation and enforcement of State chemical disclosure laws and regulations.
21.2	Provides information and assistance to residents, businesses, and industry that request information regarding the proper use, storage, transportation, handling and disposal of hazardous substances.

Source: City of San Buenaventura, Comprehensive Plan for the Year 2010. Safety Element. Adopted on August 28, 1989.

4.2 HYDROLOGY AND WATER RESOURCES

4.2.1 Hydrology

The information on hydrologic conditions presented in this section is derived from *Hydrology, Hydraulic and Sediment Studies of Without-Project Conditions, Matilija Dam Ecosystem Restoration Project* (June 2002) prepared by the U.S. Bureau of Reclamation (BOR) (BOR, 2002).

4.2.1.1 General River and Watershed Description

The Ventura River drains about 223 square miles on the southern slope of the Transverse Range of southern California, discharging into the Pacific Ocean near the town of Ventura. The Ventura River watershed is mountainous and in a tectonically active area, resulting in large amounts of upland sediments for supply to the streambed. The sediment production per area from the Ventura River watershed is one of the highest in the nation. The result, in a natural condition, is a highly dynamic, relatively steep stream with the potential for large amounts of sediment, including sand, gravel and cobbles, transported during large floods. In a state of natural dynamic equilibrium, the river channel shape would potentially change from flood to flood, and the river would serve as a major supplier of beach sand to the Ventura coastline. Channel slope would remain relatively constant, although there would be local and seasonal variations in slope resulting from flooding and sediment transport and deposition.

Matilija Creek, on which Matilija Dam is situated, is a tributary to the Ventura River. At Matilija Dam, Matilija Creek drains a watershed of approximately 54 square miles, which represents approximately one fourth the total Ventura River watershed. Since its construction, Matilija Dam has served as a trap for sediments from the watershed upstream.

Although floods passing through Matilija Dam are no longer effectively attenuated by the dam, the trapping of sediment has effects on downstream stream morphology. Trapping sediment in the dam substantially reduces the sediment supply to the stream downstream of the dam. As a result, the stream, which still has a similar sediment transport capacity, makes up the difference by obtaining sediment for transport from the channel bank and bed. The removal of this sediment, without replacement by sediment from upstream, causes the bed elevation to drop over the long term, and increases the potential for bank erosion. In-stream structures such as bridges and utility crossings could be adversely affected, as could structures located adjacent to the stream. As the smaller-sized sediments in the channel bed are more easily transported than larger sediments, the channel bed composition would change to become more dominated by cobbles and boulders rather than sand. The delivery of sand to the beach would be reduced.

The Ventura River starts at the confluence of Matilija Creek and North Fork Matilija Creek, approximately 0.6 mile downstream of Matilija Dam. There are several smaller basins that feed the Ventura River (Cozy Dell, McDonald, Kennedy, Rice and Wills Canyons) before the next major tributary, San Antonio Creek. Coyote Creek then enters Ventura River just downstream of the confluence with San Antonio Creek. Casitas Dam regulates Coyote Creek. Downstream, Cañada Larga enters from the east and Cañada de Rodriguez and Cañada del Diablo enter from the west. The drainage basin characteristics associated with the major sub-areas and the minor drainages are given in Table 4.2-1. Over 75 percent of the Ventura River Basin is classified as rangeland covered with shrub and brush and 20 percent of the basin is classified as forested. In general, the highest sediment producing parts of the watershed are those covered in shrub and brush and are located in the upper parts of the watershed where slopes are greater and annual rainfall is larger. Nearly 45 percent of the watershed may be classified as mountainous, 40 percent as foothill, and 15 percent as valley area. The maximum elevation in the watershed is 5,457 feet above sea level.

Table 4.2-1: Major Sub-Basins in the Ventura River Basin

Local Area Basin Name	Drainage Area (sq. mi.)	Maximum Length of Watershed (feet)	Minimum Elevation of Watershed (feet)	Maximum Elevation of Watershed (feet)	Mean Annual Precipitation (inches)
Matilija at Matilija Dam	54.6	83363	1009.29	5456.77	23.5
North Fork Ventura River - Matilija	16.2	40554	1009.29	5006.72	22.1
Ventura River D/S of Willis Canyon	7.4	22090	696.87	4278.56	20.2
Ventura River at Live Oak Creek	11.6	45685	290.61	2310.04	17.8
San Antonio Creek	51.0	79331	290.41	5410.69	18.3
Santa Ana Creek at Lake Casitas	9.5	38211	528.60	4645.89	18.7
Coyote Creek above Lake Casitas	13.4	36127	560.88	4769.48	21.1
Drainage area that includes Lake Casitas	15.3	31470	514.96	2342.64	18.2
Ventura River Subarea to Foster Park	9.3	25313	195.36	1302.82	17.3
Cañada Larga Subarea	19.3	50752	195.78	2788.00	17.9
Lower Ventura River Subarea	15.5	35470	0.00	2117.63	16.9
Entire Ventura River Basin	223.1		0.0	5456.77	19.9

There are eight major bridge crossings between the Matilija Dam and the ocean, three levees, and two water diversions. There is extensive development along the river, including commercial and residential development located in areas where flooding has previously occurred. Many of these developments are now protected by levees.

4.2.1.2 Dams and Diversions

There are several structures that affect the flow in the Ventura Basin, including Matilija Dam, Casitas Dam, Robles Diversion Dam, and the City of San Buenaventura diversion structure located at Foster Memorial Park.

Matilija Dam was completed in 1948 with a capacity of 7,018 acre-feet and impounds Matilija Creek. Matilija Reservoir now has less than 500 acre-feet of capacity remaining and its ability to trap sediment and attenuate floods has been substantially decreased. The volume of sediment now in the reservoir, approximately 5.9 million cubic yards, is equivalent to approximately 12 years total delivery of sediment by the Ventura Rive to the ocean.

Casitas Dam, which dams the Santa Ana and Coyote Creeks, was built in 1958 with a capacity of 250,000 acre-feet. Casitas Dam was built as part of the Ventura River Project by the Bureau of Reclamation. Prior to Casitas Dam, Coyote Creek contributed 18 percent of flow at Ventura River. After construction, substantial flows downstream of the Casitas Dam in Coyote Creek only occurred during wet years in which the spillway was passing water. As a result, Coyote Creek contributed approximately only five percent of the flow in the Ventura River during the period 1971-1980. Casitas Dam also traps effectively all the sediment that enters into it.

Robles Diversion Dam was built in 1958 and diverts water from the Ventura River into Casitas Reservoir. During the period 1991-1999, the average diversion into Robles Canal was 23.0 cubic feet per second (cfs), which is approximately 31 percent of the flow in Matilija Creek during this period. Most of the diversion at Robles occurs from December through March and is highly variable. The maximum diversion rate at Robles is approximately 500 cfs. In dry years, Casitas Municipal Water District's operating criteria allow almost no diversion of water. Robles Diversion is subject to large amounts of sediment deposition during floods and, as a result, considerable sediment removal is necessary after every major flood.

The general operating criteria for Matilija Reservoir is to maintain outflow equal to inflow when diversions are not taking place at Robles. When diversions are being performed at Robles, the reservoir level is cycled to produce larger flows in the Ventura River to optimize the amount of diversion at Robles. There is a 36-inch, a 12-inch, and a 6-inch release valve at Matilija Reservoir with the potential to release a maximum of 250 cfs.

There is also a City of San Buenaventura diversion structure located at Foster Park. The diversions at Foster Park are 7.0 cfs on average with a maximum of 24 cfs. No surface water is diverted if large suspended sediment concentrations are present in the river.

Robles Diversion and the diversion at Foster Park do not impact the sediment transport in Ventura River appreciably, as large floods are responsible for the majority of the sediment transport in the river and these diversions do not represent a substantial quantity of the flow during the large floods.

There are three major levees along the Ventura River. The most upstream is near the Santa Ana Bridge. It protects the Live Oak community along the west bank. The Casitas Springs Levee is along the east bank and protects the community of Casitas Springs. The Ventura Levee is along the East bank and protects the City of San Buenaventura.

4.2.1.3 Hydrology

Flood Frequency Analysis

The BOR performed a flood-frequency analysis for the entire length of the Ventura River (Bullard, 2002). According to BOR's analysis, Matilija Dam has a negligible impact on the peak flows of large floods (floods with a return interval greater than 10 years). Before the large storm in 1969, the dam had approximately 3,500 acre-feet of storage remaining and this storage did not attenuate the 1969 flood. In fact, according to stream gauge records, the peak flow was larger downstream of the dam than upstream of the dam. Currently, the storage capacity of Matilija Dam is less than 500 acre-feet and the reservoir would quickly fill during a major storm. For example, the 10-year flood peak of 9,900 cfs in Matilija Creek would completely fill a dry reservoir in less than 40 minutes. Therefore, the dam provides no practical attenuation of the peak flow for large flood events. It may slightly lengthen the arrival time of the peak flow because of the decreased slopes in the reservoir area, but this extension of the arrival time would be less than 40 minutes.

The flow in the Ventura River and its tributaries can vary rapidly. A comparison between the instantaneous flow recorded at 15-minute intervals and the daily average flows shows that the daily average recorded flow for the flood of February 1992 was 8,670 cfs while the peak for that day was 44,200 cfs.

Flow Duration Curves

Flow duration curves were developed by the BOR for various stream gauges along the river. Over 60 percent of the time, the flow is less than ten cfs in the Ventura River at Foster Park, and approximately 80 percent of the time the flow is less than ten cfs in the Ventura River at Meiners Oaks. The river has no flow at least 30 percent of the time at Meiners Oaks. Flood duration is very short and large flows occur infrequently. For example, the two-year flood value is only exceeded approximately 0.2 percent of the time in the Ventura River.

4.2.2 Sediment Transport

The information on sediment characteristics presented in this section is primarily derived from *Hydrology, Hydraulic and Sediment Studies of Without-Project Conditions, Matilija Dam Ecosystem Restoration Project* (June 2002) prepared by the BOR.

4.2.2.1 Riverine Transport

Upstream of the dam, Matilija Creek is a steep cobble bed stream that is well confined between canyon walls. Matilija Creek gradually becomes less steep and experiences active channel migration as it cuts through the delta to reach Matilija Reservoir. Downstream of the dam, Matilija Creek joins North Fork Matilija Creek to form the Ventura River. The 1.5 miles immediately downstream of the dam is a very steep reach with mostly boulders as bed material. As the Ventura River exits this steep canyon, it enters a wide depositional plain for approximately one mile until it reaches Robles Diversion Dam. From Robles Diversion Dam to the confluence with San Antonio Creek, the Ventura River is a slightly sinuous braided stream that experiences active channel migration. From San Antonio Creek until the estuary, the river is relatively more confined and has fewer channels. The estuary is a presently protected from tidal action by a sand bar. The sand bar is removed when high flows pass through the estuary and then is created again by the supply of sand from littoral transport (Wetlands Research Associates, 1992). Table 4.2-2 presents Matilija Creek and the Ventura River as divided into the reaches discussed in Section 1 (Introduction) and shown in Figure 1-2 and indicates where the river within a given reach is generally homogeneous.

The reaches also roughly correspond to changes in stream slope. Immediately downstream of Matilija Dam (Reach 6), the slope is greater than two percent, but decreases as the reach becomes depositional to 1.5 percent. The slope slowly decreases throughout Reaches 4 and 5 and then decreases rapidly at the confluence with San Antonio Creek. The slope again slowly decreases throughout Reaches 2 and 3, starting at approximately one percent and ending at a ratio of 0.6 percent. The slope again sharply decreases in the estuary.

Table 4.2-2: Major Reaches of Matilija Creek and the Ventura River

Reach No(s).	Reach	River Mile	Description
9	Matilija Creek	30 – 17.46	Natural stream channel
8	Matilija Delta	17.46 – 16.76	Delta
7	Matilija Reservoir	16.76 – 16.46	Reservoir
6	Downstream of Matilija Dam to canyon opening	16.5 – 15	Steep channel, mostly single channel
6	From Canyon opening to upstream of Robles Diversion	15 – 14.15	Depositional reach
4-5	Near Robles diversion to upstream of confluence with San Antonio Creek	14.15 – 7.93	Braided channel
2-3	San Antonio Creek confluence to estuary	7.93 – 0.60	Relatively more confined less braided channel
1	Mouth of Ventura River and estuary	0.20 – 0.60	Temporary channel naturally cut through sand delta, estuary periodically flushed by floods

The channel width also shows distinct changes along the river. In the canyon downstream of Matilija Dam, the channel width is approximately 100 feet. As is enters into the valley in Reach 6, the channel width almost doubles as it approaches 200 feet. The channel width decreases again after Robles due to the man-made constriction and then gradually increases in the downstream direction. The channel width again decreases substantially due to the constrictions at Baldwin Road and Santa Ana Boulevard. The confluence with San Antonio Creek creates a wider channel once again, but the river narrows considerably at river mile 6 due to a natural constriction of the valley at this location. The river remains relatively narrow (approximately 200 feet wide) until river mile 2.5 where the valley widens rapidly. The river is constricted again from the valley on the West and the Ventura Levee on the East. As the delta is approached the river widens markedly.

Sediment Yield from Watershed

The watershed of the Ventura River is experiencing active tectonic uplift (Scott and Williams, 1978; Rockwell et al., 1984) and, therefore, the relatively young hillslopes can generate large amounts of sediment. Scott and Williams identified several mechanisms for sediment movement in the small basins (less than ten square miles). Rockfalls and slides are common throughout the area and these events form deposits at the base of steep hillsides and along the river banks. Rock-fragment flows or dry sliding is the motion in aggregate of gravel size (2 to 64 millimeters) and smaller material. They stated that it is the dominant form of sediment transport on hill slopes in the Ojai area. Debris flows were found to occur in Cozy Dell Canyon, Stewart Canyon and a tributary to Senior Canyon as the result of the 1969 storm. Mudflows are similar to debris flows and occur when the concentration of clay exceeds a certain threshold (usually ten percent). Scott and Williams did not find evidence of this type of flow in the Ventura River Basin.

The river channels in the basin may experience periods of filling and entrenching. Dry sliding of sediments from the hillslopes fill the stream channel below and then, when a storm arrives, the channel is scoured. However, the periods of filling and entrenchment will be much more pronounced in the upper watershed and smaller tributaries. The main stem of the Ventura River receives relatively little sediment directly from the hillslopes compared to the inputs from the tributaries. Therefore, the main stem of the Ventura River will show smaller elevation changes before and after storms than the upper watershed and small tributaries. Scott and Williams only studied watersheds smaller than ten square miles and, therefore, their conclusions may not necessarily scale up to the larger watersheds.

The BOR concluded that the best estimate of the long-term sediment yield of the Ventura Basin is provided in the analysis of Brownlie and Taylor (1981) and the best estimate of the long-term sediment yield of the Matilija Creek Basin is based on the analysis of the sediment deposited behind the reservoir. These estimates are given in Table 4.2-3. It should be noted that because Matilija Dam is rapidly losing ability to trap sediment, its effect on the sediment yield is decreasing. Therefore, the actual sediment yield of the Ventura Basin is gradually approaching that of the Ventura Basin with only Casitas Dam in place.

Table 4.2-3: Average Sediment Yield in the Ventura River Basin

Basin	Sediment Yield (acre-ft/mi²/yr)
Ventura Basin without Casitas Dam and Matilija Dam	2.1
Ventura Basin with Casitas Dam and Matilija Dam in place	1.30
Ventura Basin with Casitas Dam in place	1.64
Matilija Creek Basin	1.66

Sediment Loads in Streams

Hill and McConaughy (1988) analyzed the sediment load data from USGS stream gauge 11118500 (Ventura River near Ventura) from 1969-1973 and from 1975-1981, and from USGS stream gauge 11117500 (San Antonio Creek at Casitas Springs) from October 1976 to September 1978. They found that during the period of sediment sampling on the Ventura River, 92 percent of the total sediment transported in the Ventura River occurred during five storms averaging ten days each. Relatively infrequent storms dominate the movement of sediment in the Ventura River Basin. The years corresponding to the five storms were the only years to show substantial sediment transport.

Over 98 percent of the total sediment load in the Ventura River and San Antonio Creek is suspended. Approximately 96 percent of coarse sand load (0.062 mm to 2 mm in diameter) is suspended. While larger particles are moved during large floods, it comprises a relatively small portion of the total load. The relative amount of coarse material being transported increases with increasing flow rate. Because large particle sizes dominate the bed material, they are important in determining the channel geometry.

The drainage area of North Fork Creek is approximately 9 percent of the total drainage at the Ventura stream gauge at Foster Park, and it contributes approximately 17 percent of the total load and 26 percent of the sand load. The drainage area of San Antonio Creek is approximately 27 percent of the total drainage at the Ventura stream gauge at Foster Park, and it contributes approximately 29 percent of the total load and 44 percent of the sand load.

The BOR estimated that Matilija Dam traps approximately 55 percent of the sediment of Matilija Creek. However, for sand size and greater, the trapping efficiency is still practically 100 percent. This is evidenced by the small amount of sand located in the reservoir region. If sand were passing over the dam, there would have to be sand in the bed of the reservoir. A large percentage of the fine material (silt size and smaller) can pass over the top of Matilija Dam. The drainage area of Matilija Creek is only 29 percent of the drainage area at Ventura stream gauge at Foster Park, but it supplies 49 percent of the flow and, therefore, can supply a large amount of fine sediment. Assuming that the trap efficiency of 55 percent and using the sediment yields from Table 4.2-3, gives an average contribution of Matilija Creek of 17 percent. This is assumed to be a low estimate.

The minor drainages between the start of the Ventura River and Foster Park also contribute sediment and, if the 1969 storm is representative, they contribute at least 16 percent of the total load at Foster Park. As mentioned previously, 16 percent is likely a large underestimate of the total load of the minor drainages. Assuming a trap efficiency of 75 percent of the debris basins gives an average contribution of 21 percent for the minor drainages. The minor drainages contribute relatively coarser load and it is estimated that they contribute the remaining 27 percent of the sand load.

4.2.2.2 Littoral Transport

Flows and sediment transport from the Ventura River affect beaches east of the river mouth by adding sediment into the Santa Barbara Littoral Cell, an alongshore flow current that transfers sediment along beaches in a west-to-east direction from Ellwood in Santa Barbara County to Point Mugu in Ventura County. The main sources of natural sand supply are from cliff erosion and episodic delivery of sediment from the streams and rivers that discharge into the river on a five- to ten-year periodic basis. Beaches along this region are becoming increasingly eroded due to lack of replenishment from input sources, partially caused by constructed structures that block sediment, such as the Matilija Dam. The region from Emma Wood State Beach to Point Mugu has a wider berm width than the eastern portion of the littoral cell, but is receiving increased erosion stress, leading to greater sand depletion and beach recession.

Littoral cells are flow patterns within an independent coastal segment that does not circulate sand between its end points. The Santa Barbara Littoral Cell, one of the longest littoral cells in southern California, extends from Point Conception to the Mugu Submarine Canyon, where it is believed that all of the littoral sand transport is deposited down the axis of the canyon and lost from the system. The principal feature of the cell is its predominant net alongshore transport direction. Wave shelter provided by the Channel Islands results in an almost unilateral movement of sand along the beaches from west to east.

Sub-cells include Ventura River to Ventura Harbor, Ventura Harbor to Channel Islands Harbor, Channel Islands Harbor to Port Hueneme, and Port Hueneme to Mugu Submarine Canyon. In the case of the Ventura River to Ventura Harbor, Ventura Harbor to Channel Islands Harbor, and Channel Islands Harbor to Port Hueneme, the sub-cells are bounded on the downcoast end by man-made harbor facilities that intercept most if not all of the littoral transport. The Ventura Harbor, at the downcoast end of the Ventura River to Ventura Harbor sub-cell, requires annual dredging to maintain adequate water depth within the entrance channel. During dredging, sand is bypassed around the harbor and discharged on McGrath State Beach.

In the last 80 years, fluvial sand supplies have been markedly reduced due to dam construction, watershed improvements, and riverbed sand and gravel mining. In the Ventura River to Ventura Harbor sub-cell, sand delivery from the Ventura River and losses from Pierpont Bay beaches have been identified as the main sources of sediment.

The 1989 Comprehensive Sand Management Plan prepared for BEACON estimated that the Ventura River produced 80,000 cubic yards of sediment per year, while beach erosion between Ventura River and the Ventura Harbor produced 200,000 cubic yards per year. The study by BEACON suggests that the Ventura River in 1989 was producing about 70 percent of its former natural yield. Therefore, a deficit of at least 35,000 cubic yards per year may be attributed to the construction of Matilija Dam and other structures, along with sand mining. Since 1970, the beaches have eroded at a rate of about 210,000 cubic yards per year.

4.2.3 Water Quality

The California Water Code (Water Code) establishes policy for water quality control for State (Section 13100-13198) and regional (Section 13200-13286) water resources. California is divided into nine water quality control regions, each of which has developed regional water quality control plans to address water quality issues specific to the region. The Ventura River watershed is under the jurisdiction of the Los Angeles Regional Water Quality Control Board (RWQCB) (Region 4). Region 4 adopted the *Water Quality Control Plan: Los Angeles Region* (Basin Plan) in June of 1994. The Basin Plan was designed to preserve and enhance water quality and protect the beneficial uses of waters located within the Los Angeles Region (CRWQCB-LA, 1994). The Basin Plan also identifies beneficial uses for specific water bodies located within the region and establishes water quality standards for the water bodies.

Section 303(d) of the federal Clean Water Act (CWA, 33 USC 1250, *et seq.*, at 1313(d)) requires States to identify waters that do not meet water quality standards after applying certain required technology-based effluent limits and to classify them by category. States are required to list such waters and submit the list to the EPA for review and approval. The State-developed and submitted list is known as the Section 303(d) list of impaired waters. Additionally, states are required to prioritize waters/watersheds for future development of total maximum daily load (TMDL), or assessment of water quality problems, contributors, and actions for restoring and protecting bodies of water. The Clean Water Action Plan (USEPA and USDA, 1998) establishes four assessment categories of watersheds. Categories I thru IV are described as follows:

- Category I - Watersheds that are candidates for increased restoration activities due to impaired water quality or other impaired natural resource goals (emphasis on aquatic systems)
- Category II - Watersheds with good water quality that, through regular program activities, can be sustained and improved
- Category III - Watersheds with pristine or sensitive areas on federal, State or tribal lands that need protection
- Category IV - Watersheds where more information is needed in order to categorize them.

Planning and development of water quality monitoring programs for the Ventura River began in 1994 and monitoring began in 2000. Pursuant to Section 402(p) of the federal Clean Water Act, the RWQCB (Region 4) issued a National Pollutant Discharge Elimination System (NPDES) permit to the Ventura County Flood Control District (VCFCD) and other local municipalities within Ventura County to regulate discharge of all point source pollutants into waters of the United States, including the receiving waters of the Santa Clara River, Ventura River, Calleguas Creek, Malibu Creek and other coastal watersheds within Ventura County (VCWPD, 2001). The NPDES permit was issued for a first term beginning August 22, 1994, and expiring on July 27, 2000. During this term, the VCFCD developed two programs for monitoring water quality of receiving waters throughout the County: (1) the Ventura Countywide Stormwater Quality Management Program and (2) the Ventura River Watershed Monitoring Program. Both programs establish parameters that collectively characterize the water quality of the Ventura River watershed.

The VCFCD, as the Principal Co-permittee, is responsible for management of the Ventura Countywide Stormwater Quality Management Program, which involves collecting and analyzing stormwater samples from seven sites across Ventura County. Results from one of the seven sites, a mass emissions site located in the Ventura River (site ME-VR, described below), reflect the stormwater quality for the Ventura River watershed.

A description of the parameters and results of the Ventura River Watershed Monitoring Program and the Ventura Countywide Stormwater Quality Management program are provided below.

4.2.3.1 Ventura River Watershed Monitoring Program

The RWQCB, Region 4 classifies the Ventura River and its tributaries as a Category I (impaired) watershed and has approved the river's status on the 303(d) list and TMDL priority schedule for pollutants including DDT, copper, silver, zinc, algae (eutrophication) and trash. In response to the impaired status of the river, the Ventura River Watershed Monitoring Program was developed with aims of enhancing and restoring the Ventura River (Alstatt and Jenkin, 2001). The Ventura River Watershed Monitoring Program was organized in February 2000 by Santa Barbara ChannelKeeper in conjunction with the RWQCB to establish comprehensive water quality monitoring throughout the Ventura River. Water quality monitoring began in 2001 and consists of collecting samples at 14 established sites, spanning 16 miles of the Ventura River and ten miles of tributaries, and testing the samples for field and laboratory parameters (or characteristics of the watershed identified in the field or in a laboratory).

The *Second Quarterly Report to the City of San Buenaventura* (Alstatt and Jenkin, 2001) summarizes results of the monitoring efforts for January 2001 thru June 2001. Santa Barbara ChannelKeeper provided data for the first monitoring year January 2001 through January 2002 period; however, a formal report is not yet available. The parameters used to characterize water quality are summarized in the *Watershed Manual* for the Ventura River Watershed Monitoring Program and include:

- Temperature
- Dissolved Oxygen
- Turbidity
- Conductivity
- pH
- Flow
- Total Coliform
- E.Coli
- Entrococcus
- Nitrate
- Phosphorous

The parameters and how they relate to water quality within the Ventura River watershed are described below, along with the results for the first term (2001-2002).

Temperature

Water temperature directly affects biological and chemical processes, including dissolved oxygen. Temperature can be altered by man made structures by changing water flow rates with dams or artificial river channels. Water and air temperature were measured in the field with a shielded Celsius (C) thermometer. Temperature varied throughout the seasons at all sites, with lowest temperatures occurring in January and February, and highest temperatures occurring in June through August. Lowest readings throughout the watershed were on January 20, 2001, with 7.3° C at Santa Ana Road and 7.5° C at Lower Cañada Larga. Highest readings were recorded at Matilija Creek on June 24 (25.4° C) and Lion Canyon on August 12 (25.3° C).

Several sites experienced large changes throughout the year. Matilija Creek, below the dam, had the greatest variability, with a range of 15.8° C. Thacher Creek had the lowest temperature range of 9° C. Lower Cañada Larga runs through a concrete channel immediately upstream of our sampling site, and the effects of air temperature upon water temperature were evident as shown by the temperature range of 13.8° C. In comparison, Stewart Creek has a natural bottom and a riparian cover immediately upstream of our site, and was not affected as much by changes in air temperature as shown by the temperature range of 9.1° C. Low flows and reduced cover have reduced suitability for steelhead in some areas of the watershed. Table 4.2-4 summarizes the temperature range by monitoring station during the 2001- 2002 monitoring period.

Table 4.2-4: Temperature Range by Monitoring Station (2001-2002)

Station	Temperature (C)		
	High	Low	Range
1. Main Street	23.3	9.2	14.1
2. Stanley	23.1	12.5	10.6
3. Shell Road	22.2	11.1	11.1
4. Lower Cañada Larga	21.2	7.5	13.7
5. Upper Cañada Larga	22.9	11.3	11.6
6. Foster Park	23.2	10.9	12.3
7. San Antonio	23.0	10.3	12.7
8. Lion Canyon	25.3	10.8	14.5
9. Stewart/Fox	19.4	10.3	9.1
10. Thacher	21.8	12.8	9.0
11. Santa Ana Bridge[2]	21.2	7.3	13.9
12. Highway 150[2]	20.2	10.3	9.9
13. Matilija	25.4	9.6	15.8
14. North Fork	21.8	10.7	11.1
15. Upper Matilija[3]	25.4	15.6	9.8

1 Range calculated as the difference between the high and low recorded temperatures.
2 Temperatures were only recorded on 6 of 12 possible dates.
3 Station 15 was installed in August 2001, thus temperatures were only recorded on the latter 5 of 12 possible dates.

Dissolved Oxygen

Dissolved oxygen (DO) represents the concentration of oxygen present in the river water. DO is controlled by combined effects of oxygen production by attached plants, biological respiration, gas exchange with the atmosphere, and oxidation of organic matter. Sites were sampled between 9:30 am and 1:00 pm. Concentrations of DO within the watershed varied from site to site. The lowest dissolved oxygen reading was 3.79 mg/L at Upper Cañada Larga on June 24, as this creek began to dry up. The highest readings (~17mg/L) were in shallow water, such as at Upper Cañada Larga and Stanley in

July. With the first major winter or spring storm and corresponding increased flows in the Ventura River, the DO levels tend to return to desirable values. During low flow conditions, DO levels decrease. Table 4.2-5 summarizes the DO range for each monitoring site during the 2001-2002 monitoring period.

Table 4.2-5: Dissolved Oxygen Range by Monitoring Station (2001-2002)

Station	Dissolved Oxygen (mg/L)		
	High	Low	Range[1]
1. Main Street	14.17	7.47	6.70
2. Stanley	17.65	9.38	8.27
3. Shell Road	15.65	8.87	6.78
4. Lower Cañada Larga	15.52	8.59	6.93
5. Upper Cañada Larga	17.06	9.04	8.02
6. Foster Park	13.84	9.16	4.68
7. San Antonio	13.96	8.38	5.58
8. Lion Canyon	11.82	8.22	3.60
9. Stewart/Fox	13.24	6.75	6.49
10. Thacher	10.30	7.67	2.63
11. Santa Ana Bridge[2]	12.44	9.67	2.77
12. Highway 150[2]	11.61	8.75	2.86
13. Matilija	15.68	6.55	9.13
14. North Fork	14.75	8.70	6.05
15. Upper Matilija[3]	15.40	10.40	5.00

[1] Range calculated as the difference between the high and low recorded DO.
[2] DO recorded on 6 of 12 possible dates.
[3] Station 15 was installed in August 2001, thus DO recorded on the latter 5 of 12 possible dates.

Turbidity

Turbidity is the measure of water clarity—the higher the turbidity, the poorer the clarity of the water. Sudden changes in turbidity can lead to impacts on living organisms in water. There is a correlation between turbidity and the temperature of a water body. Increased turbidity often corresponds with increased water temperature and vice versa. The correlation between turbidity and water temperature is also inversely related to the amount of oxygen that a water body can hold. Increased turbidity and temperature results in a decrease in the amount of oxygen that a water body can hold and vice versa. Natural factors such as wave action, changes in seasonal light intensity, and erosion can alter turbidity. Human factors such as logging, construction, and mining leads to unnatural soil erosion, which alters turbidity. Increase in turbidity results in increased difficulty for fish or other living organisms in the water to survive.

The overall turbidity of the Ventura River watershed tended to decrease with distance upstream. The sites located furthest upstream appeared the clearest most often. The lowest turbidity on average was at Santa Ana Road; however, this site was dry for six of the twelve months.

Twelve out of fourteen sites had the highest turbidity on February 25, 2001, immediately after one of the biggest rain events of the season. Turbidity for both Upper and Lower Cañada Larga sites was extremely high on February 25, 2001 (~800 nephelometric turbidity units (NTU)), measuring much higher than any other site. Sampling teams noted landslides and high sediment input on this sampling day. For all reaches, turbidity was highest during the wet season. During the dry season, turbidity decreased with distance upstream. Table 4.2-6 summarizes the turbidity range for each of the monitoring sites during the 2001-2002 period.

Table 4.2-6: Turbidity Range by Monitoring Station (2001-2002)

Station	Turbidity (NTU)		
	High	Low	Range[1]
1. Main Street	175.00	0.22	174.78
2. Stanley	70.00	0.32	69.68
3. Shell Road	89.50	0.10	89.40
4. Lower Cañada Larga[2]	800.00	0.00	800.00
5. Upper Cañada Larga[2]	792.00	0.05	791.95
6. Foster Park	28.00	0.05	27.50
7. San Antonio	26.00	0.00	26.00
8. Lion Canyon	39.00	0.01	38.99
9. Stewart/Fox	4.40	0.00	4.40
10. Thacher	18.00	0.00	18.00
11. Santa Ana Bridge[3]	1.03	0.00	1.03
12. Highway 150	9.70	0.00	9.70
13. Matilija	7.30	0.00	7.30
14. North Fork	9.60	0.00	9.60
15. Upper Matilija[4]	0.50	0.00	0.50

[1] Range calculated as the difference between the high and low recorded turbidity.
[2] Turbidity recorded on 10 of 12 possible dates.
[3] Turbidity recorded on 6 of 12 possible dates.
[4] Station 15 was installed in August 2001, thus turbidity was recorded on the latter 5 of 12 possible dates.
NTU – Nephelometric Turbidity Units

Conductivity

Conductivity in water is related to the concentration of solids in the water. As water comes into contact with a great number of substances, it will dissolve many of them and develop a concentration of that substance. The concentration of solids can be measured as total dissolved solids (TDS) and salinity. TDS measures the concentrations of solids in fresh water, and the concentrations in salt water are collectively known as salinity. Salt water has immensely higher concentrations of solids than does fresh water. As solids in water conduct electricity, the test uses a digital meter that measures electrical conductivity. In fresh water when levels of TDS get too high, problems similar to those of excessive turbidity become common. Also if water dissolves a toxic solid, detrimental environmental effects may result. Salinity increases with depth. This is due to two factors: (1) fresh water is less dense than seawater, thus freshwater tends to float on top of the seawater until it is mixed by waves and (2) the ocean floor contains a higher concentration of minerals.

Salinity tends to decrease in the spring when heavy rainfall and melting snow increase the amount of fresh water flow. Since there is more water, the minerals are more dilute and there is a decreased concentration of the total dissolved solids. On the other hand, in late summer and fall, especially during periods of drought, less fresh water reaches the ocean. Since the flow of water is less, the dissolved solids are more concentrated, raising the TDS level. The temperature of the water affects TDS levels. As the temperature decreases, the salinity increases.

Soil acts as a natural filter by trapping many of the minerals as the water soaks through. However, paving or vegetation removal reduces the amount of water that can be absorbed by the land. This results in more water running off into the waterways instead of soaking into the soil, dissolving and carrying with it many different substances. Urban runoff from storm drains contains many chemicals, which readily dissolve in the water and raise TDS levels. Excessive withdrawals of fresh water from rivers (for agriculture and drinking water) that drain into the ocean reduce the total flow and volume of the water, also increasing the concentration of the total dissolved solids. Pollutants that contain heavy metals (such as lead) can dissolve more readily in saline water. In summer, higher temperature can combine with higher salinity levels and a lower dissolved oxygen level to create conditions where heavy metals previously deposited in the sediment can be more readily released into the water.

Conductivity varied between sampled sites. The highest conductivity levels were routinely found in both Lower and Upper Cañada Larga (~ 800 microsiemens (μS)), over three times higher than levels in the upper watershed. Table 4.2-7 summarizes the conductivity range for each of the monitoring sites during the 2001-2002 period.

Table 4.2-7: Conductivity Range by Monitoring Station (2001-2002)

Station	Conductivity (µS)			TDS (parts per million)		
	High	Low	Range[1]	High	Low	Range[1]
1. Main Street	1586.0	66.3	1519.7	785.0	34.9	750.1
2. Stanley	1525.0	63.0	1462.0	760.0	31.4	728.6
3. Shell Road	1480.0	41.1	1438.9	745.0	33.8	711.2
4. Lower Cañada Larga	3280.0	95.3	3184.7	1470.0	63.8	1406.2
5. Upper Cañada Larga	3055.0	140.8	2914.2	1515.0	70.7	1444.3
6. Foster Park	2420.0	772.0	1648.0	1220.0	455.0	765.0
7. San Antonio	3050.0	138.0	2912.0	1520.0	558.0	962.0
8. Lion Canyon	4430.0	1112.0	3318.0	2250.0	809.0	1441.0
9. Stewart/Fox	3755.0	47.3	3707.7	1650.0	23.7	1626.3
10. Thacher	2049.0	45.5	2003.5	2135.0	23.6	2111.4
11. Santa Ana Bridge[2]	2450.0	730.0	1720.0	--	--	--
12. Highway 150[2]	2530.0	721.0	1809.0	--	--	--
13. Matilija	2320.0	731.0	1589.0	471.0	458.0	13.0
14. North Fork	2300.0	78.6	2221.4	450.0	39.7	410.3
15. Upper Matilija[3]	914.0	878.0	36.0	457.0	457.0	--

1 Range calculated as difference between high and low recorded conductivity or TDS measurements.
2 TDS measurements unavailable.
3 One TDS measurement was recorded on November 3, 2001.

pH

The relative measure of alkalinity and acidity is pH. More specifically, pH measures the number of free hydrogen atoms present in a sample. The pH reading refers to a log-scale, 0-14, with a reading of 7 being neutral. Water becomes more acidic as the pH approaches 0 and more alkaline or base as the pH approaches 14. Most living species have a specific pH range for survival. If pH exceeds an organism's survival range, the organism will die. Many pollutants push pH readings toward the extremes of the scale. A change of more than two points on the scale can kill many species of fish. Values of pH in the watershed range from 7.3 to 8.7. Upper Cañada Larga has the greatest range of pH, approximately 1.2 units, followed by Highway 150, with approximately 1.1 units. The lowest range in pH was found at Lower Cañada Larga, Matilija, and North Fork (0.4 units). On average, the Ojai sites gradually decrease in pH upstream. Table 4.2-8 summarizes the pH range at each of the monitoring stations during the 2001-2002 period.

Table 4.2-8: pH Range by Monitoring Station (2001-2002)

Station	pH (C)		
	High	Low	Range
1. Main Street	8.5	7.7	0.8
2. Stanley	8.6	7.9	0.7
3. Shell Road	8.5	7.9	0.6
4. Lower Cañada Larga[2]	8.4	8.0	0.4
5. Upper Cañada Larga[2]	8.5	7.3	1.2
6. Foster Park	8.4	7.7	0.7
7. San Antonio	8.3	7.6	0.7
8. Lion Canyon	8.3	7.6	0.7
9. Stewart/Fox	8.3	7.6	0.7
10. Thacher	8.1	7.6	0.5
11. Santa Ana Bridge[3]	8.7	8.3	0.4
12. Highway 150[3]	8.7	7.6	1.1
13. Matilija	8.5	8.1	0.4
14. North Fork	8.5	8.1	0.4
15. Upper Matilija[4]	8.7	8.2	0.5

[1] Range calculated as the difference between the high and low recorded pH over the course of 12 dates unless otherwise noted.
[2] pH recorded on 10 of 12 dates.
[3] pH recorded on 6 of 12 dates.
[4] Station 15 was installed in August 2001, thus pH was only recorded on the latter 5 of 12 possible dates.

Flow

Flow refers to the amount of water that travels through a given location within the watershed. Flow varies within the watershed. Some sites dry up completely for several months (Cañada Larga sites, Santa Ana, Highway 150), while others experience flow throughout the dry season. Site 10 (Thacher) increased slightly during the summer, while flows at neighboring Stewart Creek dropped steadily. Table 4.2-9 presents the flow range by monitoring station.

Table 4.2-9: Flow Range by Monitoring Station (2001-2002)

Station	Flow (cubic feet per second)		
	High	Low	Range[1]
1. Main Street	93.36	6.72	86.64
2. Stanley	25.66	4.71	20.95
3. Shell Road[2]	25.37	25.37	--
4. Lower Cañada Larga[2]	18.88	0.47	18.41
5. Upper Cañada Larga[2]	6.54	0.96	5.58
6. Foster Park	104.10	4.28	99.82
7. San Antonio	45.81	1.16	44.65
8. Lion Canyon	8.87	0.15	8.72
9. Stewart/Fox	16.55	0.24	16.31
10. Thacher	18.64	1.82	16.82
11. Santa Ana Bridge	48.40	5.08	43.32
12. Highway 150	22.53	9.98	12.55
13. Matilija[2]	20.99	20.99	--
14. North Fork	32.53	1.75	30.78
15. Upper Matilija	13.32	4.84	8.48

[1] Range calculated as the difference between the high and low recorded flow.
[2] Flow measurement recorded for one of 12 possible measurement dates.

Bacteria: Total Coliform, E.Coli, Entrococcus

Total coliform bacteria are a collection of relatively harmless microorganisms that live in large numbers in the intestines of warm- and cold-blooded animals. They aid in the digestion of food. A specific subgroup of this collection is the fecal coliform bacteria, the most common member being *Escherichia coli*. These organisms may be separated from the total coliform group by their ability to grow at elevated temperatures and are associated only with the fecal material of warm-blooded animals. *Enterococcus* bacteria are a valuable indicator for determining the extent of fecal contamination of water.

The presence of fecal coliform bacteria in aquatic environments indicates that the water has been contaminated with the fecal material of man or other animals. The presence of fecal contamination is an indicator that a potential health risk exists for individuals exposed to this water. Fecal coliform bacteria may occur in ambient water as a result of the overflow of domestic sewage or nonpoint sources of human and animal waste.

In general, all three bacterial indicators increased after the first flush of heavy rains in February. The highest *Enterococcus* levels of the whole year were in February for almost every site.

Almost every month, the sites with the highest bacteria levels were Lower and Upper Cañada Larga and Stewart. Cattle were often observed in the creek bed at Upper Cañada Larga. Stewart often had trash and signs of human encampment in the giant reed thickets and creek bed. Although cattle often grazed in the creek bed at Lion, bacteria levels were not comparable to Upper Cañada Larga. The Upper River sites were typically lower that the rest of the watershed. The cleanest sites were Matilija and North Fork. Correlations between bacteria levels at Main Street and beach advisories down the coast of the river mouth were not identified. Table 4.2-10 summarizes the bacteria range for each monitoring site for the 2001-2002 period.

Table 4.2-10: Bacteria Range by Monitoring Site (2001-2002)

Station	Total Coliform (mpn/100)			*E. Coli* (mpn/100)			*Entrococcus* (mpn/100)		
	High	Low	Range[1]	High	Low	Range[1]	High	Low	Range[1]
1. Main Street	>24,192.0	332.0	23,860.0	884.0	<10.0	874.0	2784.0	<10.0	2774.0
2. Stanley	17,329.0	576.0	16,753.0	441.0	<10.0	431.0	2316.0	<10.0	2306.0
3. Shell Road	>24,192.0	314.0	23,878.0	7270.0	10.0	7260.0	3654.0	<10.0	3644.0
4. Lower Cañada Larga	>24,192.0	274.0	23,918.0	12,033.1	47.0	11986.1	860.0	<10.0	850.0
5. Upper Cañada Larga	15,531.0	364.0	15,167.0	464.0	<10.0	454.0	>24,192.0	74.0	24118.0
6. Foster Park	14,136.0	310.0	13,826.0	583.0	10.0	573.0	26132.0	<10.0	26122.0
7. San Antonio	17,329.0	303.0	17,026.0	594.0	20.0	574.0	1624.0	10.0	1614.0
8. Lion Canyon	24,192.0	294.0	23,898.0	1071.0	20.0	1051.0	2247.0	10.0	2237.0
9. Stewart/Fox	19,862.8	1,785.0	18,077.8	960.0	<10.0	950.0	780.0	86.0	694.0
10. Thacher	12,997.0	359.0	12,638.0	171.0	10.0	161.0	281.0	10.0	271.0
11. Santa Ana Bridge	6,484.0	104.0	6,380.0	213.0	<10.0	203.0	712.0	<10.0	702.0
12. Highway 150	2,909.0	93.0	2,816.0	63.0	<10.0	53.0	10.0	<10.0	0.0
13. Matilija	3,654.0	95.0	3,559.0	20.0	<1.0	19.0	862.0	<10.0	852.0
14. North Fork	1,674.0	193.0	1,481.0	72.0	<10.0	62.0	318.0	<10.0	308.0
15. Upper Matilija	3,282.0	31.0	3,251.0	10.0	<10.0	0.0	20.0	<10.0	10.0

[1] Range calculated as the difference between the high and low recorded bacteria concentrations. For approximate high or low recorded bacteria concentrations (< or >), approximate range is provided.

Nutrients: Nitrogen, Nitrate, Ammonia, and Phosphate

Organic nitrogen is found in proteins and is continually recycled by plants and animals. Nitrogen-containing compounds act as nutrients in streams and rivers. Inorganic nitrogen, or nitrogen that has experienced a reaction with nitrate or other forms, can cause oxygen depletion in fresh water. Thus, aquatic organisms depending on the supply of oxygen in the stream can die. The major routes of entry of nitrogen into bodies of water are municipal and industrial wastewater, septic tanks, feed lot discharges, animal wastes (including birds and fish) and discharges from car exhausts. Inorganic nitrogen may exist in the free state as a gas (N_2), or as nitrate (NO_3), nitrite (NO_2), or ammonia (NH_3).

Nitrites can produce a serious condition in fish called "brown blood disease." Nitrites also react directly with hemoglobin in human blood and other warm-blooded animals to produce methemoglobin. Methemoglobin destroys the ability of red blood cells to transport oxygen. Nitrite/nitrogen levels below 90 mg/L and nitrate levels below 0.5 mg/L seem to have no effect on warm water fish.

Phosphorus (PO_3) is one of the key elements necessary for growth of plants and animals. Phosphates (PO_4) are formed from this element. Organic phosphates are important in nature. Their occurrence may result from the breakdown of organic pesticides, which contain phosphates. They may exist in solution, as particles, loose fragments, or in the bodies of aquatic organisms.

Rainfall can cause varying amounts of phosphates to wash from farm soils into nearby waterways. Phosphate stimulates the growth of plankton and aquatic plants, which provide food for fish. This increased growth may cause an increase in the fish population and improve the overall water quality. However, if an excess of phosphate enters the waterway, algae and aquatic plants will grow wildly, choke up the waterway and use up large amounts of oxygen. This condition is known as eutrophication or over-fertilization of receiving waters. The rapid growth of aquatic vegetation can cause the death and decay of vegetation and aquatic life because of the decrease in dissolved oxygen levels. Phosphates are not toxic to people or animals unless they are present in very high levels. Digestive problems could occur from extremely high levels of phosphate.

At some sites (Upper San Antonio, San Antonio, Stewart, Thacher) nitrate levels rose during the summer months. This stronger signature could be due to the combination of constant urban runoff and reduced natural flows. Phosphate, however, did not show summer peaks as did nitrate. Dense algal mats were observed in Lion and San Antonio Creeks and at other sites during the summer months. Phosphate levels may appear constant since phosphate is a limiting nutrient for algae, which may result in immediate plant uptake of all available phosphate.

Table 4.2-11 summarizes the range of nutrient concentrations for each monitoring site during the 2001-2002 period. Nitrate (NO_3) and phosphate (PO_3) concentrations are included in Table 4.2-11. Ammonia (NH_3) concentrations for each of the monitoring sites were less than 0.05 and were identified on one or fewer days. Thus, ammonia concentrations were excluded from Table 4.2-11.

4.2.3.2 Ventura Countywide Stormwater Quality Management Program

The Ventura Countywide Stormwater Quality Management Program includes collection and analysis of stormwater samples across Ventura County. In the first monitoring year (2000/01), wet weather and dry weather water samples were collected at three types of monitoring locations: land use, receiving water and mass emission. Samples from one of two mass emission sites represent the stormwater qualities of the Ventura River (ME-VR).

Table 4.2-11: Nutrient Range by Monitoring Site (2001-2002)

Station	Nitrate (NO_3) mg/L			Phosphate (PO_3) mg/L		
	High	Low	Range[1]	High	Low	Range[1]
1. Main Street	1.20	0.00	1.20	1.25	0.03	1.22
2. Stanley	1.50	0.05	1.45	1.21	0.04	1.17
3. Shell Road	1.70	0.09	1.61	1.36	0.04	1.32
4. Lower Cañada Larga	0.40	0.00	0.40	1.32	0.00	1.32
5. Upper Cañada Larga	1.10	0.01	1.09	2.17	0.36	1.81
6. Foster Park	1.30	0.01	1.29	0.87	0.07	0.80
7. San Antonio	2.40	0.01	2.39	0.72	0.09	0.63
8. Lion Canyon	0.50	0.00	0.50	0.80	0.28	0.52
9. Stewart/Fox	1.40	0.01	1.39	0.68	0.27	0.41
10. Thacher	4.10	0.00	4.10	0.39	0.11	0.28
11. Santa Ana Bridge	0.24	0.01	0.23	0.33	0.13	0.20
12. Highway 150	0.20	0.00	0.20	0.28	0.00	0.28
13. Matilija	0.10	0.00	0.10	0.36	0.07	0.29
14. North Fork	0.70	0.00	0.70	0.27	0.00	0.27
15. Upper Matilija	0.1	0.00	0.10	0.18	0.02	0.16

[1] Range calculated as the difference between the high and low recorded nutrient concentrations.

Ventura County developed and submitted annual stormwater quality reports to the RWQCB-LA, the most recent being the *Annual Report for Permit Year 1, Reporting Year 7* (Report). The Report outlines the permit application and implementation process, describes program management and program elements, summarizes results of the Stormwater Monitoring Plan (SMP), and evaluates the SMP as well as program goals for the next reporting year (July 1, 2001, to June 30, 2002). In describing the stormwater quality of the Ventura River watershed, results of the latest SMP (July 2000 to June 2001) are most relevant. Environmental samples collected at the ME-VR monitoring station and conventional and nutrient results from the ME-VR station are provided in Tables 4.2-12 and 4.2-13 on the following page.

Storm water quality for the Ventura River mass emission site was compared with water quality objectives established in the California Toxic Rule (CTR), RWQCB-LA Basin Plan, and Ocean Plan. Due to a lack of sampling data, some modifications were required for a comparative analysis (Ventura County, 2001). The results indicate, for the most part, that there was insufficient data to provide a complete comparison (Ventura County, 2001).

For the data that met the selection criteria, there were only two constituents that did not meet either the freshwater or saltwater acute CTR, Ocean Plan, or Basin Plan criteria, which were copper and chromium in the Ventura River. This occurred during the wet-weather monitoring period. When data were compared to chronic criteria, lead was found to exceed the CTR and Ocean Plan. In addition, the concentration of bacteria for all sites exceeded Basin Plan criteria for fecal coliform during wet weather (Ventura County, 2001).

Table 4.2-12: Environmental Samples and QA/QC Samples Collected at the ME-VR Station

Constituents	2/13/01	2/26/01	3/5/01	5/17/01	6/19/01	8/8/01
Composite						
Metals, Total Recoverable[5]	✓ (FB)	✓	✓ (FB)	✓	✓ (FB)	✓
Metals, Dissolved[5]	✓	✓	✓	✓	✓	✓
Conventionals[6]	✓	✓	✓	✓	✓	✓
Total Organic Carbon[5]	✓	✓	✓	✓	✓	✓
Nutrients	✓	✓	✓	✓	✓	✓
EPA 8370 Semi/Non Volatiles[3]	✓ (FB)	✓	✓ (FB)	✓	✓ (FB)	✓
EPA 8270 Chlorinated Pesticides and PCBs[3]	✓ (FB)	✓	✓ (FB)	✓	✓ (FB)	✓
EPA 8141[4]	✓	✓	✓	✓	✓	✓
EPA 8151[4]	✓	✓	✓	✓	✓	✓
Grabs						
Mercury[2]	✓ (FB)	✓	✓ (FB)	✓	✓ (FB)	✓
Oil & Grease[5]	✓	✓	✓	✓	✓	✓
Microbiological	✓ (FB)	✓	✓ (FB)	✓	✓ (FB)	✓
PH/Conductivity	✓	✓	✓	✓	✓	✓
Ammonia	✓	✓	✓	✓	✓	✓
Total Recoverable Petroleum Hydrocarbons (TRPH)[5]	✓	✓	✓	✓	✓	✓
Bioassay[1]	✓	✓		✓		

Source: Ventura Countywide Stormwater Quality Management Program Table 10.7 (Ventura County, 2001)

Notes: "✓" indicates that the analysis was performed.
"FB" indicates that a field blank was collected.
Conventional are: TDS, Hardness, TSS, BOD, Bromide & Chloride; Nutrients are: TKN, Nitrogen-Nitrate, Orthophosphate & Phosphorus (total & dissolved); Metals are: As, Cd, Cr, Cu, Pb, Ni, Se, Ag, Th & Zn.

Unless otherwise noted, all analyses were performed by City of Oxnard Laboratory.

1. Performed by Aquatic Bioassay & Consulting
2. Performed by Frontier Geosciences, Inc.
3. Performed by CRG Marine Laboratories
4. Performed by APPL, Inc.
5. Performed by FGL Environmental
6. Bromide analysis performed by FGL Environmental

Table 4.2-13: Conventional and Nutrient Results from ME-VR Station

Constituent	Units	2/13/01	2/26/01	3/05/01	5/17/01	6/19/01
BOD5	mg/L	30	3	4	2	2
Conductivity	µmhos/cm	455	631	263	918	920
Hardness as CaC03	mg/L	184	272	122	396	384
PH	STD UNITS	7.7	8	8.1	8.3	8.3
Solids, Total Dissolved	mg/L	328	420	172	648	670
Solids, Total Suspended	mg/L	920	190	3500	<5	<5
Bromide	mg/L	0.04*	<0.5	<0.5	<0.5	<0.1
Chloride	mg/L	16	13	4	33	36
Fecal Coliforn	MPN/100 mL	5000	800	2300	<200	20
Fecal Streptococcus	MPN/100 mL	3000	17000	13000	700	1300
Total Coliform	MPN/100 mL	160000	13000	70000	<200	110
Carbon, Total Organic	mg/L	5.9	6.9	5.7	5.8	2
Oil & Grease	mg/L	<3	<3	<3	<3	<3
Ammonia as N	mg/L	0.1	<0.1	0.1	<0.1	0.2
Nitrate as N	mg/L	2.22	1.32	2.19	9.43	1
Orthophosphate-P	mg/L	0.29	0.14	0.15	0.06	0.05
Phosphorus, Total	mg/L	1.73	0.17	3.72	0.2	0.07
Phosphorus Dissolved	mg/L	0.35	0.17	0.35	0.2	0.07
TKN	mg/L	6.2	2.5	5.6	<0.5	1.7
TRPH	mg/L	0.17*	<0.5	<1	<1	<1

* Appendix B of the Ventura Countywide Stormwater Quality Management Program provides a description of the data aquifers associated with this sample result.

4.2.4 Groundwater

4.2.4.1 Groundwater Basins

In the Ventura River watershed, there are two major alluvial groundwater basins: Ojai Valley/Upper Ojai Basin (under the City of Ojai and extending east) and Upper/Lower Ventura River (area north and south of Oak View). The Sulphur Mountain aquifer is a bedrock aquifer located south of Ojai and Upper Ojai (Ventura County, 1994). Good quality water pumped from the Ojai Basin, the Upper Ojai Basin and the Upper Venture River Basin is used for agricultural and domestic uses by farmers, homeowners, and two water districts (Casitas MWD and Ventura, 1978). A description of the groundwater basins in the region follows.

Ojai Groundwater Basin

The Ojai Groundwater Basin is a fault-bounded basin that has been down-dropped relative to adjacent mountains and contains alluvium ranging in thickness from 500 to 700 feet. The basin is believed to hold 70,000 acre-feet when full. The Upper Ojai Basin is a small basin located southeast of the main Ojai Basin (Casitas MWD and Ventura, 1978). The groundwater is generally in an unconfined condition, and recharge occurs primarily through percolation from active streambeds. A confining clay layer is located in the southwest corner of the basin along San Antonio Creek at depths of up to 200 feet where wells may be artesian at times (Casitas MWD et al., 1997).

Upper Ventura River Groundwater Basin

The upper basin has been partly down-dropped along the Arroyo Parida fault to the north. The upper part of the basin has a maximum thickness of 200 feet. The lower pan of this basin has a maximum thickness of 100 feet and is approximately 60 to 70 feet thick beneath the riverbed from the confluence with San Antonio Creek to Foster Park. The basin is believed to have a capacity of 14,000 acre feet when full. A natural subsurface obstruction blocks subsurface flow below the Ventura River just above San Antonio Creek causing groundwater to rise as springs.

There are over 300 private wells along the Ventura River and its tributaries, extracting groundwater from the Ventura River Alluvial Basin, outside of the Ojai Basin. The greatest concentration of wells is in the Oak View, Live Oak Acres, and western Mira Monte area where there is substantial residential development. The Upper Ventura River Basin aquifer is a very shallow, unconfined aquifer consisting of alluvium about 60 feet deep. The total storage capacity is about 14,000 acre-feet and is typically emptied during a one- to three-year critical dry period. The dominant source of recharge is direct infiltration of precipitation and percolation from local streambeds. Areas of naturally shallow bedrock underlie portions, which cause water levels to remain or rise near the surface (Casitas MWD et al., 1997).

San Antonio Creek Basin

A thin alluvium, up to 20 to 30 feet thick, along San Antonio Creek holds relatively good quality water that is used for agricultural and domestic purposes (Casitas MWD and Ventura, 1978).

Lower Ventura River Groundwater Basin

The Lower Ventura River Groundwater Basin has a thickness on the order of 100 feet and probably thickens to 200 to 300 feet thick near the ocean. The boundary between the lower and upper Ventura Basin is the City of San Buenaventura underground diversion weir located at Foster Park. The primary recharge for the lower basin is subsurface flow around the diversion weir. The storage capacity of the lower basin is 1,400 acre-feet. The basin extends to the Pacific Ocean and becomes part of the Oxnard Plain at the coast. The lower basin is made up of sediments and rocks with poor permeability. Ground water within the basin is unconfined with the main water-bearing units being unconsolidated to semi-consolidated alluvial deposits. Depth to water table ranges from 0 to 40 feet with the shallowest levels near the Ventura River Channel. The water level varies considerably with seasons and drought conditions. The basin has historically poor water quality due to high total dissolved solids and is not generally suitable for agricultural or domestic use. The weir that was constructed at Foster Park in 1906 cut off a substantial flow of good quality ground water, reduced surface flows by Robles Diversion Dam, and allowed poor-quality water to seep in from the adjacent bedrock areas and from surface flows dominated by effluent from the Ojai Valley Wastewater Treatment Plant.

Weldon Canyon

In the Weldon Canyon area, sandstones and conglomerates of the Pico Formation form an aquifer that could be developed for agricultural and industrial uses. It does not meet drinking water standards due to high total dissolved solids, chloride, iron, sulfate, and sodium. Groundwater wells from the deep area of the aquifer are productive and have safe yields of up to 25 gallons per minute (Ventura County, 1992).

4.3 BIOLOGICAL RESOURCES

The Proposed Action is located on the Ventura River and Matilija Creek in the foothills of the Santa Ynez Mountains. Matilija Dam is located on Matilija Creek approximately 0.6 mile upstream of the confluence of the Matilija and the North fork of Matilija Creek where these creeks join to form the main stem of the Ventura River (USFWS, 2003). The Ventura River flows southward for approximately 16.5 miles to the river mouth where it enters the Pacific Ocean at Emma Woods State Beach (Entrix, 1997). Biological resources located in this area are typical of plant and wildlife species encountered in the transverse ranges of southern California and are adapted to a Mediterranean climate with cool wet winters and hot dry summers. Rainfall occurs primarily between October and March with the heaviest rainfall located on the steep mountain faces while beach areas receive substantially less rainfall. For example, the mountain headwaters of the Ventura River may receive up to 40 inches of rainfall a year compared to 16 inches of rainfall received at the mouth of the Ventura River (Entrix, 1997). The area may also be subject to rainfall during summer months for short but intense periods of time as a result of periodic monsoons. This climatic condition provides for a variety of plant communities that support diverse and species-rich flora and fauna.

Sage scrub and chaparral communities occur on many of the adjacent hillsides while mixed riparian and alluvial scrub habitat occurs along the lower sections of the Ventura River. Pine forests dominate many of the peaks of the surrounding Santa Ynez Mountains. Agricultural lands planted with citrus and avocado groves are intermixed with residential properties, horse stables, and parks along many sections of the river. This development has also encroached into the surrounding flood plain and adjacent habitat removing much of the previous upland habitat, which has required the development of a levee system. This section describes the current biological conditions, and is based on existing literature and recent vegetation and wildlife studies conducted within the project area.

For purposes of this study, the biological resources study area (Figure 1-1) is defined as the Ventura River floodplain (extending from bank to bank) along its course from Matilija Dam downstream to its confluence with the Pacific Ocean, and the Matilija Dam Reservoir area/Ventura River upstream to the "lake influence" limits (highest elevation that the lake reaches at capacity). The areas affected by the project and their component major vegetative communities are identified below:

- The Matilija Reservoir (a lucustrine/riverine/palustrine system)
- Slurry disposal sites, desiltation basins, and water and slurry pipeline right of ways (components of riverine/palustrine system)
- The Ventura River (a riverine/palustrine system), including the reach of Matilija Creek downstream of Matilija dam
- The Ventura River Estuary (an estuarine system)
- An upland vegetation community at the uppermost transition of the floodplain associated with the Ventura River vegetative community.

The Matilija Reservoir

The current reservoir (open water) created by the Matilija Dam is characteristic of a lacustrine system. The deepwater portion of the lake (the lacustrine limnetic unconsolidated bottom deepwater habitat) does not support vegetation. The perimeter of the lake (the lacustrine littorial emergent wetland) includes cattails (*Typha* spp.), bulrush (*Scirpus* spp.), and rushes (*Juncus* spp.).

As the original Matilija Reservoir has filled in with sediment over time, wetland habitats have developed in the original reservoir footprint. These include riverine and palustrine wetlands that support a variety of plant species. Matilija Creek, which is located in the former reservoir footprint, is described as a riverine upper perennial wetland. Mule fat (*Baccharis salicifolia*), cottonwood (*Populus* spp.) and willow (*Salix* spp.) saplings are common species in this area and quickly establish on sandbars and bank areas. Bulrush, cattails, smartweed (*Polygonum* spp.) and other wetland species occur in pools of this riverine system. Duckweed (*Lemna* spp.) and green algae (*Chara* sp.) cover some surface areas in stagnant pools and backwaters. The invasive species giant reed (*Arundo donax*) is common to the area and composes a substantial quantity of the existing vegetation.

Palustrine shrub/scrub wetland and palustrine forested wetland occupy the remainder of the former reservoir footprint and are dominated by willow, mule fat and cottonwood. Upland areas adjacent to the dam consist of palustrine scrub habitat dominated by California buckwheat (*Eriogonum fasciculatum*), California sagebrush (*Artemisia californica*), coast golden bush (*Isocoma menziesii*), and yucca (*Yucca whipplei*). Black sage (*Salvia mellifera*), white sage (*Salvia apiana*), and deer weed (*Lotus scoparius*) are other common species to this area. Laurel sumac (*Malosma laurina*), ceanothus (*Ceanothus* spp.), big berry manzanita (*Arctostaphylos glauca*), and holly leaf cherry (*Prunus ilicifolia*) occur on the adjacent hillsides. Invasive species are common to the area and include Russian thistle (*Salsola tragus*), tocalote (*Centaurea melitensis*) and brome grasses (*Bromus* spp.). Vegetation in the palustrine system is similar to that described for the Ventura River below Matilija Dam. One substantial difference, however, is that giant reed is rapidly spreading throughout much of the wetlands in the original reservoir area (USFWS, 2000a), and is expected to completely dominate the area in the near future. Aerial photo studies conducted by the VCFCD in 2002 reveal that the giant reed infestation in the original reservoir has increased from 5 percent vegetation cover in the 1969 delta area (approximately 5000 feet upstream of the dam) to nearly 100 percent cover in the 2001 delta area (approximately 1400 feet upstream of the dam).

The Ventura River

The Ventura River has components common to rivers and streams that includes a stream channel, a floodplain, and the transitional upland fringe. In addition, the Ventura River is typical of coastal southern California streams in that it exhibits typically steep gradients and is dominated by a flashy, precipitation regime (Faber et al., 1989). "Flashy" signifies that the river stage rises and falls abruptly within a hydrologic event such as daily precipitation. The riparian vegetation of the river is directly related to these hydro-geomorphic factors. Where slopes are steep, water scours the streambed. Major storms can produce sediment-laden flows that dislodge large portions of the riparian vegetation and alter the stream channel. Where gradients are low, alluvial material is deposited, thereby providing areas where pioneer, seral vegetation can become established. If the interval between stream-altering flows is several years, rapidly growing riparian vegetation can become mature and well established providing dense riparian canopies. The general pattern of riparian vegetation in the study area is, therefore, in a state of constant succession.

The riverine system (as defined by Cowardin et al., 1979) includes the channel (with or without flowing water) and is bounded by the channel bank. The system is subdivided into an upper perennial wetland (high gradient with limited floodplain), lower perennial wetland (low gradient with well developed floodplain), and intermittent wetland (channel that contains water only part of the year).

The riparian and wetland vegetation adjacent and associated with the channel (i.e., the floodplain) are discussed below (palustrine system). The mature riparian forest that includes Fremont cottonwoods (*Populus fremontii*), willows, California black walnut (*Juglans californica* var. *californica*), and western sycamore (*Platanus racemosa*) are described as the palustrine forested wetland.

The floodplain has shrub vegetation that is early successional or stunted due to environmental conditions (i.e., repeated scour/deposition or moisture regime). After a scouring event, herbs including white clover, willow herb (*Epilobium ciliatum*), mugwort (*Artemisia douglasiana*), and ragweed (*Ambrosia psilostachya* var. *californica*) typically dominate the lower terraces of the floodplain. Emerging shrubs and trees are also present in the lower terrace and can include dense populations of mule fat, cottonwood, and willows. The upper terraces typically include alluvial scrub vegetation, such as California sagebrush, white and black sage, buckwheat, and laurel sumac.

Giant reed also colonizes the floodplain within the Ventura River and has been demonstrated to effectively exclude many native species. Within active channels, scouring action removes giant reed, as well as native woody vegetation before maturation. However, in lower flood terraces that may be washed over by floodwaters but not necessarily scoured, existing populations of giant reed and other vegetation can survive. Once established, populations of giant reed can out compete and displace native vegetation in a number of ways including depleting existing water and overcrowding native vegetation.

Slurry Disposal Areas and Desiltation Sites

The Matilija Dam Ecosystem Restoration Project Alternatives Analysis Draft Report (F4) Milestone identified one site for slurry disposal/habitat restoration for the two million cubic yards of fine sediment locked behind Matilija Dam. When stakeholders expressed concern about this site, the Plan Formulation Subcommittee asked for volunteers to form a Slurry Fine Disposal/Habitat Restoration Site Search Committee. The Search Committee was charged with identifying and assessing alternative sites, reaching a consensus, and making a recommendation back to the Plan Formulation Subcommittee. This report summarizes the analysis and assessment of alternative sites in the selection of the recommended site(s). During the process of formulating project alternatives, three additional sites were identified for slurry disposal and habitat restoration (VCWPD, 2003). These areas would potentially be used to dispose of the two million cubic yards of fine sediment locked behind Matilija Dam.

Slurry Disposal Site 1

Site 1 is located within Reach 5 on the east side of the Ventura River, approximately one half mile downstream from the Robles Diversion Dam. Approximately 94 acres would be utilized for slurry disposal and habitat restoration. The site is primarily uplands, including grasslands, scrub, chaparral, oak and walnut woodlands, with approximately ten percent palustrine scrub/shrub and forest.

Slurry Disposal Site 2

Site 2 is composed of four noncontiguous units, totaling approximately 118 acres. Sub-site 1 is located immediately upstream of the Highway 150 Bridge with a usable area of about 50 acres. Sub-site 2 is located just below the Highway 150 Bridge with an area of about 25 acres. Sub-site 3 is located about one half mile below the Highway 150 Bridge with an area of about 11 acres. Sub-site 4 is about 1,000 feet below Santa Ana Bridge and is the most downstream location. The distance to Matilija Dam ranges from 3.6 miles to 6.3 miles. The four sub-sites contain relatively moderate-quality lower floodplain terraces with some newly eroded channels. Non-native grassland, oak trees, and some patches of alluvial scrub are present, as well as some alluvial scrub. Exotics species, such as Spanish broom (*Spartium junceum*) and giant reed, are present throughout this area.

Slurry Disposal Site 3

Site 3 is located north of Baldwin Road, off the Ventura River, approximately 3.6 miles downstream from Matilija Dam. Approximately 95 acres would be utilized for slurry disposal and would be restored at the completion of project construction. Most of the land is currently dry-farmed and non-native grasses are common. Oak trees and some small riparian drainages occur throughout the site.

To reduce the impacts of sediment on water supplies to Lake Casitas a downstream sedimentation basin would be constructed along the existing Robles canal. The basin would be up to 3,000 feet in length and up to 1,000 feet in width. This site would between 11 and 14 acres and require construction of a levee approximately 25 feet in height. Two possible sites were selected to construct the basin and are discussed below.

Desiltation Basin Site 1

Site 1 is located approximately 1.5 miles north of Highway 150, on the east side of the river adjacent to the Robles canal. The site consists of disturbed non-native grassland dominated by wild oats and brome grasses with small sections of disturbed scrub habitat. Mustard and star thistle are other common species identified in this area. Access to the site would be available from the existing service road located along the Los Robles Canal.

Desiltation Basin Site 2

Site 2 is located approximately 0.5 mile north of Highway 150, on the east side of the river adjacent to the Robles canal. The site is similar to Site 1 and consists of disturbed non-native grassland with small sections of disturbed scrub habitat. Access to the site would be available from the existing service road located along the Los Robles Canal.

Levees, Floodwalls and Pipelines

Removal of the Matilija Dam would also require the construction or expansion of existing levees at several locations along the Ventura River and Matilija Creek. Levees would be required to ensure adequate flood protection for highway access, private residences, orchards, and other structures. The project would also require the removal of the Camino Cielo Bridge and the installation of a water and slurry pipeline.

Cañada Larga Levee and Floodwall

The Cañada Larga levee site is located along the east bank of the Ventura River approximately 11 miles downstream from Matilija Dam. At this location, approximately 10,000 feet of levee and floodwall would be constructed along the east bank of the river to protect a series of private structures from flood flows including a water purification facility, photography school and film studio, small farms, and a decommissioned oil refinery. Other structures in this area include several single-family residences, light industrial centers, storage yards, and large undeveloped lots containing disturbed non-native grasses and ruderal species. The Ojai Trails bicycle path runs parallel to the river and crosses the proposed levee in several locations. The levee would also contain two small drainages including Cañada Larga that discharge into the Ventura River within this section of the levee.

Disturbed riparian habitat occurs at many locations along east side of the river dominated by arroyo willow with isolated populations of mulefat, sycamore and alder. Dense thickets of giant cane occur in many sections of the river in this area and appear to have excluded large sections of native riparian vegetation. Poison oak, castor bean, and tree tobacco are other common species to this area. Upland sections located in this area include disturbed non-native grasslands dominated by brome grasses, tocalote, summer and black mustard, and Russian thistle. Weedy annuals are common and include telegraph weed, horseweed, fennel, and sow thistle. Some portions of the area supports disturbed coastal sage scrub dominated by coyote bush, California sagebrush, California buckwheat, and sages. Spanish broom, black mustard, yucca, and beaver tail cactus occur intermittently across this area.

Casitas Springs Levee and Floodwall

The Casitas Springs levee would be located in the community of Casitas Springs approximately nine miles downstream of the Matilija Dam. An existing levee runs along the east bank of the Ventura River in this location and is currently scheduled for a retrofit to raise the existing structure three feet in order to meet current flood protection requirements. Removal of the Matilija Dam would require expansion of the existing levee system along an approximately 4,800-foot section of the existing levee. The levee and floodwall may reach twelve feet in height at this location. Expansion of the levee would be constructed primarily on either disturbed habitat dominated by non-native brome grasses or on the existing levee road surface. Several mature sycamores and willows occur in upland areas adjacent to the levee road and ornamental landscaping occurs along the edge of the mobile home park. Rock riprap currently exists on the bank of the existing levee and lacks vegetation. A small section of riparian scrub dominated by willow, mulefat, and coyote bush is located east of the levee road on the upper third of the porposed levee area.

Live Oak Acres Levee and Floodwall

An existing levee and access road is located along the west bank of the Ventura River in this location. Removal of the Matilija Dam may require expansion of the existing levee system in this area to ensure adequate flood protection along this section of the river. The proposed levee and floodwall would be approximately 5,000 feet in length and up to five feet in height. The majority of construction in this area would be along the existing levee system and would not result in impacts to riparian or upland habitat. Private residences, small businesses, and open space occur on the west bank in this area and are located adjacent to the existing levee road. Habitat is limited in this area to disturbed nonnative grasses dominated by ruderal species with many areas lacking vegetation. Small sections of disturbed coastal sage scrub are located intermittingly along the levee road within open fields and fenced yards. Riparian scrub occurs in some sections of the floodplain near the toe of the existing levee slope.

Meiners Oaks Levee and Floodwall

No levee currently exists in this location. Located approximately two miles downstream from the Matilija Dam the proposed levee and floodwall would be approximately 5,000 feet in length and up to 17 feet high. A dirt access road is located along a section of the proposed levee near the existing Los Robles Diversion Dam and fish ladder. Single-family homes, horse stables and orchards border the river in this location. Braided channels composed of alluvial scrub meander near the east bank of the river while upland areas support a diverse assemblage of sumac dominated chaparral and oak woodland. Black and white sages are common in this area with small populations of mulefat and sycamores. Invasive species including giant cane and French broom occur throughout this area.

Camino Cielo Road Levee and Floodwall

The Camino Cielo Bridge and proposed levee site is located approximately two-miles downstream of the Matilija Dam along Matilija Creek. To protect State Route (SR) 33 from floodwaters the Camino Cielo Bridge would be removed and a levee and floodwall would be constructed along a 1,000-foot section of the stream bank. Private residences and abandoned structures occupy much of the area in this location. Habitat consists of a mixture of riparian and oak woodland dominated by sycamores, live oaks, and willows. This habitat intergrades with willow dominated palustrine forest located along Matilija Creek. Ornamental landscaping, invasive species and mixed chaparral are also common in this area.

Slurry and Water Pipelines

The slurry pipeline would transport sediment from the reservoir downstream to the slurry disposal sight. The majority of the proposed pipeline route would occur on previously disturbed habitat, existing dirt roadways, and agricultural areas. Near the proposed slurry disposal site the pipeline would be constructed across upland terraces consisting of palustrine scrub habitat. Sages, sumac, and scattered oak trees occur throughout this area. Below Matilija Dam the pipeline would cross palustrine forest dominated by mature willows and sycamore. Construction of the pipeline in this location would result in temporary disturbances to palustrine habitat.

Construction of the water pipeline would occur adjacent to the water diversion canal and on existing access roads located along the west side of the Ventura River. Non-native grassland, palustrine scrub, and agricultural land dominate most of the habitat in this area. At Reach 6, the water pipeline would join the slurry pipeline is expected to follow the same right of way up to Matilija Dam.

The Ventura River Estuary

The Ventura River flows into the Pacific Ocean at the Ventura River estuary near the western city limits of San Buenaventura (Ventura). The estuary area is approximately 30 acres and incorporates portions of the City of San Buenaventura, Seaside Wilderness Park, and Emma Wood State Beach (CRWQCB-LA, 2002). Surrounding wetland habitat covers approximately 110 acres (WRA, 1992).

The estuary includes a main lagoon that is separated from the ocean by a sand/cobble bar during the dry season. When full, the lagoon covers approximately 1.5 surface hectares and ranges in depth from 0.6 to 2.4 meters. The lagoon sandbar gets breached by winter storm flows and then slowly rebuilds through the summer as sand is deposited by the long-shore drift. In some extremely wet years, the lagoon remains open to the ocean and thus tidal exchange all year. In some dry years, the sand bar never gets breached in the winter and water flows over the sand bar (CRWQCB-LA, 2002). Rain generally occurs between October and March with 75 percent of the runoff occurring from January through April. Mean annual precipitation near the mouth of the river is about 15.5 inches (40 cm).

The river has a perennial flow to the estuary due to rising groundwater and water discharges. Another major influence on habitats is the seasonal and at times catastrophic winter floods that can substantially alter the path of the river channel, topography of the floodplain and delta, and location of estuarine wetlands. Floods that cause extensive damage to the estuary have occurred about every 12 years on average. The largest flood event between 1929 and 1971 occurred in 1969 and was recorded at 58,000 cfs. Channel migration in 1978 and 1982 also caused damage even with lesser flows. Large floods temporarily remove most of the vegetation, greatly alter topography, and completely redefine the habitats and occurrence of vegetation.

For most years, the lagoon is dominated by freshwater during most of the year (CRWQCB-LA, 2002). When the lagoon is open to the ocean, tidal water level changes are observed to about 150 meters upstream of the railroad bridge (CRWQCB-LA, 2002). The estuary salinity is controlled by tidal flushing during the periods when it is open to the ocean (and ranged during 1988 and 1989 from 2 to 17 parts per thousand for surface and up to 20 parts per thousand at bottom) and by perennial freshwater inflows during rest of the year. During July and August, when the lagoon is closed, stratification may result in surface salinity of 10 parts per thousand and up to 3l parts per thousand at the bottom. If the mouth does not open during the summer, the salinity may drop to 0 parts per thousand by the fall (CRWQCB-LA, 2002).

A smaller estuary to the west of the main estuary is only flushed during major storms. The side estuary area typically remains flooded and dominated by freshwater when the main estuary is in lagoonal stage due to a raised groundwater level caused by the lagoon water (CRWQCB-LA, 2002).

The estuarine system and associated vegetation are fully described below in Section 4.3.1 (Vegetation). The main subsystems described include the subtidal wetland (areas continuously submerged) and the intertidal estuary (areas exposed and flooded by tides). The intertidal estuarine vegetation is further subdivided into classes defined as emergent wetlands (typically cattails and bulrush), scrub/shrub wetlands (i.e., woody vegetation less than 20 feet, such as saltbush [*Atriplex* spp.], pickleweed

[*Salicornia* spp.], and mule fat), and the forested wetlands (i.e., large mature trees dominated by willows with an understory of small trees and shrubs).

The wetlands and lagoon area support coastal salt marsh, dune swale wetland, and scrub/shrub wetland. The west side of the estuary is dominated by non-persistent emergent (annual) vegetation composed of coast goosefoot (*Chenopodium macrospermum*), New Zealand spinach (*Tetragonia tetragonioides*), and salt march sand spurrey (*Spergularia marina*), a species that is unique in the Los Angeles Region. Adjacent are southern arroyo willow riparian forest, alluvial scrub, and southern riparian scrub (CRWQCB-LA, 2002).

Along the eastern floodplain terrace between the Highway U.S. 101 and the Southern Pacific railroad tracks, the Ventura County Flood Control District's (VCFCD) aerial photo studies reveal that following the almost complete removal of vegetation as a result of the February 1969 flood, native willow scrub vegetation had recovered at least 90 percent cover by 1983. Present were also a few giant reed clumps, making up between 5 to 10 percent of the overall cover. By 2001, in the absence of any extensive flood events to remove surface vegetation, the giant reed has expanded to comprise over 75 percent of the overall cover.

Marine Wetland and Deepwater Habitats

Unlike some coastal basins in southern California, no submarine canyon occurs off the coast, apparently because the continental slope has a gentle rather than steep gradient and therefore none was cut during periods of lower sea level (Ferren Jr. et al., 1990). Marine wetland and deepwater habitats were mapped in nearshore areas as part of the analysis of botanical resources at Emma Wood State Beach and Ventura River Estuary (Ferren Jr. et al., 1990). The boundary between marine wetland and deepwater habitat coincides with the mean lower low water elevation (subtidal area). The upland beach area consists of unvegetated sand and cobble substrate, grading to an unconsolidated shore intertidal habitat (as defined by Cowardian, et al., 1979) that contains various amounts of small green algae including sea lettuce (*Ulva* sp.) that use the cobble for attachment. The lower intertidal area contains increasing amounts of red algae, primarily *Gigartina* spp., *Chondria midifica*, and *Pteriosiphonia dendroidea*. Subtidal areas are comprised of an unconsolidated cobble bottom that provides substrate for feather boa kelp (*Egregia menziesii*). Further offshore, outside of areas regularly disturbed by wave action, are scattered populations of giant bladder kelp beds (*Macrocystis pyrifera*) (Ferren Jr. et al., 1990). Table 4.3-1 identifies common marine macrophytes in marine wetlands and deepwater habitats in the area of the estuary and Emma Wood State Beach.

Table 4.3-1: Dominant Species of Marine Macrophytes of the Intertidal and Nearshore Subtidal Zones of the Ventura River Delta

Marine Wetland and Deepwater Habitats	
Wetland/Habitat System	Dominant Species
High Intertidal Wetlands	Bryopsis corticulans Chaeotomorpha linum Enteromorpha intestinalis Grateloupia doryphora Ulva angusta
Mid and Low Intertidal Wetlands	Gigartina leptorhyncos Gracilaria sjoestedtii Grateloupia lanceolata Porphyra lanceolata Phyllospadix torreyi (vascular)
Subtidal Deepwater Habitats	Chondria midifica Egregia menziesii Macrocystis pyrifera Phyllospadix torreyi (vascular) Pterosiphonia dendroidea

Source: Ferren Jr. et al., 1990

Biological resources associated with the inter- and shallow subtidal habitats include mole crabs, clams, and polychaete worms, which bury themselves in the sand between cobbles and feed on particles brought in by the waves. These species in turn are fed on by shorebirds during low tides and by fish during high tides. The mixture of sand and cobble, coupled with the strong wave energy and periods when low tides expose the area to desication creates a harsh environment that limits the numbers of animal, plant, and algal species that occur in this area. Fish observed during the diver reconnaissance for the 2000 survey included a pile perch, a leopard shark, a sand bass, and a half moon (Rincon Consultants, 2002).

The Pacific Coast Groundfish Fishery Management Plan (1998) and Coastal Pelagic Species Fishery Plan (1999) have designated Essential Fish Habitat (EFH) for this region. At least four species named in the Coastal Pelagic Species Fishery Plan may occur in the nearshore areas adjacent to the estuary. These species include the northern anchovy, Pacific sardine, Pacific mackerel, and jack mackerel. The EFH for Pacific coast groundfish include coastal waters and the upriver extent of saltwater intrusion in river mouths (Rincon Consultants, 2002).

Marine mammals potentially occurring in the nearshore waters include the common dolphin (*Delphinus delphis*), Pacific white-sided dolphin (*Lagenorhynchus obliquidens*), harbor seals (*Phoca vitulina*), California sea lions (*Zalophus californianus*), and California grey whales (*Eschrichtius robustus*). Although individual seals and sea lions may be sighted along the nearby shoreline, the beach surrounding the estuary is not expected to be used as a haul-out area for either of those species (Rincon Consultants, 2002).

Avifauna observed during the 2000 biological surveys for the Surfers Point EIR included several species in the nearshore area including sandpipers, willets, marbled godwits, and gulls.

Upland Vegetation Community Associated with the Ventura River Vegetative Community

The uppermost terraces of the floodplain transition into the upland vegetation community. Upland vegetation does not require a permanent source of water or seasonal flooding. Vegetation within this system is described in Section 4.3.1.7 below, and includes grasslands, oak grasslands, chaparral, California sagebrush, and coastal sage scrubs (e.g., black sage, white sage, and buckwheat).

4.3.1 Vegetation

Comprehensive vegetation studies were conducted in 2002 that described and mapped existing vegetation communities (Appendix F.1); recorded plant species observed (Appendix F.2); and developed a habitat valuation model for the project area (Appendix E). Vegetation communities and plant species data were delineated and described by David Magney Environmental Consulting (DMEC, 2002; see Appendix F.4). The habitat valuation surveys were conducted by the Matilija Dam Removal Habitat Valuation Task Force. The habitat valuation study was implemented to develop a model for assigning habitat value to the vegetation community data. A detailed description of the habitat evaluation model and the data collected for this effort is presented in Appendix E.

Vegetation communities were delineated as field drawn polygons onto geo-referenced and ortho-rectified aerial image field maps that were developed with Geographic Information System (GIS) software by Geo InSights, Inc. Field-collected vegetation community information was digitized into GIS and used to generate vegetation community mosaics that depict the vegetation communities within the project area (Appendix F.1).

Wetland habitats within the project area were classified using Cowardin et al. (1979). Upland habitats were classified using Sawyer and Keeler-Wolf (1995). The natural vegetation in the Ventura River study area consists of all five of the major Cowardin (1979) wetland systems (Lacustrine, Riverine, Palustrine, Estuarine, and Marine), and includes the four major upland vegetation types (Grassland, Coastal Scrub, Chaparral, and Woodland). Human-influenced areas are also mapped throughout the surveyed portion of the Ventura River and are discussed briefly at the end of this section. Vegetation within the project area was classified using Cowardin et al. (1979) and Sawyer and Keeler-Wolf (1995).

The general wetland systems and upland vegetation types are first described, which are followed by descriptions of the wetland subsystems and classes and the upland plant series, observed and mapped along Ventura River. The vegetation descriptions include the scientific names of the dominant and associate species contributing to the plant communities (common names are only provided once), site requirements, and biological factors.

4.3.1.1 Wetland and Deepwater Habitats

Wetlands are lands where saturation with water (at least periodically saturated or covered by water) is the dominant factor determining the nature of the soil development and the type of plant and animal communities occupying the land. Water creates severe physiological problems for most plants and animals, except for those adapted for life in water or saturated soil. Wetlands are transitional between terrestrial and aquatic systems, where the water table is at or near the soil surface, or the land is covered by shallow water. Wetlands consist of one or more of the following three attributes: (1) the land supports predominantly hydrophytic vegetation (plants are adapted to living in water), (2) the substrate is predominantly undrained hydric soil, and (3) the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season (Cowardin et al., 1979).

Deepwater habitats are permanently flooded lands lying below the deepwater boundary of wetlands. Deepwater habitats include environments where surface water is permanent and often deep, so that water rather than air, is the principal medium within which the dominant organisms live (attached to the substrate or not). The substrates are considered nonsoils here because the water is too deep to support emergent vegetation (Cowardin et al., 1979).

The Cowardin Classification System (Cowardin et al., 1979) uses a hierarchical approach to wetlands classification, progressing from systems and subsystems, at the most general level, to classes, subclasses, and dominance types. Systems share the influence of similar hydrologic, geomorphologic, chemical, or biological factors. Subsystems are characterized by factors including tidal influence, water permanence, gradient, water velocity, substrate, and the extent of floodplain development. Class, subclass, and dominance type describe wetland categories based on modifiers for vegetation, water regime, water chemistry, and soils. The class is the highest taxonomic unit below the subsystem level. It describes the general appearance of the vegetation, or the physiography and composition of the substrate. The subclass level described finer distinctions in substrate material, or may also refer to specific vegetated wetland types with vegetative cover of 30 percent or more. The dominance type is the level that best describes the characteristic plant species and is the hierarchical level that best describes the vegetative cover. Because a single class may support more than one dominance type, the Cowardin system is best defined as a wetland classification system rather than a vegetation classification system.

The marine, estuarine, riverine, and lacustrine systems include both wetland and deepwater habitats; however, the palustrine system includes only wetland habitats (as defined by Cowardin). It should be noted that the Cowardin wetlands definition requires the presence of only one of the three wetland attributes (i.e., vegetation, hydric soil, and wetland hydrology) while the Corps 1987 Wetlands Delineation Manual generally requires the presence of all three attributes in order for an area to be characterized as wetlands. Therefore, portions of the areas described below as wetlands may not necessarily meet the Corps' definition.

Table 4.3-2 shows a summary of how the wetland habitats mapped and observed in the surveyed portion of the Ventura River are classified. The Dominance Types provided in Table 4.3-2 represent generalized vegetation communities.

Lacustrine System

The lacustrine system includes wetlands and deepwater habitats with all of the following characteristics: (1) situated in a topographic depression or a dammed river channel; (2) lacking trees, shrubs, and emergents with greater than 30 percent aerial coverage, and (3) total area exceeds 8 ha (20 acres).

Table 4.3-2: Wetland and Deepwater Habitats of the Ventura River

System	Subsystem	Class	Acreage Dominance Type(s)
		Lacustrine	
	Limnetic	Unconsolidated Bottom	4.92 Open Water
	Littoral	Emergent	14.98 Freshwater Marsh
		Riverine	
Riverine	Upper Perennial	Rock Bottom	3.41 Southern Willow Scrub Freshwater Marsh
Riverine	Upper Perennial	Unconsolidated Bottom	22.80 Unvegetated Open Water
Riverine	Upper Perennial	Emergent	34.41 Seral Southern Willow Scrub Freshwater Marsh
Riverine	Lower Perennial	Unconsolidated Bottom	17.37 Unvegetated
Riverine	Lower Perennial	Aquatic Bed	Open Water with Duckweed and Mosquito Fern
Riverine	Lower Perennial	Emergent	20.24 Riparian Herb Seral Southern Willow Scrub
Riverine	Intermittent	Streambed	86.12 Riparian Herb Ruderal
Riverine	Intermittent	Unconsolidated Shore	88.45 Alluvial Fan Sage Scrub
Riverine	Intermittent	Emergent	6.79 Riparian Herb Seral Southern Willow Scrub Alluvial Fan Sage Scrub
		Palustrine	
Palustrine	(None)	Emergent	14.90 Seral Southern Willow Scrub Freshwater Marsh
Palustrine	(None)	Scrub/Shrub	825.99 Southern Willow Scrub Chaparral Coastal Sage Scrub Giant Reed Seral Alder, Cottonwood, and Sycamore Ruderal
Palustrine	(None)	Forested	287.30 Willow Woodland Mixed Riparian Forest (Bigleaf Maple, Alder, Ash, Walnut, Bay, Coast Live Oak, and Cottonwood)
		Estuarine	
Estuarine	Intertidal	Flats	Green and red algae, isolated brown algae
Estuarine	Intertidal	Beach/Bar	Green and red algae
Estuarine	Subtidal	Aquatic Bed	Duckweed,Mosquito Fern, and Widgeon Grass Open Water
Estuarine	Intertidal	Emergent	Spiny rush, alkali rye, cattail, bulrush
Estuarine	Intertidal	Scrub/Shrub	Poison oak, saltbush, coyote bush, virgins bower
Estuarine	Intertidal	Forested	Willow woodland, mule fat, tamarisk, castor bean and Giant Reed
		Marine	
Marine	Intertidal	Beach/Bar	Unvegetated

Similar habitats less than 8 ha are also included here if an active wave-formed, or bedrock shoreline, feature makes up the boundary, or if the deepest water depth exceeds 2 meters (6.6 feet) at low water. Lacustrine waters may be tidal or non-tidal, but ocean-derived salinity is always less than 0.5 percent (Cowardin et al., 1979.)

Lacustrine Limnetic Unconsolidated Bottom Deepwater Habitat. The limnetic subsystem includes all deepwater habitats lacking emergent vegetation, and is further classed as Unconsolidated Bottom, which includes at least 25 percent cover of particles smaller than stones and a vegetative cover less than 30 parts per thousand. Water regimes are restricted to subtidal, permanently flooded (as observed in the project area), intermittently exposed, and semipermanently flooded. This class is characterized by the lack of large stable surfaces for plant and animal attachment. Exposure to wave and current action, temperature, salinity, and light penetration determine the composition and distribution of organisms. Most animals in unconsolidated sediments live within the substrate, while some maintain permanent burrows, and others may live on the surface (Cowardin et al., 1979).

The lacustrine system was observed in the study area immediately below (south of) the Matilija Dam as a large deep pool, and this system exists above (northwest of) the dam as Matilija Lake. These two areas of the surveyed portion of Ventura River are further classified as lacustrine limnetic unconsolidated bottom deepwater habitat.

Lacustrine Littoral Emergent Wetland. The lacustrine system is further defined as littoral, which extends from the shoreward boundary of the system to a depth of two meters (6.6 feet) below low water or to the maximum extent of nonpersistent emergents; it is further classed as emergent, which is characterized by a dominance of erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation usually consists of perennial plants that are present for most or all of the growing season (Cowardin et al., 1979).

Lacustrine littoral emergent wetland was observed as a perimeter to Matilija Lake. The predominant plant species making up the lacustrine littoral emergent wetland habitat around Matilija Lake includes: bulrush (*Scirpus*), smartweed (*Polygonum*), nutsedge (*Cyperus*), and rush (*Juncus*) species.

Riverine System

The riverine system includes all wetlands and deepwater habitats contained within a channel (or a conduit periodically or continuously containing moving water, or forming a connecting link between two bodies of water), with two exceptions: (1) wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens; and (2) habitats with water containing ocean-derived salts in excess of 0.5 percent. The riverine system is bounded on the landward side by the channel bank, or by wetland dominated by trees, shrubs, and persistent emergents. Water is usually, but not always, flowing in this system (Cowardin et al., 1979).

The Riverine system is classified into three subsystems for the Ventura River, and they include upper perennial, lower perennial, and intermittent.

Riverine Upper Perennial Wetland. The riverine upper perennial subsystem includes habitats where the gradient is high, water velocity is fast, and floodplain development is low. No tidal influence exists, and some water flows throughout the year. The substrate consists of rock, cobbles, or gravel with occasional patches of sand. The natural dissolved oxygen concentration is normally near saturation (Cowardin et al., 1979).

This subsystem is mapped predominantly in the upper reaches of the Ventura River. The three classes mapped for the Ventura River are rock bottom, unconsolidated bottom, and emergent.

Riverine Upper Perennial Rock Bottom Wetland. Riverine upper perennial rock bottom wetland includes wetland habitats with substrates having an aerial cover of stones, boulders, or bedrock 75 percent or greater and vegetative cover of less than 30 percent. The rock substrate of the rocky benthic zone determines the abundance, variety, and distribution of organisms. The stability of the bottom allows a rich assemblage of plants and animals to develop. Rock bottoms are usually high-energy habitats with well-aerated waters (Cowardin et al., 1979).

Boulders and cobbles were observed as the predominant substrate type within the riverine upper perennial rock bottom wetlands. The plant species observed scattered throughout this class include mule fat (*Baccharis salicifolia*), arroyo willow saplings (*Salix lasiolepis*), California bulrush (*Scirpus californica*), and southern cattail (*Typha domingensis*).

Riverine Upper Perennial Unconsolidated Bottom Wetland. Riverine upper perennial unconsolidated bottom wetland includes habitats with at least 25 percent cover of particles smaller than stones, and a vegetative cover less than 30 percent. Water regimes are restricted to subtidal (not present at the project site), permanently flooded, intermittently exposed, and semipermanently flooded. This class is characterized by the lack of large stable surfaces for plant and animal attachment. Unconsolidated bottom is usually found in areas with lower energy than rock bottoms, and may be very unstable. In the riverine system, the substrate type of this class is largely determined by current velocity, and plants and animals exhibit a high degree of morphologic and behavioral adaptation to flowing water (Cowardin et al., 1979).

Cobble and gravel, with some sand, were observed as predominant substrate types within the riverine upper perennial unconsolidated bottom wetlands within the Ventura River. No vegetation was observed inhabiting this class except for the green algae, *Chara*.

Riverine Upper Perennial Emergent Wetland. Riverine upper perennial emergent wetland is characterized by a dominance of erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation usually consists of perennial plants that are present for most or all of the growing season (Cowardin et al., 1979).

The predominant herbaceous plant species, making up the riverine upper perennial emergent wetland along the Ventura River channel, include: young plants of giant reed (*Arundo donax*), umbrella sedge (*Cyperus eragrostis*), northern willow-herb (*Epilobium ciliatum* ssp. *ciliatum*), iris-leaved rush (*Juncus xiphioides*), white sweetclover (*Melilotus alba*), rabbitsfoot grass (*Polypogon monspeliensis*), water-cress (*Rorippa nasturtium-aquaticums*), southern cattail, and water speedwell (*Veronica anagallis-aquatical*). Saplings of the shrubs mule fat and narrow-leaved willow (*Salix exigua*) were also common. Note: this class is closely related to, and can sometimes be considered synonymous to palustrine emergent or scrub/shrub wetland depending on the length of time since the area was scoured by flooding.

Riverine Lower Perennial Wetland. The riverine lower perennial subsystem includes habitats where the gradient is low and water velocity is slow. No tidal influence exists, and some water flows throughout the year. The substrate consists of mainly sand and mud. Oxygen deficits may occur, the fauna is composed of species that reach their maximum abundance in still water, and true planktonic organisms are common. The gradient is lower than that of the upper perennial system, and the floodplain is well developed (Cowardin et al., 1979).

This subsystem is mapped predominantly in the lower reaches of the surveyed portion of the Ventura River. The three classes mapped for the Ventura River are unconsolidated bottom, aquatic bed, and emergent.

Riverine Lower Perennial Unconsolidated Bottom Wetland. Riverine lower perennial unconsolidated bottom wetland includes habitats with at least 25 percent cover of particles smaller than stones, and a vegetative cover less than 30 percent. Water regimes are restricted to subtidal (not present at the project site), permanently flooded, intermittently exposed, and semipermanently flooded. This class is characterized by the lack of large stable surfaces for plant and animal attachment. Unconsolidated bottom is usually found in areas with lower energy than rock bottoms, and may be very unstable. In the riverine system, the substrate type of this class is largely determined by current velocity, and plants and animals exhibit a high degree of morphologic and behavioral adaptation to flowing water (Cowardin et al., 1979).

Cobble, gavel, and sand were observed as predominant substrate types within the riverine lower perennial unconsolidated bottom wetlands of the Ventura River.

Riverine Lower Perennial Aquatic Bed Wetland. Riverine lower perennial aquatic bed wetland includes habitat dominated by plants that grow on or below the water surface for most of the growing season. Aquatic beds represent a diverse group of plant communities that require surface water for optimum growth and reproduction. (Cowardin et al., 1979). This habitat class is characterized by seasonally or permanently flooded freshwater channel/bed that is dominated by floating or attached vascular aquatic plants. Two floating aquatic plant species are documented as occurring within the study area and include mosquito fern (*Azolla filiculoides*) and duckweed (*Lemna* spp.). These two annual plants are typically present in quiet water during the warm summer months. An example of this wetland type occurs on the west side of the river at Foster Park immediately upstream of its confluence with Coyote Creek.

Riverine Lower Perennial Emergent Wetland. Riverine lower perennial emergent wetland is dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation usually consists of perennial plants that are present for most or all of the growing season (Cowardin et al., 1979).

The predominant herbaceous plant species, making up the riverine lower perennial emergent wetland along the Ventura River channel, include: celery (*Apium graveolens*), cutleaf water-parsnip (*Berula erecta*), African brass-buttons (*Cotula coronopifolia*), umbrella sedge, willow-herb, Rosilla (*Helenium puberulum*), white sweetclover, rabbitsfoot grass, water-cress, curly dock (*Rumex crispus*), willow dock (*Rumex salicifolius* var. *salicifolius*), woolly hedge nettle (*Stachys albens*), and water speedwell. Saplings of shrub species are also common, including mule fat and willows.

Riverine Intermittent Wetland. The riverine intermittent wetland subsystem exists where the channel contains nontidal flowing water for only part of the year. When active flows are not present, surface water may be absent or water may remain in isolated pools (Cowardin et al., 1979). The reaches of the

Ventura River where water was not present during the time of the survey and where the substrate was not dominated by vegetation are classified as riverine intermittent wetland.

Riverine Intermittent Streambed Wetland. The streambed class includes all wetlands contained within the Intermittent subsystem of the riverine system. Riverine intermittent streambed wetland varies greatly in substrate and form depending on the gradient of the channel, velocity of the water, and sediment load. In most cases, streambeds are not vegetated because of the scouring effect when moving water is present, but like unconsolidated shore (description follows), they may be colonized by pioneering annuals and perennials during periods of low flows, or they may be too scattered to qualify as an emergent or scrub/shrub wetland (Cowardin et al., 1979).

All non-active, unvegetated, primary channels and secondary drainages with no flows at the time of the survey are classified as riverine intermittent streambed wetland. The substrate varied from boulders and cobbles to cobbles and gravel with patches of sand. Scattered pioneering annual and perennial herbs include: mugwort (*Artemisia douglasiana*t), Antisell three-pod milkvetch *(Astragalus trichopodus* var. *phoxus*), poison hemlock (C*onium maculatum*), common horseweed (C*onyza canadensis*d), summer mustard (H*irschfeldia incana*), castor bean (*Ricinus communis*), common sow-thistle (*Sonchus oleraceus*), and cocklebur (*Xanthium strumarium*).

Riverine Intermittent Unconsolidated Shore Wetland. Riverine intermittent unconsolidated shore wetland includes all wetland habitats having three characteristics: unconsolidated substrates with less than 75 percent aerial cover of stones, boulders, or bedrock; having less than 30 percent aerial cover of vegetation other than pioneering plants; and having almost any particular flooding water regime. This habitat is characterized by substrates lacking vegetation except the pioneering plants that become established during brief periods when growing conditions are favorable. Erosion and deposition by waves and currents produce landforms such as beaches, bars, and flats, all of which are included in this class. Unconsolidated shores are typically found adjacent to unconsolidated bottoms (and streambeds, which are very similar to unconsolidated bottoms) in all systems, and particle size of the substrate and the water regime are the important factors determining the types of plant and animal communities present (Cowardin et al., 1979).

All raised bars or banks (adjacent to streambeds and unconsolidated bottom classes), with less than 30 percent cover by vegetation, and with less than 75 percent cover of stones, boulders, or bedrock, during the time of the survey, are classified as riverine intermittent unconsolidated shore. The substrates observed in this class include boulder/cobble bar with sand, cobble/gravel bar, cobble/gravel bar with sand, gravel bar, and sand bar. Scattered pioneering annual and perennial herbs include mugwort, Antisell three-pod milkvetch, coastal everlasting (*Gnaphalium canescens* ssp. *beneolens*), hairy golden-aster (*Heterotheca sessiliflora* var. *fastigiata*), summer mustard, and cocklebur. Scattered shrub pioneer saplings are common as well, and they include: mule fat, California brickelbush (*Brickellia californica*), scale-broom (*Lepidospartum squamatum*), deerweed (*Lotus scoparius* var. *scoparius*), laurel sumac (*Malosma laurina*), castor bean, and Spanish broom (*Spartium junceum*).

Riverine Intermittent Emergent Wetland. Riverine intermittent emergent wetland is characterized as being dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation usually consists of perennial plants that are present for most or all of the growing season (Cowardin et al., 1979).

The predominant herbaceous plant species, making up riverine intermittent emergent wetlands along the Ventura River no-flow bars and channels, include a mixture of typical plant species of both the riverine lower perennial emergent and riverine intermittent unconsolidated shore wetlands; however, the vegetative cover is at least 30 percent.

Palustrine System

The palustrine system includes all nontidal wetlands dominated by trees, shrubs, persistent emergent plants, emergent mosses or lichens, and all such wetlands that occur in tidal areas, where salinity due to ocean-derived salts is below 0.5 parts per thousand. This system is bounded by upland habitats or by any other system. The palustrine system was developed to group the vegetated wetlands traditionally called such names as marshes, swamps, bogs, prairies, and ponds. Palustrine wetlands may be situated shoreward of lakes, river channels, or estuaries; on river floodplains; in isolated catchments; or on slopes. The erosive forces of wind and water are of minor importance except during severe floods. No subsystems exist for the palustrine system (Cowardin et al., 1979).

Palustrine Emergent Wetland. Palustrine emergent wetlands are characterized by a dominance of erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation usually consists of perennial plants that are present for most or all of the growing season (Cowardin et al., 1979).

Palustrine emergent wetlands were observed primarily as bars and banks adjacent to unconsolidated bottom and streambed wetlands with at least a 30 percent cover by herbaceous vegetation. The predominant herbaceous plant species, observed making up palustrine emergent wetlands along the riparian zone of the Ventura River, include typical plant species of the other system emergent wetlands described above, as well as some nonnative pioneering plants including ripgut grass (*Bromus diandrus*), Italian thistle (*Carduus pycnocephalus*), and smile grass (*Piptatherum miliaceum*). Saplings of trees and shrubs, such as mule fat, arroyo willow, western sycamore (*Platanus racemosa* var. *racemosa*), are also common.

Palustrine Scrub/Shrub Wetland. Palustrine scrub/shrub wetlands occur only in the estuarine and palustrine systems, but are one of the most widespread classes in the U.S. This habitat type includes areas dominated by woody, generally broad-leaved deciduous plants less than six meters (20 feet) tall. The plant species of this wetland include true shrubs, young trees, and trees or shrubs that are small or stunted due to environmental conditions. Scrub/Shrub Wetlands may represent a successional stage leading to Forested Wetland, or may be relatively stable communities. All water regimes are included except subtidal (Cowardin et al., 1979).

Palustrine scrub/shrub wetlands require at least seasonal flooding and are dominated predominantly by shrubs located on bars and banks of river channels and form substantial riparian habitat in floodplain areas as well. Although this habitat is typically characterized by the presence of broad-leaved winter-deciduous shrubs, such as narrow-leaved willow, arroyo willow, and shining willow (*Salix lucida* ssp. *lasiandra*), the floodplain areas may consist of several evergreen shrubs (mule fat, greenbark, hoary, bigpod, and snowball ceanothus, scale-broom, and laurel sumac) and summer-deciduous shrubs (typical of coastal sage scrub [described in the upland plant communities section below]), including California sagebrush (*Artemisia californica*), white sage (*Salvia apiana*), and black sage (*Salvia mellifera*). Giant reed, tree tobacco (*Nicotiana glauca*), castor bean (a robust, shrub-sized, invasive perennial herb), and Spanish broom (invasive shrub) create highly competitive conditions for other native riparian plant species within the Scrub/Shrub layer of the palustrine system.

Other common associate palustrine scrub/shrub wetland plant species observed contributing to the shrub canopy include: sticky snapdragon (*Antirrhinum multiflorum*), coyote brush (*Baccharis pilularis*), California brickelbush, yerba santa (*Eriodictyon crassifolium* var. *nigrescens*), leafy California buckwheat (*Eriogonum fasciculatum* var. *foliolosum*), deerweed, long-leaved bush lupine (*Lupinus longifolius*), chaparral bushmallow (*Malacothamnus fasciculatus* var. *fasciculatus*), Fish's milkwort (*Polygala cornuta* var. *fishiae*), skunkbush (*Rhus trilobata*), Mexican elderberry (*Sambucus mexicanus*), white nightshade (*Solanum americanum*), and Douglas nightshade (*Solanum douglasi*). Saplings and emergent trees, such as white alder (*Alnus rhombifolia*), California sycamore, black cottonwood (*Populus balsamifera* ssp. *trichocarpa*), are also common. Herbaceous plant species, observed occupying the ground layer, include: mugwort, umbrella sedge, smilo grass, rabbitsfoot grass, white everlasting (*Gnaphalium canescens* ssp. *microcephalum*), hairy golden-aster, summer mustard, white sweetclover, and cocklebur.

Palustrine Forested Wetland. Palustrine forested wetlands are characterized by woody vegetation that is six meters tall or taller. All water regimes are included except subtidal. Forested wetlands only occur in the palustrine and estuarine systems and normally possess an overstory of trees, an understory of young trees and shrubs, and an herbaceous layer. Moisture must be relatively abundant, and wetlands in this subclass generally occur on mineral soils or highly decomposed organic soils (Cowardin et al., 1979).

Palustrine forested wetlands are important riparian plant communities as they provides suitable, structurally diverse, and often species-rich habitat for many species of wildlife that frequent and inhabit the Ventura River. Dominant trees that are typical of palustrine forested wetland along the Ventura River are predominantly broad-leaved winter-deciduous species, including bigleaf maple (*Acer macrophyllum*), white alder, California flowering ash (*Fraxinus dipetala*), southern California black walnut (*Juglans californica* var. *californica*), western sycamore, black cottonwood, Fremont cottonwood (*Populus fremonti*), coast live oak (*Quercus agrifolia* var. *agrifolia*), red willow (*Salix laevigata*), arroyo willow, shining willow, and California bay (*Umbellularia californica*). Shrub and herbaceous species include those typical of Palustrine Emergent and Scrub/Shrub Wetlands (described above).

Estuarine System

The estuarine system consists of deepwater tidal habitats and adjacent tidal wetlands that are usually semi-enclosed by land but have open partly obstructed, or sporadic access to the open ocean, and in which ocean water is at least occasionally diluted by freshwater runoff from the land. The salinity may be periodically increased above that of the open ocean by evaporation. The estuarine system includes both estuaries and lagoons. It is more strongly influenced by its association with the land than is the Marine system. Estuarine water regimes and water chemistry are affected by several environmental forces (tides, precipitation, freshwater runoff, evaporation, and wind), and salinities range from hyperhaline to oligohaline (Cowardin et al., 1979).

Estuarine Subtidal Aquatic Bed Wetland. Estuarine subtidal aquatic bed wetlands include substrate that is continuously submerged (subtidal) and consists of habitat dominated by plants that grow on or below the water surface for most of the growing season. Aquatic Beds represent a diverse group of plant communities that require surface water for optimum growth and reproduction (Cowardin et al., 1979).

This habitat class is characterized by seasonally or permanently flooded freshwater channel/bed that is dominated by floating (mosquito fern and duckweed) or attached vascular aquatic plants including spiral widgeon grass (*Ruppia cirrhosa*).

Estuarine Intertidal Wetland. Estuarine intertidal wetlands include habitat of the estuarine system with substrate that is exposed and flooded by tides, and it includes the associated splash zone (Cowardin et al., 1979).

Estuarine Intertidal Emergent Wetland. Estuarine intertidal emergent wetlands are characterized by a dominance of erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation usually consists of perennial plants that are present for most or all of the growing season (Cowardin et al., 1979).

Estuarine Intertidal Scrub/Shrub Wetland. Estuarine intertidal scrub/shrub wetlands occur only in the estuarine and palustrine systems, but are one of the most widespread classes in the U.S. This habitat type includes areas dominated by woody, generally broad-leaved deciduous plants less than six meters (20 feet) tall. The plant species of this wetland include true shrubs, young trees, and trees or shrubs that are small or stunted due to environmental conditions. Scrub/shrub wetlands may represent a successional stage leading to forested wetland, or may be relatively stable communities. All water regimes are included except subtidal (Cowardin et al., 1979).

Estuarine Intertidal Forested Wetland. Estuarine intertidal forested wetlands are characterized by woody vegetation that is 6 meters tall or taller. All water regimes are included except subtidal. Forested wetlands only occur in the palustrine and estuarine systems and normally possess an overstory of trees, an understory of young trees and shrubs, and an herbaceous layer. Moisture must be relatively abundant, and wetlands in this subclass generally occur on mineral soils or highly decomposed organic soils (Cowardin et al., 1979).

Marine System

The marine system consists of the open ocean overlaying the continental shelf and its associated high-energy coastline. Marine habitats are exposed to the waves and currents of the open ocean. The water regimes are determined primarily by the ebb and flow of oceanic tides. Salinities exceed 30 percent, with little or no dilution except outside the mouths of estuaries.

Marine Intertidal Beach/Bar Wetland. Marine intertidal beach/bar wetlands include habitat of the Marine system with substrate that is exposed and flooded by tides, and it includes the associated splash zone (Cowardin et al., 1979).

4.3.1.2 Upland Plant Communities

Upland plant communities include vegetation dominated by plant species that do not require a permanent source of water (xerophytes), as opposed to plant species that are adapted to areas that are seasonally flooded or have saturated soils for at least a portion of the growing season (hydrophytes). Generally, upland plant communities consist of plant species that are adapted to dryer conditions and typically require only seasonal precipitation to obtain adequate water resources for growth and reproduction. Although most of the survey area is occupied by wetland habitats, several plant communities occupy the upland areas as well, including upland islands occurring as elevated terraces within the river floodplain, or immediately adjacent to the river's edge. Classification of the upland vegetation types observed in the surveyed portion of the Ventura River are provided in Table 4.3-3.

Table 4.3-3: Upland Vegetation Communities

Grassland Communities
California Annual Grassland Series
Ruderal Grassland Series
Scrub Communities
Black Sage Series
Black Sage-California Sagebrush Series
Mixed Sage Series
California Buckwheat Series
California Buckwheat-Black Sage Series
California Buckwheat-California Sagebrush Series
Coyote Brush Series
Chaparral Communities
Chamise Series
Sumac Series
Sumac-Black Sage Series
Sumac-California Sagebrush Series
Sumac-Ceanothus Series
Sumac-White Sage Series
Woodland Communities
California Walnut Series
Coast Live Oak Series

Grassland

Grassland consists of predominantly low-growing herbaceous and graminoid vegetation that forms a continuous groundlayer covering open hillsides, or forms understory patches below emergent shrubs, shrublands, and woodlands. Many native flowering annual herb and perennial bulb species (wildflowers), as well as naturalized annual forbs and invasive exotics, are important contributors to grassland.

Grassland typically grows in well-developed, deeper, fine textured soils on gentle slopes and flats, coastal terraces, and in disturbed sandy sites. Areas dominated by grasses are often in early successional stages, and over time, grassland tends to revert back to shrublands, and eventually even to woodlands, if burning and disturbance frequencies are minimal (Zedler et al., 1997).

The two mapped Grassland plant communities include California Annual Grassland Series and Ruderal Grassland Series.

California Annual Grassland Series. Although species composition varies among stands, alien and native annual grasses (genera including *Avena*, *Bromus*, *Hordeum*, *Lolium*, and *Vulpia*) typically dominate this plant community, while many native wildflowers, as well as naturalized annual forbs and invasive exotics, are important contributors to annual grassland. The major factors determining grassland composition include fall temperatures and precipitation, light intensity and shading, and microtopography variations (Zedler et al., 1997).

California Annual Grassland Series occurs on all topographic locations, especially gradual slopes, flats, coastal terraces, and in disturbed sandy sites; it typically grows in well-developed, deep, fine textured soils; and it occurs at elevations below 1,200 meters (Sawyer and Keeler-Wolf, 1995). California Annual Grassland Series observed scattered throughout the surveyed portion of the Ventura River exists as an understory growing below the Coast Live Oak Series (described below). It predominates on open terraces and contributes to the Scrub and Chaparral plant communities as well.

The predominant nonnative annual grasses forming California Annual Grassland Series of the Ventura River include slender wild oat (*Avena barbata*), cultivated oak (*Avena sativa*), ripgut, soft chess (*Bromus hordeaceus*), red brome (*Bromus madritensis* ssp. *rubens*), Italian ryegrass (*Lolium multiflorum*), Mediterranean grass (*Schismus barbatus*), and foxtail fescue (*Vulpia myuros*). The nonnative perennial grasses observed on site are Bermuda grass (*Cynodon dactylon*) and smilo grass.

The native herbaceous species recorded for California Annual Grassland Series include: western ragweed (*Ambrosia psilostachya* var. *californica*), evening primrose (*Camissonia* spp.), purple owl's-clover (*Castilleja exserta* ssp. *exserta*), Turkish rugging (*Chorizanthe staticoides*), four-spotted purple clarkia (*Clarkia purpurea* ssp. *quadrivulnera*), elegant farewell-to-spring (*Clarkia unguiculata*), common horseweed, wild forget-me-not (*Cryptantha* spp.), dove weed (*Eremocarpus setigerus*), telegraph weed (*Heterotheca grandiflora*), California cudweed aster (*Lessingia filaginifolia* var. *filaginifolia*), Parish lotus (*Lotus parishianus* var. *purshianus*), truncate-leaved lupine (*Lupinus truncatus*), arroyo lupine (*Lupinus succulentus*), sticky phacelia (*Phacelia viscida* var. *viscida*), and western verbena (*Verbena lasiostachys*). Some of the naturalized, and often invasive, herbs scattered throughout California Annual Grassland Series include many of those listed below in Ruderal Grassland Series.

Ruderal Grassland Series. Ruderal Grassland Series forms plant communities that are typically in early successional stages as a result of severe human disturbance, or as a result of a recurrent natural disturbance. This plant community is dominated by herbaceous, introduced, pioneering plant species that readily colonize open disturbed soil and thrive as a result of human impacts. Ruderal communities may provide a certain degree of erosion control for recently disturbed or graded areas, but such communities are also a threat to the natural biodiversity. They continually distribute invasive, highly competitive, nonnative propagules into otherwise native vegetation; however, if ruderal grassland stands are not disturbed for more than five years, they can undergo succession towards more stable, and less weedy, plant communities such as coastal or riparian scrub (Zedler et al., 1997).

Ruderal Grassland Series observed in the disturbed portions of the Ventura River are most commonly dominated by summer mustard, Tocalote (*Centaurea melitensis*), and bristly ox-tongue (*Picris echioides*). Some of the naturalized, and often invasive, associate herbs scattered throughout Ruderal Grassland Series include: tumbling pigweed (*Amaranthus albus*), scarlet pimpernel (*Anagallis arvensis*), mayweed (*Anthemis cotula*), five-hook (*Bassia hysopifolia*), black mustard (*Brassica nigra*), pineapple weed (*Chamomilla suaveolens*), Italian thistle, Mexican tea (*Chenopodium ambrosioides* var. *ambrosioides*), redstemfilaree (*Erodium cicutarium*), sweet fennel (*Foeniculum vulgare* [invasive]), lowland cudweed (*Gnaphalium luteo-album*), smooth cats-ear (*Hypocharis glabra*), prickly lettuce (*Lactuca serriola*), horehound (*Marrubium vulgare*), bur-clover (*Medicago polymorpha*), radish *Raphanus* sativa), Russian thistle (*Salsola tragus*), windmill pink (*Silene gallica*), milk thistle (*Silybum marianum*), and sow-thistle.

Scrub

Scrub vegetation occupying the Ventura River is predominantly coastal sage scrub, which is a type of shrubland that is dominated by drought-deciduous, low-growing shrubs and subshrubs. Coastal sage scrub forms various stands dominated by several different soft-leaved and grayish-green shrub species, and forms stands with specific characteristics and site requirements; therefore, coastal sage scrub is often considered as a collection of species-specific plant series.

Scrub plant size and species composition is relative to the available water supply present at each site; however, these semi-woody plants are typically already low growing since drought seasons accompanied with high temperatures and drying winds cause severe moisture stress (Zedler et al., 1997). Scrub species form various canopy densities; they occupy shallow or heavy soils of dry gentle to steep, moderately rocky, predominantly southern-facing slopes; and they generally occur at lower elevations. Some larger evergreen shrubs, typically categorized as chaparral species, are also often observed as emergent shrubs within coastal sage scrub.

Important associate shrub and herbaceous species observed contributing to the Coastal Sage Scrub Series throughout the Ventura River include: California sagebrush, coyote brush, california brickelbush, greenbark ceanothus (*Ceanothus spinosus*), bush poppy (*Dendromecon rigida* var. *rigida*), Claiforni bush sunflower (*Encelia californica*), California fuchsia (*Epilobium canum* ssp. *canum*), leafy California buckwheat, chaparral bedstraw (*Galium angustifolium* ssp. *angustifolium*), sawtooth goldenbush (*Hazardia squarrosa*), deerweed, chaparral bushmallow, laurel sumac, sticky bush monkeyflower (*Mimulus aurantiacus*), coast prickly-pear (*Opuntia littoralis*), lemonade berry (*Rhus integrifolia*), chaparral currant (*Ribes malvaceum*), white sage, chaparral nightshade (*Solanum xantii* var. *xantii*), and our Lord's candle (*Yucca whipplei* ssp. *whipplei*).

Typical coastal sage scrub series subshrubs, perennial vines, and herbaceous plant species include: Antisell three-pod milkvetch, moning glories (*Calystegia* spp.), lanceleaf live-forever (*Dudleya lanceolata*), golden yarrow (*Eriophyllum confertiflorum* var. *confertiflorum*), California everlasting

(*Gnaphalium californicum*), coastal everlasting, hairy golden-aster, heart-leaved penstemon (*Keckiella cordifolia*), giant wildrye (*Leymus condensatus*), and coast melic grass (*Melica imperfecta*).

Black Sage Series. Black sage series is dominated by black sage. Black sage resprouts both between and after recurring fires, although post-fire resprouting is sensitive to fire intensity. It responds to seasonal drought by reducing transpiring surface area through leaf curling and loss of larger leaves. Except for the driest years, few small green leaves remain on these shrubs even during the summer. This retention of some leaves makes it possible for black sage to respond quickly to the first fall rains (Zedler et al., 1997). Black sage series forms a continuous or intermittent low canopy over a variable ground layer, it occurs on steep slopes with shallow soils, and is a common species of elevations less than 1,200 meters (Sawyer and Keeler-Wolf, 1995). The associate shrub and herbaceous plant species observed as contributors to Black Sage Series include many of those listed above in the coastal sage scrub section.

California Sagebrush-Black Sage Series. California Sagebrush-Black Sage Series is a scrub community that is co-dominated by California sagebrush and black sage. Sawyer and Keeler-Wolf (1995) describe California sagebrush-black sage series as being considered part of the coastal sage scrub collection of series, and it forms a continuous or intermittent canopy over a variable ground layer. This series requires steep, south-facing slopes with colluvial-derived soils, and inhabits sites at elevations between 250 and 750 meters. The associate shrub and herbaceous plant species observed as contributors to California sagebrush-black sage series include many of those listed above in the coastal sage scrub section.

Mixed Sage Series. The Mixed Sage Series observed within the Ventura River survey area is co-dominated by the highly aromatic black sage, white sage, and California sagebrush (California buckwheat is important as well). No single species or pair of species can dominate stands of this series; instead, three or more must equally share commonness and cover. This series is the most typical Coastal Sage Scrub plant community. Mixed Sage Series forms an intermittent to continuous canopy over a variable ground layer, and grows on sandy, rocky, shallow soils of upland slopes at elevations below 1,200 meters (Sawyer and Keeler-Wolf, 1995). Associate species include those listed in Coastal Sage Scrub description (above).

California Buckwheat Series. California buckwheat series is dominated by California buckwheat. California buckwheat series forms an intermittent canopy (less than one meter tall) over a variable or grassy ground layer. This series requires shallow and rocky soils of dry, predominantly south-facing slopes and canyons, and is typically found scattered throughout terraces, foothills, and mountains at elevations below 1,200 meters. This series is likely to be seral to other plant communities and is most often found on slopes that have been disturbed within the last ten years. Other co-dominant California buckwheat series mapped for the Ventura River include the following:

- **California Buckwheat-Black Sage Series:** co-dominated by leafy California buckwheat and black sage. Black sage is a common species of elevations below 1,200 meters (Hickman, 1993). Sawyer and Keeler-Wolf (1995) list black sage as an important shrub contributing to the canopy of California buckwheat series.
- **California Buckwheat-California Sagebrush Series:** co-dominated by leafy California buckwheat and California sagebrush. California sagebrush is common on dry foothills especially near the coast below 800

meters (Hickman, 1993). Sawyer and Keeler-Wolf (1995) list California sagebrush as an important shrub contributing to California buckwheat series.

These series are very similar to California buckwheat series, require similar site conditions, and include many of the same associate species. The associate shrub and herbaceous plant species observed as contributors to California buckwheat series, California buckwheat-black sage series, and California buckwheat-California sagebrush series include many of those listed above in the Coastal sage scrub section.

Coyote Brush Series. Coyote brush series is dominated by coyote brush. Coyote brush series occurs in scrub and oak woodland communities on stabilized dunes of coastal bars, river mouths, coastline spits, coastal bluffs, open slopes (sometimes serpentine soils), and ecotonal areas with grasslands below 1,000 meters (3,281 feet) in elevation. This series forms a continuous or intermittent canopy (less than two meters tall), growing over a variable ground layer. The associate shrub and herbaceous plant species observed as contributors to coyote brush series include many of those listed above in the coastal sage scrub section.

Chaparral

Chaparral is a type of shrubland that is dominated by evergreen shrubs with small, thick, leathery, dark green, sclerophyllous leaves. The shrubs of chaparral are relatively tall and dense, and are adapted to periodic wildfires by stump sprouting or by germination from a dormant seed bank. These evergreen shrubs are also adapted to drought by deep extensive root systems, while their small thick leaf structure prevents permanent damage from moisture loss (Zedler et al., 1997). Many typical coastal sage scrub species also grow intermixed as associates with chaparral species. Chaparral typically occurs on moderate to steep south-facing slopes with dry, rocky, shallow soils, becoming more abundant with higher elevations where temperatures are lower and moisture supplies are more ample.

Important associate shrub species observed contributing to the Chaparral plant communities in the Ventura River include: bigberry manzanita (*Arctostaphylos glauca*), California sagebrush coyote brush, snowball ceanothus (*Ceanothus crassifolius*), wedgeleaf ceanothus (*Ceanothus cuneatus*), bigpod ceanothus (*Ceanothus megacarpus* var. *megacarpus*), hoary ceanothus (*Ceanothus oliganthus* var. *oliganthus*), greenbark ceanothus, birch-leaf mountain mahogany (*Cercocarpus betuloides* var. *betuloides*), wolly yerba santa (*Eriodictyon crassifolium* var. *nigrescens*), leafy California buckwheat, toyon (*Heteromeles arbutifolia*), chaparral bushmallow (*Malacothamnus fasciculatus* var. *fasciculatus*), laurel sumac, hollyleaf redberry (*Rhamnus ilicifolia*), lemonade berry, sugar bush (*Rhus ovata*), white sage, black sage, chaparral nightshade, and our Lord's candle.

Chamise Series. Chamise Series is dominated by chamise (*Adenostoma fasciculatum*), a needle-leaved, evergreen shrub, which is the most abundant species in the non-desert shrublands of California. Chamise Series is the most common chaparral type throughout California. It is adapted to California's Mediterranean climate by a dual root system with both deep and shallow roots, and individuals recover from fire by both resprouting and seedling recruitment. Chamise is usually associated with drier steep to gradual south- and west-facing slopes and ridges, and also occurs on xeric slopes on very shallow soils (often mafic-derived) at elevations below 1,600 meters (Zedler et al., 1997).

Sawyer and Keeler-Wolf (1995) describe Chamise Series as forming a continuous tall shrub canopy growing over a variable groundlayer, where herbaceous species are uncommon in older stands. Important associate shrub species observed contributing to the chamise canopy include those listed above in the chaparral description. Understory (ground layer) species are typically sparse, but include annual grasses and herbaceous species typical of the coastal sage scrub plant communities.

Sumac Series. Sumac Series is dominated by laurel sumac, which is a large shrub known to occur predominantly in chaparral series and as an important associate to scrub communities. This evergreen shrub has a deep, extensive root system that penetrates deep moisture reserves during summer drought and has thick, curved, reddish leaves that are folded at the leaf margin.

Sumac Series forms an open canopy over lower-growing shrubs with a sparse ground layer. This series typically requires steep north- and south-facing slopes with shallow coarse soils at elevations below 400 meters (1,312 feet) (Sawyer and Keeler-Wolf, 1995). Other co-dominant sumac series observed and mapped within the Ventura River survey area include the following:

- **Sumac-Black Sage Series:** co-dominated by laurel sumac and black sage. Black sage is a common species of elevations below 1,200 meters (Hickman, 1993). Sawyer and Keeler-Wolf (1995) list black sage as an important shrub contributing to the canopy of Sumac Series.
- **Sumac-White Sage Series:** co-dominated by laurel sumac and white sage. White sage is common on dry slopes at elevations below 1,500 meters (Hickman, 1993). Sawyer and Keeler-Wolf (1995) list white sage as an important contributor to Sumac Series.
- **Sumac-California Sagebrush Series:** co-dominated by laurel sumac and California sagebrush. California sagebrush is common on dry foothills especially near the coast below 800 meters (Hickman, 1993). Sawyer and Keeler-Wolf (1995) also list California sagebrush as an important shrub contributing to the Sumac Series canopy.
- **Sumac-Ceanothus Series:** co-dominated by laurel sumac and one Ceanothus species (either snowball, bigpod, hoary, or greenbark).

Woodland

Woodland describes vegetation dominated by woody trees and tall tree-like shrubs, forming an open to closed canopy, growing over a scattered variety of low-growing shrubs and a graminoid ground layer. Some woodland communities may not contain a shrub stratum, and may only form a tall canopy over annual or perennial grasslands. Woodland understory is directly related to the density of the tree canopy and its total percent canopy cover. Permanent shade, created by dense tree canopies, typically inhibits the growth of stratified canopy layers.

The two mapped Woodland plant communities include California Walnut Series and Coast Live Oak Series.

California Walnut Series. California walnut series is dominated by southern California black walnut, a broad-leaved deciduous, monoecious, tree that blooms from March to May. Southern California black walnut is an uncommon and endemic species, ranging from Santa Barbara to Los Angeles County (coastal southern California), and is primarily found on canyon slopes of all slope aspects.

California walnut series occurs in intermittently flooded or saturated wetland soils of freshwater riparian corridors, floodplains, incised canyons, seeps, and stream or riverbanks; however, this woodland may also grow in deep, shale-derived soils of rarely flooded upland north-facing slopes, terraces, and flats at elevations between 150 and 900 meters. California walnut series forms an open to closed canopy (less than 10 meters tall) growing over a variable understory of common or infrequent shrubs and a sparse or grassy ground layer (Sawyer and Keeler-Wolf, 1995).

Southern California black walnut was observed throughout the Ventura River area as a scattered tree in the Palustrine Forested Wetland (described above), and was observed as forming a woodland on several raised terraces, canyon slopes, and banks of the river corridor. The tree and shrub species growing as important associates to southern California black walnut include: coyote brush, Plummer baccharis (*Baccharis plummerae var. plummerae*), virgin's bower (*Clematis ligusticifolia*), pipestem clematis (*Clematis lasiantha*), toyon, laurel sumac, monkeyflower, coast live oak, and nightshades. The groundlayer is typically sparse.

Coast Live Oak Series. Coast live oak series is dominated by coast live oak, which is a broad-leaved, evergreen, broad-canopied tree with dark green leaves. Coast live oak is the most widely distributed species of the evergreen oaks, and it is capable of achieving large size and old age. This oak typically occurs in valleys on predominantly north-facing slopes, along riparian woodland fringes, scattered in grassland or coastal sage scrub communities, as an element of mixed evergreen forest, or as a contributor to other oak woodlands (Zedler et al., 1997).

Coast live oak series forms an intermittent, 30-meter tall, tree canopy growing over an understory of occasional shrubs and a grassy/herbaceous groundlayer. It also requires sandstone or shale-derived soils of elevations below 1,200 meters (Sawyer and Keeler-Wolf, 1995). Although coast live oak was observed scattered along the Palustrine Forested Wetland and as an emergent tree in coastal sage scrub and chaparral plant communities (all described above), coast live oak series is primarily mapped as occurring on raised terraces between channels and is influenced substantially by California annual grassland series (creating scattered oak savannahs throughout the river).

The native trees and large shrubs observed contributing to the oak canopy include southern California black walnut, Mexican elderberry, and California bay; however, other introduced trees, such as gum (*Eucalyptus* spp.) and Peruvian pepper tree (*Schinus molle*) were also observed. The shrub stratum growing below the oak canopy typically includes many native species listed above in the Scrub section; however, other site specific species were observed as well, and they include: giant needlegrass (*Achnatherum coronatum*), Plummer's Baccharis, wild morning-glory (*Calystegia macrostegia* ssp. *cyclostegia*), silk-tassel bush (*Garrya veatchii*), toyon, southern honeysuckle (*Lonicera subspicata* var. *denudata*), laurel sumac, bush monkeyflower, hollyleaf cherry (*Prunus ilicifolia*), hollyleaf redberry (*Rhamnus ilicifolia*), California coffeeberry (*Rhamnus californica* ssp. *californica*), California wild rose (*Rosa californica*), common snowberry (*Symphoricarpos mollis*), poison oak (*Toxicodendron diversilobum*), and canyon sunflower (*Venegasia carpesioides*). The groundlayer associate species include those typical of California annual grassland series (described above).

4.3.2 Wildlife

The diversity of aquatic and upland community types that occur within and adjacent to the project provide habitat for a wide variety of resident and migratory wildlife species, including several special status species. Of particular importance are the habitat types associated with the Ventura River and its estuary that are known to provide habitat for several special status species including critical habitat for the federally endangered steelhead (*Oncorhynchus mykiss*) and tidewater goby (*Eucyclogobius newberryi*).

The riverine, lacustrine, and palustrine systems associated with the Ventura River, Matilija Creek, and Matilija Dam Reservoir support a variety of habitat types, including sensitive riparian and emergent wetland habitats. Riparian and emergent wetlands occur throughout the Ventura River, and provide wildlife with shade, protection from predators, foraging habitat, and nesting and breeding habitat. Similarly, the adjacent emergent wetlands and riparian habitats supported by the Matilija Dam Reservoir and the Ventura River Estuary (estuary) provide these important wildlife habitat values. The upland vegetation communities that occur within and adjacent to the project (e.g., annual grassland and oak savannah) also support a wide variety of species, and contribute to the overall wildlife species diversity.

Several studies have been conducted that document wildlife species occurrences within the project area. Hunt and Lehman (1992) documented nearly 275 vertebrate species from the estuary and vicinity alone. In addition, wildlife surveys conducted by the U.S. Fish and Wildlife Service (USFWS, 2000) and by Aspen (Aspen, 2002) described over 160 vertebrate species from locations throughout the project area. Appendix F-3 is a list of wildlife species that has been complied from existing literature and recent field studies within the project area (Aspen, 2002; USFWS, 2000). Additionally, Section 4.3.3.2 provides a table of 35 special status wildlife species that are known or expected to occur in the project area.

Birds constitute the most abundant wildlife group within the project area, and are represented by a wide variety of aquatic and upland species. Aquatic-associated bird species observed include diving birds such as double-crested cormorant (*Phalacrocorax auritus*), pie-billed grebe (*Podilymbus podiceps*), and eared grebe (*Podiceps nigricol*lis), wading birds such as great blue heron (*Ardea herodias*), great egret (*Ardea alba*), and green heron (*Butorides virescens*), waterfowl species including American widgeon (*Anas Americana*), gadwall (*Anas strepera*), and greater scaup (*Aythya marila*), and shorebirds including spotted sandpiper (*Actitus macularia*), and killdeer (*Charadrius vocifierus*).

Other bird species observed include raptors such as red-tail hawk (*Buteo jamaicensis*), red-shouldered hawk (*Buteo lineatus*), and American kestrel (*Falco sparverius*), upland gamebirds such as California quail (*Callipepla californica*), mountain quail (*Oreortyx pictus*), and mourning dove (*Zenaida macroura),* hummingbirds such as Anna's hummingbird (*Calypte anna*), and Costa's hummingbird (*Calypte costae*), house sparrow (*Passer domesticus*), house finch (*Carpodacus mexicanus*), northern mockingbird (*Mimus polygottos*), European starling (*Sturnus vulgaris*), and goldfinch (*Carduelis psaltria*).

Mammals known to occur in the proposed area include western gray squirrel (*Sciurus griseus*), raccoon (*Procyon lotori*), gray fox (*Urocyon cinereoargenteus*), bobcat (*Lynx rufus*), mountain lion (*Felis *concolor*), domestic cat (*Felis cattus*), domestic dog (*Canis domesticus*), coyote (*Canus latrans*), and mule deer (*Odocoileus hemionus*).

Amphibians observed in the project include species such as California treefrog (*Hyla cadaverina*), bullfrog (*Rana catesbeiana*), California red-legged frog (*Rana aurora draytonii*), and California toad (*Bufo boreas halphilus*). Herpetofauna present includes species such as southern alligator lizard (*Elgaria multicarinata*), coastal whiptail (*Cnemidophorus tigris multiscutatus*), side-blotched lizard (*Uta stansburiana*), two-striped garter snake (*Thamnophis hammondii*), southwestern pond turtle (*Clemmy's marmota pallida*), and gopher snake (*Pituophis melanoleucus*).

4.3.3 Special-Status Species

4.3.3.1 Special-Status Plants

No State or federally listed endangered or threatened plant species were identified within the project area, and none are expected to occur. A single sensitive species, southern California black walnut (*Juglans californica* var. *californica*) was observed within the project area during vegetation surveys conducted in 2002. Seven additional sensitive plant species are known from the vicinity of the project area, and have the potential to occur. In addition two of these species were identified as USFS sensitive species. Candidates for such listing, or species that would meet the criteria for listing but have not yet been formally listed, include such species in the California Native Plant Society's (CNPS) Lists 1A (presumed extinct), 1B (rare, threatened, or endangered in California and elsewhere), and 2 (rare, threatened, or endangered in California but more common elsewhere) of the CNPS Inventory (CNPS, 2001). Species that are not currently considered candidates for listing include species on CNPS List 4 (watch list).

These special-status plant species are listed in Table 4.3-4 and include:

- **Aphanisma** (*Aphanisma blitoides*), a List 1 B Species, is associated with coastal bluff scrub and coastal sage scrub, and coastal dunes, and is typically found in sandy soils. This annual herb is known from the Channel Islands, This species is found on the Channel Islands with occurrences in Ventura, Los Angeles, Orange, Santa Barbara, and San Diego counties. An occurrence is known from approximately 4.5 miles southwest of the mouth of the Ventura River.
- **Mile's milk vetch** (*Astragtalus didymocarpus* var. *davidsonii*) a List 1B species, is associated with coastal scrub communities and is typically found in clay soils. This annual herb is known from Santa Barbara, San Luis Obispo, and Ventura Counties.
- **Davidson's saltscale** (*Atriplex serenana* var. *davidsonii*) a List 1B species, is associated with the coastal sage scrub, coastal bluff scrub, alkali vernal pools, alkali annual grassland, alkali playa, and alkali scrub. Davidson's saltbush is known to occur in cismontane southwestern California from Ventura County (Ojai, near San Antonio Road), western Orange County (Seal Beach, San Joaquin Freshwater Marsh, Newport Backbay) and in western Riverside County (CDFG, 2004). The distribution of this species outside the United States is poorly known. This species is extremely rare outside of Riverside County.
- **Late-flowered mariposa lily** (*Calochortus weedii* var. *vestus*) a List 1B species, associated with chaparral, woodlands, and riparian habitiats, often found on serpentine soils. This species occurs from Monterey County to Ventura County. An occurrence is known from Red Mountain, east of Rincon Hills.
- **Southern tarplant** (*Centromadia parryi* ssp. *australis*), a List 1B species, is associated with valley and foothill grasslands including areas dominated by non-native species, alkaline playas, alkali meadow, vernal pools, and vernally saturated areas on the margins of salt marsh. The species is known from Santa Barbara, Ventura, Los Angeles, Orange, and San Diego Counties. An occurrence is known from 4.5 miles south of the mouth of the Ventura River.

- **Island Mountain Mahogany** (*Cercocarpus betuloides* var. *blancheae*) a List 4 species known from both insular and mainland locations in closed-cone coniferous forest and chaparral in Los Angeles and Ventura Counties. Individuals commonly occur on north-facing mesic slopes and outcrops.
- **Ojai fritillary** (*Fritillaria ojaiensis*), a List 1B species, is associated with broadleaf forests/woodlands, coniferous forests, and chaparral. The species is known to occur in rocky soils. Ojai fritillary is distributed from Santa Barbara to Ventura Counties, and is known from Stewart Canyon, north of Ojai.
- **California Black Walnut** (*Juglans californica var. californica*) a List 4 species, utilizes a variety of habitats in southern California on soils with a high water-holding capacity. Scattered individuals commonly occur on alluvium located at the base of hills and in canyons. Individuals also occur infrequently on south-facing slopes, and more commonly, on north-facing slopes. On mesic north-facing slopes this walnut is primarily a member of open woodlands of various types and sometimes produces pure stands. It is sometimes present within coastal sage scrub and rarely occurs in chaparral.
- **Coulter's goldfields** (*Lasthenia glabrata* ssp. *coulteri*), a List 1B species, Coulter's goldfields is associated with low-lying alkali habitats along the coast and in inland valleys, in association with coastal salt marsh, alkali marsh, alkali meadow, alkali playa, alkali scrub, and vernal pools (CDFG, 2004). These habitats form mosaics that are largely dependent on salinity and micro-elevational differences. Coulter's goldfields typically occurs in silty-clay soils that are highly alkaline and seasonally saturated. Coulter's goldfields is distributed from coastal San Luis Obispo County south through coastal Santa Barbara County, Ventura County, Los Angeles to San Diego County and northwestern Baja California from sea level to about 1,000 meters. Interior valley populations have been recorded from the Carrizo Plain of San Luis Obispo County south through Tehachapi (Kern County), Twenty-Nine Palms (San Bernardino County), and cismontane western Riverside County, to Mexico (CDFG, 2004). Coulter's goldfields has also been reported from Santa Rosa Island. The CNDDB reports this plant from Tulare and Colusa Counties.
- **Sanford's arrowhead** (*Saggittaria sanfordii*), a List 1B species, is associated with low elevation wetland habitats including freshwater marshes and swamps. This species is reported from several California counties, especially near the Central Valley. An occurrence is reported from Mirror Lake and Mira Monte in the Ojai Valley (CNDDB). However, CNPS (2001) reports that the species has been extirpated from southern California.
- **Salt spring checkerbloom** (*Sidalcea neomexicana*), a List 2 species, is Salt Spring Checkerbloom (*Sidalcea neomexicana*) generally associated with alkaline, mesic, or wetland soils in coastal scrub, chaparral, lower montane coniferous forests, Mojavean desert scrub, and playas. This species occurs in Los Angeles, Orange, Riverside, Santa Barbara, San Bernardino, and Ventura counties, and Baja California. It is more common outside of California.

Table 4.3-4: Special Status Plants with the Potential to Occur Within the Study Area

Common Name *Scientific Name*	Status Federal/ State/CNPS	Associated Habitats	Potential for Occurrence
Aphanisma (*Aphanisma blitoides)*	– – 1B	Coastal bluffs, sage scrub and dunes	Moderate
Mile's milk vetch (*Astragtalus didymocarpus* var. *davidsonii*)	– – 1B	Coastal scrub communities in clay soils	Moderate
Davidson's saltscale (*Atriplex serenana* var. *davidsonii*)	– – 1B	Variety of alkaline habitats	Moderate
Late-flowered mariposa lily (*Calochortus weedii* var. *vestus*)	FSS – 1B	Chaparral, woodlands, and riparian habitats	High
Southern tarplant (Centromadia parryi ssp. Australis	– – 1B	Alkaline meadows, wetland margins, annual grassland	Moderate
Island Mountain Mahogany (Cercocarpus betuloides var. blancheae)	– – 4	Chaparral and closed-cone coniferous forest	Moderate

Common Name *Scientific Name*	Status Federal/ State/CNPS	Associated Habitats	Potential for Occurrence
Ojai fritillary (*Fritillaria ojaiensis*)	FSS – 1B	Chaparral, broadleaf forests/woodlands, rocky soils	High
Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*)	– – 1B	Variety of alkaline habitats	Moderate
California Black Walnut (Juglans californica var. californica)	– – 4	Variety of habitats	Occurs
Sanford's arrowhead (*Saggittaria sanfordii*)	– – 1B	Marshes, wetlands, pools	Moderate
Salt spring checkerbloom (*Sidalcea neomexicana*)	– – 1B	Alkaline Springs and seeps	Moderate

Federal:
E = Listed as endangered under the federal Endangered Species Act.
T = Listed as threatened under the federal Endangered Species Act.
PE = Proposed for federal listing as endangered under the federal Endangered Species Act.
PT = Proposed for federal listing as threatened under the federal Endangered Species Act.
FSS = Species for which U.S. Forest Service has listed as sensitive.
SC = Species of Concern.
– = No listing.
State:
E = Listed as endangered under the California Endangered Species Act.
T = Listed as threatened under the California Endangered Species Act.
R = Listed as rare under the California Native Plant Protection Act. This category is no longer used for newly listed plants, but some plants previously listed as rare retain this designation.
C = Candidate species for listing under the California Endangered Species Act.
SSC = Species of special concern in California.
– = No listing.
California Native Plant Society:
1A = List 1A species: presumed extinct in California.
1B = List 1B species: rare, threatened, or endangered in California and elsewhere.
2 = List 2 species: rare, threatened, or endangered in California but more common elsewhere.
3 = List 3 species: plants about which more information is needed to determine their status.
4 = List 4 species: plants of limited distribution.
– = No listing.

4.3.3.2 Special-Status Wildlife Species

A total of 35 special-status species are known or expected to occur within the project area. Of these species, three are fish, two are amphibians, four are reptiles, 24 are birds, and two are mammals. Table 4.3-5 is a list of known and potentially occurring sensitive species that has been compiled from literature and recent field studies in the project area including the *California Natural Diversity Database* (CDFG, 2004), the *USFWS Revised Planning Aid Memorandum* (USFWS, 2000a), the *USFWS Supplemental Planning Aid Report for the Matilija Dam Removal Project-Ventura County, California* (USFWS, 2000b), and recent field studies conducted by Aspen Environmental Group.

Biological Assessments are prepared to comply with section 7 of the Federal Endangered Species Act, and appear in Appendix C1 for the steelhead, which is under the jurisdiction of the National Marine Fisheries Service, and in Appendix C2 for species under the jurisdiction of the US Fish & Wildlife

Service. The reader is directed to those two appendices for specifics on compliance with the Federal Endangered Species Act.

Table 4.3-5: Known and Potentially Occurring Sensitive Wildlife Species Within the Study Area

Species		Status	Known or Potential Occurrence in Project
Common Name	Scientific Name		
Fish			
Steelhead	*Oncorhynchus mykiss*	FE	Known throughout the Ventura River, Matilija Creek, and other tributary waters of the Ventura River.
Tidewater goby	*Eucyclogobius newberryi*	FE, CSC	Known from the mouth of the Ventura River to two miles upstream.
Arroyo chub	*Gila orcutti*	CSC, FSS	Known throughout the Ventura River
Amphibians			
California red-legged frog	Rana aurora draytonii	FT, CSC	Known from several locations within the project area.
Western spadefoot toad	*Scaphiopus hammondii*	FSC, CSC	Known from the Ventura River near the Oak View area.
Reptiles			
Southwestern pond turtle	*Clemmy's marmorata pallida*	FSC, CS, FSS	Known from several locations within the project area.
Silvery legless lizard	*Anniella pulchra pulchra*	FSC, CSC, FSS	Known from the coastal dunes near the mouth of the Ventura River.
Coastal western whiptail	*Cnemidophorus tigris multiscutatus*	FSC, CSC	Observed within the project area.
Two-striped garter snake	*Thamnophis hammondii*	CSC, FSS	Known from the project area.
Birds			
Western snowy plover	*Charadrius alexandrinus*	FT, CSC	Observed within the project area.
Southwestern willow flycatcher	*Empidonax traillii extimus*	FE	Potential nesting and foraging riparian habitat.
California Condor	*Gymnogyps californianus*	FE, SE, DFGFP	Observed within the project area.
California brown pelican	*Pelecanus occidentalis californicus*	FE, SE	Observed within the project area.
California least tern	*Sterna antillarum browni*	FE, SE, DFGFP	Observed within the project area.
Least Bell's vireo	*Vireo bellii pusillus*	FE, SE	Observed within the project area.
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	SE	Potential nesting and foraging riparian habitat.
American peregrine falcon	*Falco peregrinus DFGFP, anatum*	SE, DFGFP	Observed within the project area.
Belding's savannah sparrow	*Passerculus sandwichensis beldingi*	SE, FSC,	Observed within the project area.
Cooper's hawk	*Accipiter cooperii*	CSC	Observed within the project area.
Tricolored blackbird	*Agelaius tricolor*	FSC, CSC	Observed within the project area.
Southern California rufous-crowned sparrow	*Aimophila ruficeps canescens*	FSC, CSC	Observed within the project area.
Great egret	*Ardea alba*	FWSMC	Observed within the project area.
Great blue heron	*Ardea herodias*	FWSMC	Observed within the project area.
Lawrence's goldfinch	*Carduelis lawrencei*	FWSMC	Observed within the project area.
Vaux's swift	*Chaetura vauxi*	CSC	Observed within the project area.
Olive-sided flycatcher	*Contopus copperi*	FSS, FWSMC	Observed within the project area.
Black swift	*Cypseloides niger*	CSC	Observed within the project area.
Yellow warbler	*Dendrocia petechia brewsteri*	CSC, FWSMC	Observed within the project area.
White-tailed kite	*Elanus leucurus*	DFGFP	Observed within the project area.
Yellow-breasted chat	*Icteria virens*	CSC	Observed within the project area.
Osprey	*Pandion haliaetus*	CSC	Observed within the project area.
Double-crested cormorant	*Phalacrorax auritis*	CSC	Observed within the project area.

Species		Status	Known or Potential Occurrence in Project
Common Name	Scientific Name		
White-faced ibis	*Plegadis chihi*	CSC	Observed within the project area.
Mammals			
Pallid bat	Antrozous pallidus	CSC, FSS	Observed within the project area.
Ringtail	Bassariscus astutus	DFGFP	Known from the project area.

FE = Federally Endangered Species
FT = Federally Threatened Species
SE = State Endangered Species
FSC = Federal Species of Special Concern
CSC = California Species of Special of Special Concern
DFGFP = CDFG Fully Protected Species
FSS = U.S. Forest Service Sensitive Species
FWSMC = USFWS-protected migratory species

Fish

Federally Listed Species

Steelhead. Steelhead (*Oncorhynchus mykiss*) are ocean-going forms of rainbow trout that are native to Pacific coast streams from Alaska south to northwestern Mexico (Moyle, 1976). In California, six populations of steelhead have been determined to be evolutionary significant units (ESUs) and are federally listed at this time. The population of steelhead in the southern California ESU is federally endangered and has adapted to survive the semi-arid climates and the rainfall pattern of southern California. Populations in California have declined primarily due to water development (dams, reservoirs, and water harvest), land use practices, and urbanization. The population is currently known from San Luis Obispo County south to San Mateo Creek watershed in San Diego County (National Marine Fisheries Service, 1997; Wong, 2004). Once hatched, juvenile steelhead may stay in freshwater for one or two years before migrating to the ocean. This outward migration primarily occurs during the winter and spring months when river flows are relatively high. Steelhead mature at age two to four and migrate back upstream to natal spawning areas. The upstream migration generally occurs from January through March, but is dependent on the intensity of storms and subsequent outflow. Females create a depression (redd) in the gravel of the streambed to lay eggs, males fertilize the eggs with milt, and the nest is covered by the female who loosens gravel immediately upstream, which the stream currents carry downstream to cover the eggs. The eggs remain in the nest for a period of weeks or months before hatching.

Steelhead are known to historically occur in the Ventura River system and the population was between 4,000 and 5,000 individuals prior to the development of the Matilija Dam in 1947 (USFWS, 2003). Current populations of steelhead are estimated to be less than 200 individuals utilizing habitat between the Robles Diversion in Reach 5 and the Estuary in Reach 1. The sharp decline of the species within the River is likely the effect of the Matilija Dam and the Robles Diversion, hence the importance of the proposed dam removal and related Robles Diversion fish ladder to the long-term survival of the species.

A study conducted for the California Department of Fish and Game (CDFG, 1997) captured steelhead in the mainstem Ventura River from below the Robles Diversion Dam downstream to Shell Road.

Tidewater goby. The federally endangered tidewater goby (*Eucyclogobius newberryi*) is a small, elongate fish species that is endemic to brackish coastal lagoons, marshes, and estuaries of coastal California. This species can withstand the wide fluctuations in salinity, water temperature, and dissolved oxygen that are characteristic of coastal lagoons that periodically open and close to the ocean (e.g., Ventura River Estuary).

Within the project area, habitat for the tidewater goby includes the open water habitat of the Ventura River Estuary upstream to a point approximately two miles from the confluence of the Ventura River and the Pacific Ocean (Ventura River mouth). Tidewater gobies are known to occur in the brackish estuary of the Ventura River, that provides foraging and breeding habitat for this species, and have been observed up to approximately two miles upstream of the rivers mouth (Hunt and Lehman, 1992).

Sensitive Species

Arroyo chub. The California-state species of special concern arroyo chub (*Gila orcutti*) is a small native fish that typically occurs in slow moving portions of warm streams with highly variable stream flows. Arroyo chub breed in streams and lakes, but generally spawn in small pools between February and August where eggs are broadcast over beds of aquatic vegetation.

Historically, the species was native to Los Angeles, San Gabriel, San Luis Rey, Santa Ana, and Santa Margarita Rivers and Malibu and San Juan Creeks. However, this species has been successfully introduced far outside its native range, often with trout plants, including the Ventura River. This species is now only naturally abundant in the west fork of the San Gabriel River (USFWS, 2003). Populations in the study area have been observed within one mile of the Main Street Bridge, located near the intersection of 101 Freeway and SR 33 (Hunt and Lehman, 1992).

Amphibians

Federally Listed Species

California red-legged frog. The federally threatened and California state species of special concern California red-legged frog (*Rana aurora draytonii*) is a medium-sized frog that historically occurred in coastal mountains from Marin County south to northern Baja California, and along the floor and foothills of the Central Valley from about Shasta County south to Kern County (Jennings and Hayes, 1994). Currently, this species generally occurs in the coastal portions of its historic range; and is extremely rare in most of southern California south of Ventura County.

California red-legged frogs are usually confined to aquatic habitats, such as creeks, streams and ponds, and occur primarily in areas having pools approximately 1m deep, with adjacent dense emergent or riparian vegetation (Jennings and Hayes, 1994). Adult frogs move seasonally between their egg-laying sites and foraging habitat, but generally they rarely move large distances from their aquatic habitat. Major predators include wading birds, introduced fish, bullfrogs, and native garter snakes, all of which occur along the Ventura River.

Potential habitat for the California red-legged frogs occurs throughout most of the project area. This species, however, has only been documented in a few locations in the upper portion of the project area (above Matilija Dam) along Matilija Creek and within the San Antonio Creek tributary (USFWS, 2000; URS, 2000) The rarity of the species is attributed to the loss of habitat and the high densities of exotic predators such as bullfrogs, red swamp crayfish, and largemouth bass (USFWS, 2003).

Sensitive Species

Western spadefoot toad. The western spadefoot toad (*Scaphiopus hammondii*) is a federal and state species of special concern that is primarily known from the Central Valley and adjacent foothills, and in the Coast Ranges from Redding to northwestern Baja California. This species is found in arid and semi-arid regions in the lowlands and foothills (below 4,500 feet) in washes, river floodplains, alluvial fans, playas, and alkali flats. Breeding and egg laying almost exclusively occurs in shallow temporary pools formed by rainfall, and grasslands with temporary pools are considered optimal habitat for this species (Zeiner et al., 1988). Western spadefoot toads are now believed to be extirpated from many previously known occurrences in southern California.

Potential habitat for western spadefoot toad (e.g., river floodplains) occurs throughout the project area, and one occurrence of this species was reported from the Ventura River floodplain near the town of Oak View.

Reptiles

Sensitive Species

Southwestern pond turtle. The southwestern pond turtle (*Clemmy's marmorata pallida*) is classified as a federal and California-state species of special concern, and is the only abundant native turtle in the state (Zeiner et al., 1988). Historically, it occurred in most Pacific slope drainages from the Oregon to the Mexican borders. The current range is similar to the historic range, but populations have become fragmented and reduced by agriculture, urban development, and habitat alteration and degradation. Population numbers have also decreased due to competition with and predation from exotic and introduced species such as bullfrogs, largemouth bass, and sunfish (Holland, 1986; Jennings and Hayes, 1994).

Pond turtles live in rivers, streams, lakes, ponds, vernal pools, seasonal wetlands, and in intermittent streams where permanent pools exist. Although they prefer freshwater, they also seem to have a tolerance for slightly brackish conditions. Adult turtles require slow-moving water and appropriate aerial and aquatic basking sites, such as logs, tree trunks, banks, and ledges. Hatchlings (individuals less than one years old) require shallow water, less than 30 cm, with adjacent dense submergent or emergent vegetation for refuge (Jennings and Hayes, 1994). Habitat requirements of the western pond turtle also include a terrestrial component. Terrestrial habitats are used for oviposition, over-wintering, occasional seasonal use, and overland dispersal. Turtles are active on a year-round basis in both aquatic and terrestrial habitats (Holland, 1986).

Potentially suitable habitat for southwestern pond turtle occurs throughout most of the project area, and this species has been observed at several locations along the Ventura River and its tributaries (Hunt and Lehman, 1992; USFWS, 2000a; Aspen, 2002).

Silvery legless lizard. The small, secretive, snake-like silvery legless lizard (*Anniella pulchra pulchra*) is a federal and state species of special concern, and is endemic to California and northern Baja California, Mexico. In California, this species is known from the coastal slope near San Francisco to the California-Mexico border.

The silvery legless lizard is a fossorial (burrowing) animal that is found in a variety of habitat (e.g., washes, woodlands, alluvial fans, and sand dunes). This species typically inhabits sand or loose soil, and is known to forage beneath leaf litter, under debris or within sandy soil (Stebbins, 1985).

Sandy soils associated with the alluvial floodplain of the Ventura River provide potential silvery legless lizard habitat throughout most of the project area. Within the project area, however, this species is only known from the coastal dune habitat near the confluence of the Ventura River and the Pacific Ocean (Hunt and Lehman, 1992).

Coastal western whiptail. The coastal western whiptail (*Cnemidophorus tigris multiscutatus*) is a federal and California-state species of special concern. This species occurs along the coast of southern California and west Baja California, Mexico, and is widely distributed but uncommon within its range (Zeiner et al., 1988). This lizard species occurs in a variety of habitat types including valley foothill hardwood, valley foothill hardwood-conifer, valley foothill riparian, mixed conifer, pine-juniper, chamise redshank chaparral, mixed chaparral, desert scrub, desert wash, alkali scrub, and annual grass types (Zeiner et al., 1988).

Potential habitat for coastal whiptails occurs within and adjacent to the project area. Recent studies conducted by the USFWS (2000b) identified several dozen coastal whiptails in upland areas in the northern portion of the project area.

Two-striped garter snake. The California-state species of special concern two-striped garter snake (*Thamnophis hammondii*) is an aquatic snake that is known from Monterey County south to Baja California, Mexico.

Two-striped garter snakes typically occur within perennial and intermittent streams that have rocky beds and bordered by willow thickets or other dense vegetation. This species may also inhabit shallow rivers and stock ponds bordered by thick riparian vegetation.

Potentially suitable habitat for two-striped garter snake occurs throughout the project area. Only three observations, however, have been reported from the project area (Hunt and Lehman, 1992; USFWS, 2000a; and Aspen, 2002).

Birds

Federally Listed Species

Western snowy plover. The federally threatened and California-state species of special concern western snowy plover (*Charadrius alexandrinus*) is a small shorebird that occurs from the State of Washington to Baja California, Mexico, with the majority of breeding birds found in California. This species typically nests along suitable coastal beach sites from mid-March through mid-September, and may or may not migrate to southern wintering areas.

Western snowy plover foraging habitat includes areas along coastal shores, reservoirs, braided river channels, and playas. This species primarily breeds on coastal beaches from southern Washington to southern Baja California, Mexico. It nests on barren to sparsely vegetated sand and gravel beaches and open areas around estuaries, levees, and flats. Nests are typically a shallow depression or scrape in sandy or gravelly substrate.

The Ventura River Estuary and nearby beaches provide potential foraging and nesting habitat for western snowy plovers, and this species has been observed foraging on the beaches near the Ventura River Estuary (CDFG, 2002). Additionally, several to over 100 individual western snowy plovers have been observed using the adjacent sandy beaches and mudflats of the Ventura River Estuary during the late summer and early fall period (URS, 2000). No snowy plover nesting, however, has been reported from the project area.

Southwestern willow flycatcher. The federally and California state-listed endangered southwestern willow flycatcher (*Empidonax trailii extimus*) is a migratory passerine species that breeds in California from late spring through late summer, and migrates to wintering grounds in Central America, and portions of South America during the non-breeding season (Zeiner et al., 1990a). The southwestern willow flycatcher's breeding range includes southern California, Arizona, New Mexico, western Texas, southwestern Colorado, southern Nevada and Utah, and northwestern Mexico. In southern California, this subspecies is now a very rare and local summer resident.

The southwestern willow flycatcher is a riparian obligate species that breeds along rivers, streams, wetlands, and other aquatic-associated habitats such as extensive riparian woodlands with water-filled creeks, or channels and scattered overgrown clearings.

The project area supports potential breeding habitat for this species in a variety of riparian habitat types (e.g., willow and mulefat scrub and riparian woodland vegetation). No southwestern willow flycatchers, however, have been reported in the CNDDB, and none were observed during recent field surveys of the project.

California condor. The federally and state endangered California condor (*Gymnogyps californianus*) is a large vulture-like scavenger that is a permanent resident of he semi-arid, rugged mountain ranges surrounding the southern San Joaquin Valley, including the Coast Ranges from Santa Clara County south to Los Angeles County, the Transverse Ranges, Tehachapi Mountains, and southern Sierra Nevada (Zeiner et al., 1990a).

The California condor forages for carrion over wide-open areas (e.g., open savannah, grasslands, foothill chaparral, and rangeland) and nests in caves, crevices, behind rock slabs, or on large ledges on high sandstone cliffs (Zeiner et al., 1990a).

The project area provides little potentially suitable foraging habitat and no nesting habitat for California condor. This species, however, may occasionally forage within the project, and one California condor was sited soaring over the upper portion of the project area (Austin, 2000).

California brown pelican. The federally and state endangered California brown pelican (*Pelecanus occidentalis californicus*) is a large-sized aquatic bird species that occurs along the California coast. This species primarily occurs in offshore areas, along beaches, estuaries, and other coastal locations, and is rarely seen inland.

The California brown pelican forages by diving for fish in large open bodies of water associated within marine and estuarine habitats, and is often seen resting on beaches, sandbars, piers, jetties, boat docks, and off-shore rocks and islands. California brown pelicans breed from March to early August on the channel islands and islands off the coast of Baja California, Mexico. Following the breeding period, brown pelicans disperse up and down the coast of California and Baja California, and occasionally visit the Salton Sea and Colorado River reservoirs (Zeiner et al., 1990a).

The Ventura River Estuary and associated coastal areas provide foraging and resting habitat for the California brown pelican, and this species is commonly seen at the river mouth in the summer, foraging offshore and using the estuary for resting (URS, 2000).

California least tern. The federally and California-state endangered California least tern (*Sterna antillarum browni*) is the smallest North American tern, and is a migratory bird that nests in colonies along the central and southern California coast, as well as Baja California, Mexico from April through August. This species winters south of the California-Mexico border from mid-October through late April (Zeiner et al., 1990a). California least terns nest in colonies and are known to occur on sandy beaches along marine and estuarine environments, salt ponds, and other sparsely vegetated sites near fish bearing water. Least tern nests are generally placed in areas free of human or predatory disturbances on sparsely vegetated beaches or tidal flats (Zeiner et al., 1990a)

The Ventura River Estuary and near-shore areas provide potential foraging and nesting habitat for California least terns, and this species has been observed foraging within the Ventura River Estuary on several occasions (Hunt and Lehman, 1992). No California least tern nesting activity, however, has been reported from the project area.

Least Bell's vireo. The federally and California-state endangered least Bell's vireo (*Vireo bellii pusillus*) is a small and secretive migratory bird that is closely associated with dense stands of riparian vegetation along streams and rivers. Least Bell's vireos typically arrive at their breeding grounds in southern California riparian areas by mid-March and depart to their wintering grounds in late August (Zeiner et al., 1990a).

For breeding, least Bell's vireos prefer riparian woodlands that combine a dense understory with a tall canopy. Their small cup-shaped nests are made from plant material and are typically placed on slender branches approximately two or three feet above the ground.

The project area is not considered critical habitat for least Bell's vireo although riparian areas in nearby streams (i.e., the Santa Ynez and Santa Clara Rivers) are considered critical habitat for this species. The extensive riparian areas within the project area, however, are considered potential least Bell's vireo breeding habitat. Jim Greaves observed a single least Bell's vireo breeding pair three consecutive years (1993-1995) nesting in a location approximately two miles upriver of the Main Street Bridge, Ventura (URS, 2000). In addition, one historic least Bell's vireo nest was observed in the Foster Park region of the Ventura River (circa 1919), and an individual was observed in a location on the Ventura River approximately two miles upriver from the estuary (CDFG, 2002).

State-Listed Species

Western yellow-billed cuckoo. The California-state endangered western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) is an uncommon to rare summer resident in California. Within California, this species is generally found foraging and breeding in desert foothill and valley riparian habitats that support extensive riparian woodlands, especially those dominated by cottonwood and willow.

The extensive riparian vegetation in the project area provides potential foraging and nesting habitat for yellow-billed cuckoos. This species, however, has not been reported from the project area.

American Peregrine Falcon. The American peregrine falcon (*Falco peregrinus anatum*) was recently removed from the federal list of Threatened and Endangered Species (USFWS, 1999) but remains a California-state endangered species. The American peregrine falcon is known to use a variety of habitat types throughout California and is considered a rare to uncommon migrant and winter visitor in southern California, especially along the coast.

Peregrine falcons prefers coastal estuaries and other wetlands that concentrate waterfowl and shorebirds, but forages widely over many habitat, especially during migration. This species generally breeds from early March to late August on high cliffs, banks, or mounds in woodland, forest, and coastal areas (Zeiner et al., 1990a).

Suitable foraging habitat for American peregrine falcons occurs throughout the project, particularly in areas that are known to support large concentrations of birds such as the Ventura River Estuary and Matilija Dam Reservoir. In addition, potentially suitable cliff nesting habitat occurs on steep hillsides adjacent to most of the project. Sightings of this species have been reported from the Ventura River estuary (Hunt and Lehman, 1992).

Belding's savannah sparrow. The California-state endangered Belding's savannah sparrow (*Passerculus sandwichensis beldingi*) is endemic to southern California, and ranges from Baja California, Mexico northward to Santa Barbara County.

Within its geographic range, the Belding's savannah sparrow resides in salt marsh wetlands that provide nesting and foraging habitat for this species, and prefers to occupy the upper littoral zone of salt marshes.

The Ventura River Estuary provides potentially suitable foraging and nesting habitat for Belding's savannah sparrow, and this species has been observed in the coastal salt marsh habitat in the estuary (Hunt and Lehman, 1992).

Sensitive Species

Cooper's Hawk. The Cooper's hawk (*Accipiter cooperii*) is a California-state species of special concern that is a common, and primarily a yearlong, resident throughout wooded portions of California. This species forages and nest within wooded areas including dense stands of live oak, riparian deciduous, second-growth conifer stands, and other forest habitats near water (Zeiner et al., 1990a)

The project area supports suitable foraging and nesting habitat for Cooper's hawk, and this species has been observed during past and recent wildlife surveys of the project (USFWS, 2000a; Aspen, 2002).

Tricolored blackbird. The tricolored blackbird (*Agelaius tricolor*) is a federal and State of California species of concern, and is generally a non-migratory, year-long residents of California.

Tricolored blackbirds nest in large colonies in wetlands supporting cattails (*Typha* spp.) or tules (*Scirpus* spp.), and occasionally in riparian thickets with willows (*Salix* spp.), blackberries (*Rubus* spp.), wild roses (*Rosa* spp.), and tall herbs. Highly colonial, tricolored blackbirds require a nesting area large enough to support a minimum colony of about 50 pairs (Grinnell and Miller, 1944). Their nests are located a few feet above, or near, fresh water. Their foraging habitat, which includes croplands, grassy fields, flooded land, and pond edges, may be located up to four miles from the nest sites. The normal breeding period is mid-April to late July, and nesting colonies often relocate from one year to the next (Zeiner et al., 1990a).

The project area supports potential breeding habitat for this species in a variety of riparian habitat types and emergent wetland vegetation (tule and cattail marsh). In 1993, a tricolored blackbird nesting colony (40 individuals) was reported from a location approximately one mile upriver from the estuary. (CDFG, 2002).

Southern California rufous-crowned sparrow. The California-state species of special concern Southern California rufous-crowned sparrow (*Aimophila ruficeps canescens*) occurs west of the deserts from Ventura County south into Baja California.

Southern California rufous-crowned sparrows typically inhabits rocky slopes with relatively open shrub cover (e.g., coastal sage scrub and chaparral) that is intermixed with grassy areas. This species generally breeds from mid-March to mid-June, and nests are typically placed on the ground in an area concealed by low vegetation.

The small islands of upland shrub habitat within the project area provide potentially suitable foraging and nesting habitat for Southern California rufous-crowned sparrows, and this species has been observed during past wildlife surveys in the project (USFWS, 2000a).

Great egret. The great egret (*Ardea alba*) is a California Department of Forestry (CDF) sensitive species. The great egret is a large wading birds are year round residents that are commonly seen in wetlands, estuaries, ponds, lakes, agricultural lands, rivers and other aquatic environments. This species commonly occurs along coastal California and throughout the Central Valley.

Great egrets are colonial breeders that use the sticks and stems of marsh plants to build large nests in secluded trees near water (Zeiner et al., 1990a). Like great blue herons, the great egret is a predatory bird that wades slowly into shallow water waiting patiently for opportunities to strike and capture prey items such as fish, crustaceans, and small amphibians and reptiles.

The entire wetted channel of the Ventura River and the shorelines of the river estuary and Matilija Dam Reservoir provide foraging habitat for great egrets. Additionally, the large riparian and adjacent upland trees in the vicinity of the project provide potentially suitable rookery habitat for this species. No nesting great egrets, however, have been reported from the project, but several individuals have been observed during recent studies (USFWS, 2000a; Aspen, 2002).

Great blue heron. The great blue heron (*Ardea herodias*) is a CDF sensitive species. These large wading birds are year round residents that are commonly seen in wetlands, estuaries, ponds, lakes, agricultural lands, rivers, and other aquatic environments throughout most of California.

Great blue herons typically breed in colonies in the top of secluded large snags or live trees near shallow water foraging areas (Zeiner et al., 1990a). This large predatory bird wades slowly into shallow water waiting patiently for opportunities to strike and capture prey items such as fish, crustaceans, and small amphibians and reptiles.

The entire wetted channel of the Ventura River and the shorelines of the river estuary and Matilija Dam Reservoir provide foraging habitat for great blue herons. Additionally, the large riparian and adjacent upland trees in the vicinity of the project provide potentially suitable rookery habitat for this species. No nesting great blue herons, however, have been reported from the project, but several individuals have been observed during recent studies (USFWS, 2000a; Aspen, 2002).

This species generally occurs along the coastal slope of central and southern California, and the foothills of the Central Valley (Zeiner et al., 1990a).

Lawrence's goldfinch. The Lawrence's goldfinch (*Carduelis lawrencei*) is a USFWS-protected migratory bird species that breeds in California and winters in other southwestern states and in northern Mexico.

Lawrence's goldfinch are present in California mostly from April through September, and occur in a variety of habitat types (e.g., valley-foothill hardwood, valley foothill hardwood-conifer, desert riparian, palm oasis, pinyon-juniper) near a water source (Zeiner et al., 1990a).

The project area provides potentially suitable foraging and nesting habitat for Lawrence's goldfinch, and this species has been observed in the project area (USFWS, 2000a).

Vaux's Swift. The California-state species of special concern Vaux's swift (*Chaetura vauxi*) is the smallest of North American swifts and is known to occur from southwestern Canada south to South America.

Vaux's swifts forage and breed in coniferous forest habitat, and nests are typically built on the inner vertical wall of a large, hollow tree or snag in redwood, Douglas fir, and occasionally other coniferous forests types (Zeiner et al., 1990a). Vaux's swifts breed from early May to mid-August before migrating to wintering grounds in Mexico and Central America.

The project area does not support habitat that is suitable for Vaux's swift nesting. The upper watershed of the Ventura River and Matilija Creek, however, support remnant stands of Douglas fir, which could provide nesting and foraging habitat for this species.

Olive-sided flycatcher. The USFS sensitive olive-sided flycatcher (*Contopus copperi*) is an uncommon to common summer resident in a variety of wooded habitats in California. This species breeds from mid-April to mid-August before departing to wintering areas in South America.

The preferred nesting habitat for olive-sided flycatchers is large tall trees in a variety of conifer habitat types including mixed conifer, montane hardwood-conifer, Douglas fir, redwood, red fir, and lodgepole pine (Zeiner et al., 1990a).

The project area does not support suitable nesting habitat for olive-sided flycatchers but does provide potential foraging habitat. This species has been observed within the project (USFWS, 2000a) and may nest near the project in areas that support remnant Douglas fir stands (upper watershed of the Ventura River and Matilija Creek).

Black swift. The California-state species of special concern black swift (*Cypseloides niger*) is a small swallow-like bird that breeds from southern Alaska south to southern California, and winters in South America. In California, black swifts breed from June to late August, usually nesting in small colonies (Zeiner et al., 1990a).

Black swifts occur in mountainous areas and coastal cliffs, and builds nests in moist locations on sea cliffs above surf, or on cliff behind, or adjacent to, waterfalls in deep canyons (Zeiner et al., 1990a). This species forages in the air on flying insects over a wide variety of habitat types.

The project area supports little potentially suitable black swift nesting habitat. Adjacent tributary seeps and streams that feed the Ventura River, however, may provide suitable nesting areas for this species. One black swift sighting has been reported from the project area at the Ventura River mouth (Hunt and Lehman, 1992).

Yellow warbler. The California-state species of special concern yellow warbler (*Dendrocia petechia brewsteri*) is an uncommon to common summer resident in northern California, locally common in southern California, and rare but regular in southern California during the winter (Zeiner et al., 1990a). This species usually arrives in California in April and are mostly gone by October, with small numbers regularly overwintering in the lowlands of southern California (Garrett and Dunn, 1981).

Breeding occurs from mid-April to early August, typically in mature riparian woodland, especially where dominated by willows or alders, and nests are usually placed in heavy brush understory in a deciduous sapling or shrub (Zeiner et al., 1990a).

The project area supports suitable foraging and nesting habitat for yellow warbler, and this species has been observed during past and recent wildlife surveys of the project (Hunt and Lehman, 1992; USFWS, 2000a; Aspen, 2002).

White-tailed kite. The white-tailed kite (*Elanus leucurus*) is a CDFG fully protected raptor species that is a common to uncommon, yearlong resident in coastal and valley lowlands (Zeiner et al., 1990a). This species is known to forage in open habitats such as grasslands, croplands and marshes, and nest in dense stands of trees (e.g., sycamores, oaks, willows, and cottonwoods).

The project area supports suitable nesting habitat and marginal foraging habitat for white-tailed kites. This species has been observed within the project near the Ventura River estuary.

Yellow-breasted chat. The California-state species of special concern yellow-breasted chat (*Icteria virens*) is a migratory bird species that breeds in coastal California and the Sierra Nevada foothills. This species arrives in California in April and departs for wintering grounds in Mexico and Guatemala following the breeding period (Zeiner et al., 1990a).

Yellow-breasted chats generally inhabit mature riparian plant communities with a dense understory, and nests are usually placed above the ground in thick dense shrubs along watercourses (Zeiner et al., 1990a).

The dense riparian habitat within the project area supports potentially suitable nesting and foraging habitat for yellow-breasted chat, and this species has been observed in the Ventura River Estuary (Hunt and Lehman, 1992).

Osprey. The osprey (*Pandion haliaetus*) is a California-state species of special concern that is strictly associated with large water bodies that provide ample fish populations for forage.

This species breeds in the coastal range of northern California, the northern Sierra Nevada, and Cascade Range, and winters along the central and southern California coast and in Central and South America.

Ospreys are found near moderate to large bodies of fresh, brackish, or salt water throughout the year. For breeding, ospreys prefer large dead trees, poles, or other suitable sites providing nest platforms adjacent to the ocean, bays, estuaries, lagoons, or large lakes.

Potentially suitable osprey foraging habitat occurs throughout the project area. Particularly, in the deep open water aquatic habitats of the Ventura River Estuary and Matilija Dam Reservoir. These areas provide habitat that supports adequate forage for this species and several sighting of ospreys have been reported from the Ventura River Estuary (Hunt and Lehman, 1992).

Double-crested cormorant. The California-state species of special concern double-crested cormorant (*Phalacrorax auritis*) is a non-migratory aquatic bird species that is found along the entire coast of California and on inland lakes, ponds, streams, canals, salt ponds, and estuaries.

Double-crested cormorants spend much of their time foraging for fish in large bodies of water. This species rests in daytime and roosts overnight beside water on off-shore rocks, islands, steep cliffs, dead branches of trees, wharfs, jetties, and transmission lines (Zeiner et al., 1990a). Double-crested cormorants are colonial nesters that breed from April to July, and can occur in breeding colonies of a few pairs to several thousand.

Double-crested cormorants have been observed foraging and resting in the lower Ventura River estuary and in Matilija Dam Reservoir. This species is commonly seen in these locations and may occasionally forage in other deep-water areas along the Ventura River. No breeding colonies, however, have been reported from the project area.

White-faced ibis. The California-state species of special concern white-faced ibis (*Plegadis chihi*) is an uncommon summer resident in sections of southern California and is commonly seen in wetlands and agricultural lands within the Central Valley. This species prefers to feed in fresh emergent wetlands, shallow lacustrine waters, and muddy grounds of wet meadows and irrigated, or flooded, pastures and croplands, and builds mound nests on dead tules or cattails within extensive freshwater and/or brackish marshes (Zeiner et al., 1990a).

The Ventura River Estuary provides potentially suitable foraging habitat for white-faced ibis. This species, however, is only known from the project based on one sighting in 1989 (Hunt and Lehman, 1992).

Mammals

Pallid bat. The California-state species of special concern pallid bat (*Antrozous pallidus*) occurs throughout much of the West, including all of California except for the Sierras and the Pacific Northwest.

This species occurs in low elevation areas in scrubland, woodland, and grassland habitats. Pallid bats mate in the fall and young are born in maternal colonies from April-July. Roosting and maternal colonies are typically found in caves, rock crevices, mines, and buildings that provide cool daytime temperatures.

The project area supports foraging areas and adjacent hillsides and buildings provide potentially suitable breeding and roosting habitat for pallid bats. This species is expected to forage within the project and has been observed during past wildlife surveys (USFWS, 2000a).

Ringtail. The DFG fully protected ringtail (*Bassariscus astutus*) is a common to uncommon resident species that occurs in various woodland and shrub habitats throughout most of California.

Ringtails are often found in association with riparian habitats and occur in most forests and shrubland habitats at low to middle elevations (Zeiner et al., 1990b). This species nests in a variety of cover (e.g., wood hollows, logs, rock crevices, and burrows) and reportedly gives birth to young in May and June (Walker et al., 1968).

The project area supports potentially suitable foraging and breeding habitat for ringtails, and this species is has been observed within the project area (USFWS, 2000a).

4.4 CULTURAL RESOURCES

4.4.1 Environmental Baseline

4.4.1.1 Protohistoric/Ethnographic Setting

At the time Juan Cabrillo arrived in 1542, the Chumash inhabited the Ventura and Santa Barbara county area. Their larger area of occupation along the coast stretched from Malibu Canyon on the south up to San Luis Obispo. Inland they extended to the edge of the San Joaquin Valley. Lastly, they occupied the Channel Islands of San Miguel, Santa Rosa, Santa Cruz, and Anacapa (Grant, 1978).

Upon his arrival, Cabrillo found the Chumash to be very friendly and docile. This resulted in their being brought into the Mission system with ease. Unfortunately, their native culture was relatively quickly decimated by Mission life. Because of this, the documentary record of their culture suffered. Most of what we know from the contact period of their culture is from diaries and journals of the explorers who passed through the area, and from information contained in archeological sites (Grant, 1978).

Spanish explorers to the region regarded the Chumash as the most superior of the groups they came in contact with (Kroeber, 1970). They were predominantly adapted to a maritime and coastal subsistence. One of their more known material cultural traits, in fact, was the canoe, or Tomol. These plank canoes were used on a regular basis for subsistence, and for travel to the Channel Islands.

4.4.1.2 Prehistoric Setting

Early Man Horizon or San Dieguito Tradition

The time of initial human occupation in southern California is much debated among archeologists, but is generally thought to be between 9,000 to 12,000 years ago. The key feature of this period is the near absence of seed grinding implements. The subsistence revolved around hunting. The types of artifacts that are usually associated with this horizon are flake knives, leaf-shaped projectile points, flake scrapers, hammerstones, eccentric crescentrics, and atlatl spurs.

Millingstone Horizon or Encinitas Tradition

The economy did a reverse turn in this horizon; hunting and fishing became secondary in importance behind plant food, specifically seed-gathering. Wallace proposed a model to account for this transitional state. He determined that a warming trend dried up the interior lakes driving the inhabitants towards the more moderate coastal areas (Wallace, 1978). Wallace speculates that a seed-gathering people from the Great Basin brought the different subsistence mode with them to the coastal regions. He observed that a thinning of inland populations supports this theory.

This period has a distinct paucity of projectile points, the ones that are found are leaf-shaped, atlatl and dart points, and an abundance of milling equipment, usually manos and metates. In addition, the basic artifact assemblages included cog stones, crude core and flake tools, and simple polished charmstones (Wallace, 1978). There is also a tendency towards sedentism as typified by the size and depth of some coastal sites. During this period, sites are typically situated on bluffs above the shoreline.

Intermediate Horizon or Campbell Tradition

This horizon generally reflected a return to a reliance on hunting. Mortars and pestles came into importance during this period. These implements were mainly used for acorn processing, reflecting the invention of a leaching process for acorns and an emphasis on the food source. Projectile points were still large leaf-shaped points with a few smaller points present. At some point in this horizon, the bow and arrow were adopted but were not heavily represented. Otherwise, technological changes are not especially appreciable.

Late Prehistoric Horizon or Shoshonean Tradition

The distinctive feature of this horizon is the Shoshonean incursion into the area about A.D. 500, when Shoshonean speakers began to replace Hokan-speaking tribes. Following this influx of new people, the tribal landscape in the Southern California Coastal regions was altered by differentiation of tribes into the discrete cultural groups that were present at the time of European contact. There were important technological and social developments in this period. These include the increased use of the bow and arrow, circular shell fishhooks, canoes, perforated stones, ceramic vessels in the south, trade networks, elaborate art, sedentary village life, and distinctive mortuary customs. Population increases spurred the growth of larger villages with their concomitant increase in food resource exploitation. The Late Prehistoric Period drew to close with the arrival of Franciscan Friars and Spanish soldiers. The Friars and their military escorts began their occupation of coastal California with the introduction of Missions.

4.4.1.3 Records and Literature Search

A records and literature search was conducted of the study area through the South Central Coastal Information Center (SCCIC) at California State University, Fullerton. The study area consists of the area one mile on either side of the Ventura River, and Matilija Creek, from the coast at Ventura up to approximately 3.5 miles upstream of Matilija Dam. The purpose of delineating this wide of an area is to include most of the potential areas that might be affected by the project. Looking at a wider area also assists in informally predicting potential locations of cultural resources in areas that are yet to be surveyed.

The SCCIC is the official repository of the California Historical Resources Information System (CHRIS) for Ventura, Los Angeles and Orange Counties. In addition to information contained on the CHRIS database, information obtained from the SCCIC includes data from: (1) the National Register of Historic Places (NRHP); (2) California Points of Historical Interest; (3) Office of Historic Preservation's (OHP) Historic Property Data File (dated 5/23/01); (4) Copies of U.S.G.S. Topo Quads of Mt. Pinos (1903), Ventura (1904, 1941); and (5) California Historical Landmarks.

The records search indicated that over 121 cultural resources field studies have been conducted within the overall study area. Previous survey coverage within the study area is approximately 15 to 20 percent. No surveys or historical resources have been previously recorded at, or within the Matilija Dam basin. However, there is a map reference to the Chumash village of Ma'tiliha being located in the general area (Kroeber, 1970). The information in this document is based on a review of the results of these previous studies. The records search results are summarized in Table 4.4-1.

Table 4.4-1: Records Search Results by Quad Map

Primary No.	Period	Site Type
Matilija 7.5' USGS Quadrangle		
56-000005	Prehistoric	Village Site
56-000014	Prehistoric	Small Habitation Site
56-000116	Prehistoric	Small Habitation Site
56-000134	Prehistoric	Small Habitation Site
56-000135	Prehistoric	Small Habitation Site
56-000139	Prehistoric	Village Site
56-000140	Prehistoric	Small Habitation Site
56-000150	Prehistoric	Village Site (Greenwood, 1969)
56-000194	Prehistoric	Village Site
56-000306	Prehistoric	Small Habitation/Burial Site
56-000482	Prehistoric	Small Habitation Site
56-000594	Prehistoric	Village Site
56-000596	Prehistoric	Small Habitation Site
56-000621	Prehistoric	Village Site
56-000641	Prehistoric	Small Habitation Site
56-000900	Prehistoric/Historic	Small Campsite
56-000929	Prehistoric/Historic	Small Campsite /House and Associated Artifacts
56-001109	Historic	Historic Railroad Berm
Ventura 7.5' USGS Quadrangle		
56-000003	Prehistoric/Historic	Village Site
56-000004	Prehistoric/Historic	Village Site/Portola Camp Site
56-000059	Prehistoric/Historic	Small Campsite/Historic Ranch Site
56-000082	Prehistoric/Historic	Small Campsite/Mission Aqueduct
56-000087	Historic	Mission Related Debris
56-000166	Prehistoric/Historic	Village/Santa Gertrudis Chapel
56-000168	Prehistoric	Village
56-000196	Prehistoric	Small Lithic Scatter
56-000480	Historic	Mission Period Remains
56-000481	Prehistoric	Village Site
56-000749	Historic	Mission Aqueduct
56-000785	Historic	Historic Adobe
56-000842	Historic	WWII Gun Emplacements and Camp
56-000849	Prehistoric	Small Campsite
56-000974	Historic	First Chinatown
56-001071	Historic	First Brick Building in Ventura
56-001109	Historic	Historic Railroad Berm
56-001112	Historic	Misc. Historic Debris
56-001222	Historic	Misc. Historic Debris
56-001289	Historic	Mission Period Debris
56-001547	Prehistoric/Historic	Prehistoric Scatter/Historic Features & Artifacts
56-001555	Historic	Misc. Historic Debris
56-001557	Historic	Misc. Historic Debris
56-001558	Historic	Misc. Historic Debris
56-001559	Prehistoric	Sparse Scatter of Prehistoric Remains
56-001560	Prehistoric	Sparse Scatter of Shell
56-001600	Historic	Misc. Historic Debris
56-100073	Prehistoric	Isolated Prehistoric Artifact
56-120026	Prehistoric	Shell Scatter
56-120027	Prehistoric	Shell Scatter
56-120028	Prehistoric	Shell Scatter
56-150031	Historic	Historic Structure-Weldon/Canter Residence
56-150032	Historic	Historic Structures-Mill School
56-150033	Historic	Historic Structure-Ventura Water Works Building
56-150034	Historic	Historic Structure-Residence
56-150035	Historic	Historic Structure-San Gertrudis Chapel
56-150036	Historic	Historic Structure-Griswold Residence

Prehistoric Archaeological Sites

Twenty-five prehistoric archeological sites are known to be present within the study area boundary. Four isolated artifacts have also been recorded. These sites include village and small campsites, shell midden, and other resource processing sites. The artifactual and ecofactual materials contained within the archeological deposit of these sites are a record of Chumash prehistory. Presumably, some of the sites contain information that would contribute to the understanding of regional prehistory, and are therefore eligible for listing on the NRHP. Many of the sites found in the records search may no longer be in existence. Recent development may have obliterated, or to some degree, disturbed some of them. A field examination would be necessary to verify their current status.

Historic Archeological Sites

The record search revealed the presence of twenty-one historic archeological sites. These include features such as the Ruins of the Mission Period San Miguel Chapel, remains of historic adobes, and other miscellaneous evidence of historic period settlement and activities.

Historic Structures

The record search revealed the presence of several historic buildings dating from 1782 through the 1950s within the study area. The present status of the buildings is based on records search information only. Some of these structures may no longer exist. A field examination needs to be conducted to verify their current status.

The most important of historic structures in terms of the Matilija Dam Ecosystem Restoration Project is Matilija Dam itself. This dam, finished in 1948 is more than 50 years of age. As a result of its age, it must also be evaluated for listing on the National Register of Historic Places. That process of evaluating the dam is under way.

4.4.1.4 Field Survey

A field survey of the Matilija Dam and basin is being conducted the Corps of Engineers' archeology staff. It is almost complete except for the area immediately downstream of the dam. This study includes an evaluation of the NRHP eligibility of Matilija Dam itself. A technical report on the results is being prepared.

The field survey has revealed the presence of three previously known, but not formally recorded archeological sites. Two of the three sites are at the margin of the flood pool behind Matilija Dam.

The first site, COE #1, is a multi-component site with both prehistoric and prehistoric features and remains being present. Much of COE #1 was obscured by heavy vegetation, with much of it being poison oak. The prehistoric component consists of two boulders with bedrock milling features, and a configuration of boulders, which could possibly have been a small rock shelter. No artifacts were observed during the survey. However, it is likely that subsurface artifactual and ecofactual remains are present subsurface. The visible historic features of COE #1 consist of a concrete foundation, stonewall segments, stone and concrete step features.

Archival research and a test excavation of the COE #1 would be necessary to evaluate it for the NRHP. Based on what can be observed, however, it is very likely that it would contain information important in history and prehistory.

The second site, COE #2, is the physical remains of an historic road running along and above the southern portion of the basin. Portions of it have been destroyed by erosion along the creek. Additional recordation and archival research would be necessary to determine if this historic road is eligible for the NRHP.

The third site is Matilija Dam itself. Built in 1946-48, it is more that 50 years old. As built, it would be considered eligible for listing on the NRHP. However, the dam and associated features have lost most of their historic integrity. Based on this fact, the dam is probably not NRHP eligible.

4.4.1.5 Future Recommended Studies

Additional field surveys would be necessary once project alternatives outside the Matilija Dam basin are developed. If prehistoric and/or historic sites are found that cannot be avoided during construction, they would need to be evaluated for eligibility for the NRHP. That would in most cases, require additional studies in the form of archival research, test excavations, and other analyses. A test excavation and NRHP evaluation of COE #1 need to be conducted. Additional recordation of COE #2 needs to be documented, and additional archival research completed.

4.4.1.6 Native American Coordination and Concerns

A list of Native American groups and contacts was requested from the California State Native American Heritage Commission. This list includes one federally recognized tribe, the Santa Ynez Band of Mission Indians. Each was invited to the public scoping meeting conducted on January 31, 2002. Subsequent to the public meeting, a letter was sent to all contacts formally requesting information on traditional cultural properties that may be present in the study area. No specific information was provided.

Concern was expressed generally with the preservation of Native American resources and archeological sites. Concern was also expressed with regard for the potential of encountering archeological sites buried beneath sediment upstream of Matilija Dam.

Native American input and participation would continue as the project progresses. In the event that cultural resources are found which cannot be avoided during construction, Native American groups would be given the opportunity to comment on proposed mitigation measures. They would also be invited to concur in any memorandum of agreement developed to detail mitigation measures.

4.4.1.7 State Historic Preservation Officer (SHPO) Coordination

No formal or informal coordination has been initiated with the SHPO, in accordance with Section 106 of the National Historic Preservation Act (36 CFR 800). Coordination would occur once project alternatives have been defined. At that time, the Corps of Engineers would consult regarding the area of potential effects. Consultation would also include requesting concurrence with any determinations of NRHP eligibility that we have made.

4.4.2 Applicable Plans, Policies, and Regulations

There are two principal methods of locating cultural resources. Before starting a project, a records and literature search is conducted at any number of repositories of archeological site records. The search may show that an archaeological or historical survey had been conducted and some cultural resources were identified. That information may be enough to proceed with the significance evaluation stage of the project. If a conclusion is reached that (1) no previous survey had been done or (2) a previous survey was either out of date or inadequate, the project cultural resources expert, an archeologist, would need to carry out a pedestrian surface survey to determine if any cultural resources are within the proposed project boundaries.

After a cultural resource(s) has been identified during a survey or record and literature search, the federal agency overseeing the undertaking embarks on a process that involves determining if the cultural resource is eligible for listing in the NRHP. Section 106 of the National Historic Preservation Act mandates this process. The federal regulation that guides the process is called 36 CFR 800. For a cultural resource to be determined eligible for listing in the NRHP it has to meet certain criteria. The resource has to be either minimally 50 years old or exhibit exceptional importance. After meeting the age requirement, cultural resources are evaluated according to four criteria; a, b, c, and d. The NRHP criteria for evaluation as defined in 36 CFR 60.4 are:

> The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and (a) that are associated with events that have made a significant contribution to the broad patterns of our history; or (b) that are associated with the lives of persons significant in our past; or (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or (d) that have yielded, or may be likely to yield, information important in prehistory or history.

After a cultural resource has been determined eligible for inclusion in the NRHP it is accorded the same level of protection as a property that is included. It then becomes formally known as an "historic property" regardless of age. Historic property status may be applied to individual cultural resources or to a group of cultural resources that are united by a theme or context. The combined historic properties are then designated as either an historic or archeological "district" and the individual elements are called contributors.

4.5 AESTHETICS

The National Environmental Policy Act (NEPA) and Council on Environmental Quality (CEQ) regulations identify aesthetics as one of the elements that must be considered in determining the effects of a project. Additionally, Title 23 U.S.C. 109(h) requires full consideration of the Proposed Action's affects on aesthetics. The following aesthetics information was obtained from the Ventura County General Plan and from a site visit, which took place on March 21, 2002.

Aesthetics are generally described in terms of visual quality, or quality of views. Views can be categorized into three types: the foreground, middleground, and background (Ventura County, 1994). Attention to detail at varied distances determines the type of view captured by the viewer. The viewer's attention to detail at less than one-half mile represents the foreground. Attention to vegetative changes, but with less detail, from one-half mile to 3 to 5 miles represents the middleground. Attention to large landforms with little or no detail at distances greater than 5 miles represents the background. Visual quality activities and characteristics in the foreground zone are considered to be most valuable (Ventura County, 1994).

Aesthetics analysis considers the existing and future appearance, or perception of views, of the project site and areas surrounding the site, and viewer sensitivity. Aesthetics analysis for the proposed dam removal project includes identifying areas considered to contain valuable views (such as designated scenic resource areas and scenic highways), describing existing visual characteristics of the region and project area, discussing applicable plans, policies, and regulations, and anticipating the future appearance without implementation of the Proposed Action (see Section 5.6 for future without-project conditions).

4.5.1 Regional Setting

Generally, western Ventura County (County) contains natural visual resources in the form of mountains, canyons, native vegetation, beaches, lakes, rivers and creeks. Additionally, man-made visual features, such as parks, golf courses, harbors, homes, levees, oil fields, and other structures have contributed to the aesthetic quality of the county, both in positive and negative respects. Visible vegetation types within Matilija Creek and the Ventura River include native wetland and riparian types and substantial stands of non-native giant reed (USFWS, 2000). The upland areas are dominated by chaparral plant communities or coastal sage scrub communities. Vegetation on the southern facing slopes consist of sparse patches of chaparral and coastal sage scrub plant communities. The northern-facing slopes are dominated by dense chaparral communities.

While the County contains a variety of uses and views that contribute to overall aesthetic quality, the county has identified areas of distinctive aesthetic quality, or those considered as having valuable views, as Scenic Resource Areas. Scenic Resource Areas include those that are identified on the Resource Protection Map of the County's *General Plan, Goals, Policies, and Programs* (Ventura County, 1997a) and the area encompassing lakes and the viewshed extending from the lakes to the highest ridgeline surrounding the lakes (Ventura County, 1994). Views of and from these areas are considered extremely valuable as the foreground, middleground, and background of these areas can be seen clearly from adjacent trails, parks, and/or roads. The County lakes included are Lakes Casitas, Matilija, Piru, and Sherwood. The County also includes State designated scenic highways, as depicted on the Resource Protection Map and defined in the State Highway Code (SHC) Sections 260-263, as scenic resources.

Several highways and state routes (SR) within the County are eligible for designation as State scenic highways, including US 101, SR 1, SR 150, SR 126, and a portion of SR 118 in the east county (DOT, 2002; SHC § 260-263). Additionally, SR 33 is eligible for designation as a State scenic highway, except for the portion from milepost 17.5 to the Santa Barbara County line, which has been officially designated as a State scenic highway (Ventura County, 1997b; DOT, 2002). The Scenic Resource Areas within the project site, including the State-designated scenic highway, are depicted on Figure 4.5-1 (please note all figures are at the end of Section 4.5).

The Los Padres National Forest adjoins the northwest portion of the County. Visual resources within the forest generally have a natural appearance and limited man-made modifications (i.e., roads, fuelbreaks, special use sites, and utility lines). Distinctive characteristics include the coastline, oak woodlands, dry grasslands, deserts, conifer forests, stream sides, and rock outcrops.

4.5.2 Project Area Setting

The project area includes Matilija Creek (a tributary of the Ventura River), Matilija Reservoir, Matilija Dam, and the 15.6-mile stretch of the Ventura River from the Matilija Dam to the estuary and at the Pacific Ocean. Within the project area, Scenic Resource and Scenic Highway Areas depicted on the County's Resource Protection Map include Lake Matilija and SR 33, from milepost 17.5 to the Santa Barbara County line. According to the U.S. Forest Service, the canyons of Matilija Creek and its north fork area are considered a wilderness area and 16 miles of the creek have been nominated for wild and scenic designation (USFS, 2002). The SHC Section 260-263 establishes portions of SR 33 as a scenic highway and remaining portions as eligible for the scenic highway designation. Ventura County recognizes SR 33 as a scenic highway area and thus has included it on the Resource Protection Map.

The scenic views from the project area watershed are described by reach. Photos of the scenic views from each reach were taken during the March 21, 2002 site visit. Figure 4.5-2 shows a map of the reaches and the locations where photos were taken (photo vantage points). The following describes the scenic views from SR 33 and from each reach, beginning with the estuary and continuing north to Matilija Canyon.

4.5.2.1 State Route 33

SR 33 is a highway that runs north/south from the Santa Barbara County line at the north to its junction with Highway 101. The highway parallels the eastern side of the Cuyama River, through Los Padres National Forest, and along the eastern side of the Ventura River. SR 33, from milepost 17.5 to the Santa Barbara County line, is an official state-designated scenic highway. The remaining portion of SR 33, from south of milepost 17.5 to Highway 101, is eligible for designation as a state scenic highway.

Views of the Ventura River watershed, including the canyons, slopes, and ridgelines, can be seen from the majority of SR 33. However, views of the river can only be seen from limited locations. Levees have been constructed along the southern stretch of SR 33, which make up the foreground and immediate view from SR 33 within this area and thus obstruct views of the river. As SR 33 traverses north through the oil fields toward Foster Park, oil tanks and wells, homes, and other buildings obstruct views of the river. Views of the river can be seen in the foreground of SR 33 as the highway travels north through the Foster Park area.

The state scenic highway portion of SR 33 begins north of the Foster Park area as it enters Casitas Springs. Views of the slopes and ridgelines throughout the watershed can be seen from SR 33 as it passes through the Casitas Springs area and travels north to the Matilija Reservoir area. However, views of the river and the canyons from SR 33 within the Casitas Springs to Matilija Reservoir areas are obstructed by hills, homes, and vegetation that make up the foreground for those traveling on SR 33 through this area. Views of the watershed become less detailed as SR 33 diverges to the northeast from the Matilija Reservoir Area and Matilija Creek.

4.5.2.2 Reach 1: Estuary

The Ventura River enters the Pacific Ocean and forms an estuary at the northwestern end of San Buenaventura State Beach. The estuary is characterized by a lagoon, which is foraging habitat for a variety of birds, and San Buenaventura State Beach, which is a recreational area inviting activities such as surfing, swimming, biking, walking, jogging, and other leisurely activities. Emma Wood State Beach is located northwest of the estuary. A bike and pedestrian path is located parallel along the east bank of the Ventura River beginning at the beach access road and continuing north along the river. Railroad tracks traversing east/west and over Main Street Bridge at the southern portion of the river are located between Main Street and the Beach access road. The Ventura County Fairgrounds are located east of the estuary and east of the bike trail. The estuary is most often viewed by persons participating in recreation activities at San Buenaventura State Beach and Emma Wood State Beach, as well as travelers on Highway 101. Views of the estuary and surroundings are considered valuable due to high amounts of viewership and pristine views of the beaches, horizon, and estuary. Photos 1 and 2 in Figure 4.5-3 show views of the estuary.

4.5.2.3 Reach 2a: Main Street Bridge to the Shell Road Bridge

Upstream of the estuary, Reach 2a encompasses the river from the Main Street Bridge to the Shell Road Bridge located further upstream. The Ventura River runs parallel to and west of SR 33. A levee runs along the west side of SR 33 and prevents views of the river from the highway. Traveling north on SR 33, approaching the Shell Road Bridge, oil tanks and fields are located east and west of the highway and river, thus obstructing views of the river. Vegetation and ridgelines from east and west facing slopes make up the background within this Reach, which can be seen from SR 33. Photo 3 in Figure 4.5-3 shows a view in Reach 2a.

4.5.2.4 Reach 2b: Shell Road Bridge to the Casitas Vista Road Bridge

Reach 2b consists of the river upstream of the Shell Road Bridge north to the Casitas Vista Road Bridge. The river is located west of SR 33 where the oil fields and tanks that are visible from Reach 2a are also visible in the southern portion of Reach 2b. The river is not visible from the portion of SR 33 that travels through oil fields. Continuing on SR 33, views of the river are obstructed by residences located to the east and west of the highway, and a school located west of the highway. Figure 4.5-4 shows views of Reach 2b.

4.5.2.5 Reach 3: Casitas Vista Road Bridge to the Intersection of Sulphur Mountain Road and SR 33

Reach 3 consists of the river upstream of the Casitas Vista Road Bridge north to the intersection of Sulphur Mountain Road and SR 33. The Casitas Vista Road Bridge travels east-west across the river and curves north into Casitas Vista Road, which is located west of the river. Foster Park is located in the southern portion of this Reach and to the west of SR 33. Views of Foster Park and the river can be seen from SR 33 and Casitas Vista Road in the southern portion of this Reach. Stands of wetland vegetation occur within the riverbed and patches of wetland vegetation occur along the river. Water flows through this reach creating depths of 4 to 16 inches. Traveling north, elevation increases and views of the river are obstructed by residences that make up the foreground on east and west sides of the highway and dense vegetation (i.e., chaparral and coastal sage scrub plant communities) that make up the middleground and background on the west side of the highway. A small portion of the river can be seen as SR 33 runs north of the residential area to its intersection with Sulphur Mountain Road. Photo 7 in Figure 4.5-5 shows a view within Reach 3.

4.5.2.6 Reach 4: Intersection of Sulphur Mountain Road/SR 33 to the Highway 150 Bridge

Reach 4 consists of the river from the intersection of Sulphur Mountain Road and SR 33 north to the Highway 150 Bridge, an east-west bridge. Portions of the river can be seen from SR 33 just north of the intersection of Sulphur Mountain Road and SR 33 and from Santa Ana Road, which is located west of the river. As SR 33 continues north, residences, agricultural fields, and farmland obstruct views of the river. However, the river can be seen by persons within uses that abut the river and viewers traveling over the Highway 150 Bridge. From the Highway 150 Bridge the river appears dry, with little vegetation and medium to large boulders (river rock). Photo 8 in Figure 4.5-5 shows a view within Reach 4.

4.5.2.7 Reach 5: Highway 150 Bridge to the Robles Diversion

Reach 5 consists of the river from just north of the Highway 150 Bridge to the Robles Diversion. The river can be seen from the Highway 150 Bridge, SR 33 located east of the river, and Santa Ana Road located west of the river. Facing north on the Highway 150 Bridge, the river appears dry with minimal vegetation and medium to large boulders (river rock). Continuing north on SR 33 views of the river are obstructed by rural residences, churches, golf courses, cultural facilities, and hotels to the east and west of SR 33. Traveling north on Santa Ana Road, the river and farmland adjacent to the river can be seen. Photo 9 in Figure 4.5-5 and Photo 10 in Figure 4.5-6 show views of Reach 5.

4.5.2.8 Reach 6: Robles Diversion to Matilija Dam

Reach 6 consists of the Upper Ventura River from the Robles Diversion north and west to the Matilja Dam. Stands of vegetation grow in the riverbed as well as along the river. Hillsides surround the river with dense chaparral species on the east facing slopes and sparse chaparral and coastal sage scrub species on the west facing slopes. The vegetation types that dominate this portion of the river include riparian and wetland species that are described in Section 4.5.1. Water is usually present within this reach of the river. Cobbles and small, medium and large sized boulders characterize the river bottom. Agricultural uses (citrus orchards and vineyards) located on terraced slopes on the west of the river can be seen from SR 33. Rural residences are located on the west and east sides of SR 33.

The Matilija Dam is located at an elevation between 1,000 feet and 1,200 feet. The dam is a concrete structure that was constructed by the Ventura County Watershed Protection District in 1948 with an original height of 198 feet and a width of 620 feet. Portions of the dam have been removed twice (1965 and 1978) to reduce reservoir capacity and relieve strain (VCWPD, 2002). Currently, the dam stands at 168 feet high and 620 feet wide. A fish ladder is located at the base of the dam (approximate elevation 1,000 feet). The dam area consists of characteristics comparable to the northern portion of the watershed (Matilija canyon, creek, and reservoir area). The dam area is characterized by steep northeast and southwest facing slopes, with dense vegetation on the northeast facing slopes and sparse vegetation on the southwest facing slopes (see Figure 4.5-6). Additional vegetation is located at the base of the dam along Matilija Creek. Views of the dam are extremely limited. Persons traveling on Matilja Road can only see the top of the dam (reservoir side). Views of the face of the dam and access structures are limited to those who have key access, including the Ventura County Watershed Protection District, Casitas Municipal Water District, the United States Geological Survey, Southern California Edison, the Bureau of Reclamation, and the United States Army Corps of Engineers. Photos 11 and 12 in Figure 4.5-6 show views of Reach 6.

4.5.2.9 Reach 7a: Matilija Reservoir to the lake-influenced Matilija Creek

Reach 7a consists of the river from the Matilija Reservoir to the lake-influenced Matilija Creek. The Matilija Reservoir area is characterized by steep north and south facing slopes, with dense vegetation on the north facing slopes and sparse vegetation on the south facing slopes. The original reservoir area covers approximately 126.8 acres (VCWPD, 2002). The reservoir capacity is currently less than 400 acre-feet in surface area (VCWPD, 2002). Immediately upstream of the reservoir, the lake-influenced Creek consists of small to medium sized cobbles and dense vegetation dominated by giant reed. The lower elevation area approaching the reservoir consists of sediment (sand) and sparse patches of cattails that become denser as they approach the water (see Figures 4.5-7 and 4.5-8). Additionally, the area may be roaming grounds for black bears, deer, coyotes, bobcats, rattlesnakes, hawks, eagles, and California condors (USFS, 2002). Based on criteria established in the County General Plan, the Matilija Reservoir Area is considered a Scenic Resource Area. The Matilija Reservoir Area is primarily viewed by residents traveling to or from the Matilija Canyon or Matilija Canyon Ranch Communities and persons traveling on Matilija Road to or from Los Padres National Forest.

4.5.2.10 Reach 7b: Lake-influenced Matilija Creek to the Los Padres National Forest Wildlife Area

According to the USFS, the canyons of Matilija Creek and its North Fork area are considered a wilderness area (USFS, 2002). The U.S. Congress designated the Matilija Wilderness area in 1992. The Matilija Wilderness area is located at elevations ranging from 1,160 feet to 4,400 feet within the Los Padres National Forest. The area is characterized by steep north and south facing slopes that make up the canyon, hiking trails, and the perennial Matilija Creek, which flows southward (see Figure 4.5-8). The canyon is overgrown with alder and maple, with a few stands of conifers in the higher elevations. The north facing slopes are lined with dense vegetation, while the south facing slopes consist of sparse patches of vegetation.

The majority of viewers include persons traveling on Matilija Road. Additional viewers include those who visit the privately owned Matilija Canyon Ranch, which is located in Matilija Canyon, and the residents of the Matilija Canyon community. The creek consists of small, medium, and large sized river rock (cobbles) with stands of vegetation located within the creek and mild water flow creating depths of approximately 4 to 12 inches. Based on criteria established in the County General Plan, the Matilija Creek and Matilija Reservoir Area is considered a Scenic Resource Area and is depicted on the County Resource Protection Map.

4.5.3 Applicable Plans, Policies, and Regulations

Plans, policies, and regulations that apply to aesthetic resources within the project area were identified on a local and national basis. Applicable plans were obtained from the Ventura County, City of San Buenaventura (Ventura), and City of Ojai General Plans. Applicable policies and regulations were obtained from the Los Padres National Forest Plan and the Wild and Scenic Rivers Act (U.S.C. 1271-1287). The County and City General Plans address aesthetic issues as outlined by CEQA, while the Los Padres National Forest Plan and Wild and Scenic Rivers Act address aesthetic issues as outlined by NEPA and Title 23 Section 109(h) of the US Code of Regulations.

4.5.3.1 Ventura County General Plan

The Ventura County *General Plan, Policies, and Goals* (General Plan) establishes goals, policies and programs for the protection of scenic resources. The General Plan was adopted in 1988 and recently amended in 1997. Scenic Resource Areas were established to accomplish the goals disclosed in the General Plan. The General Plan Visual Resources Element discloses the following goals, which apply to the Proposed Action:

- Preserving and protecting the significant open views and visual resources of the County and those within the viewshed of designated scenic highways and scenic resource areas
- Enhance/maintain the visual appearance of buildings and development (or restoration in the case of the Proposed Action).

Additionally, policies and programs were established to meet the goals. The scenic resource policies, which apply to the Proposed Action, include the following:

- Obtain discretionary permits for significant grading (federal lands exempt)

- Comply with the County's "Tree Protection Regulations" for removal, damage, or destruction of trees
- Prevent degradation of scenic resources in scenic resource areas as well as scenic highway areas
- Implement landscape requirements of the Zoning Ordinance and the "Guide to Landscape Plans" to enhance the appearance of discretionary development.

Programs were also established to protect and preserve scenic resources. The programs include taking appropriate steps to preserving and maintaining unique natural features and other scenic resources, and continued pursuit of the State Scenic Highways designation for eligible scenic highways.

Additional policies and programs are disclosed in established County General Plan Area Plans. There are a total of ten area plans, two of which apply to the project area--North Ventura and Ojai Valley Area Plans. Detailed policies and plans are disclosed in the Area Plans for the North Ventura Area and the Ojai Valley Area, which are discussed below.

4.5.3.2 North Ventura Avenue Area Plan

The North Ventura Avenue Area Plan covers the area bordered by Buenaventura Academy Road to the south, the sanitary treatment facility and urban-designated properties north of the treatment facility to the north, the westerly property lines abutting the Ventura River on the west, and the easterly property lines of parcels at the base of the hillside area on the east (see Figure 4.10-1 in Land Use). A scenic approach is established in the area of Ventura Avenue and Cañada Larga Road. The purpose of this designation is the protection of aesthetic views of the surrounding area that could include topography, vegetation, panoramas, natural and manmade features. Policies and programs established to preserve views in this area include preventing view obstructions through appropriate landscaping, limiting signs and outdoor advertising, and the undergrounding of utility lines.

Ventura Avenue to the south of the community has been designated as a City scenic drive. Scenic approach designations have been placed on the intersection of freeways and city boundaries, as well as other prominent viewpoint areas. With anticipated future city expansion, it is likely that such designations should continue as a result of newly established boundaries.

4.5.3.3 Ojai Valley Area Plan

The Ojai Valley Area Plan covers the area bound by Nordhoff Ridge on the north, Sulphur Mountain ridgeline on the south, mountain ridge between Bear Canyon and Santa Paula Canyon on the east, and by the Lake Casitas/Ventura River watershed boundary on the west (see Figure 4.10-1 in Land Use). Scenic resource goals established by the Ojai Valley Area Plan, which apply to the Proposed Action, include the following:

- Preserving and protecting the significant visual quality and aesthetic beauty of the Ojai Valley that includes, but is not limited to, surrounding mountains, hills, ridgelines, arroyos, barrancas and protected trees
- Preserve the scenic view of State, federal, and local parkland in and around the Ojai valley
- Ensure that discretionary development on or near ridgelines minimizes impacts from grading activities in order to preserve the natural beauty of the area.

Policies established by the Ojai Valley Area Plan, which apply to the Proposed Action include the following:

- Prohibit discretionary development/grading if it will significantly degrade or destroy a scenic view or vista from public roads or publicly owned land unless it is deemed beneficial and over-riding considerations are established by the decision-making body.
- Limit construction and comply with criteria in the event of construction in a "Scenic Resource Protection Overlay" zone, which is classified as the area within 400 feet (horizontal) of prominent ridgelines.
- In the event of any discretionary development, minimize reshaping [or disturbance] of the natural terrain for access and construction purposes and comply with design and construction measures as described in Section 1.6.2.4.
- In the event of any discretionary development, avoid or provide mitigation for disturbing protected trees by complying with the County's "Tree Protection Regulations" for removal, damage, or destruction of trees.
- Cut or fill slopes for discretionary development, which exceed a vertical height of 25 feet, shall be subject to a Planning Commission hearing.

Programs for preserving and protecting scenic resources include development of ministerial ridgeline development standards, which would regulate the height, shape, and color of structures built on or near prominent ridgelines.

4.5.3.4 City of San Buenaventura General Plan

The City of San Buenaventura, commonly known as Ventura, is located in Ventura County between the Pacific Ocean on the west and hillside areas to the northeast (see Figure 4.10-1). The City's General Plan outlines goals and policies that disclose what the city "should be" (City of Ventura, 1989). The majority of the plan provides guidance for land use issues and city design programs. The General Plan does not address visual resources as an individual issue. Instead, goals and policies associated with visual resources are discussed with other elements of the plan. The associated aesthetics goals applicable to the Proposed Action are as follows:

- Conserve natural resources in a manner that will ensure availability for continued use and enjoyment by the public
- Assure that any development of the coastal zone [including restoration activities] preserves and maintains the natural assets of the shoreline.

Applicable policies associated with aesthetics basically attempt to protect and preserve the city's natural setting. Applicable policies include the following:

- Flood control channel improvements should incorporate the use of environmental and aesthetic design treatments. In the coastal zone, substantial alteration or modification of rivers and streams shall be limited to necessary water supply projects, flood control projects to protect existing development and ensure safety, and habitat restoration projects.
- Use native plants and discourage use of invasive exotics, as described by the Native Plant Society, for landscaping.

4.5.3.5 City of Ojai General Plan

The City of Ojai is located in Ventura County and considers itself a "small town," meaning the city is a quiet community located in a natural setting with limited development (see Figure 4.10-1). The city's General Plan does not contain goals or policies directly associated with visual resources. However, visual resource issues are addressed in the Land Use Element of the General Plan. The primary purpose of goals and policies is to preserve and maintain the city's unique small town character and natural setting. Applicable policies associated with visual resources include the following:

- Emphasize retention of the city's natural environmental setting, small town character, and scenic features as priority over expansion of urban areas
- Preserve views of hills and mountains and the natural character of the hillside areas, attributes and physical features that comprise Ojai's small town character, and existing mature trees.

4.5.3.6 Los Padres National Forest Land and Resource Management Plan

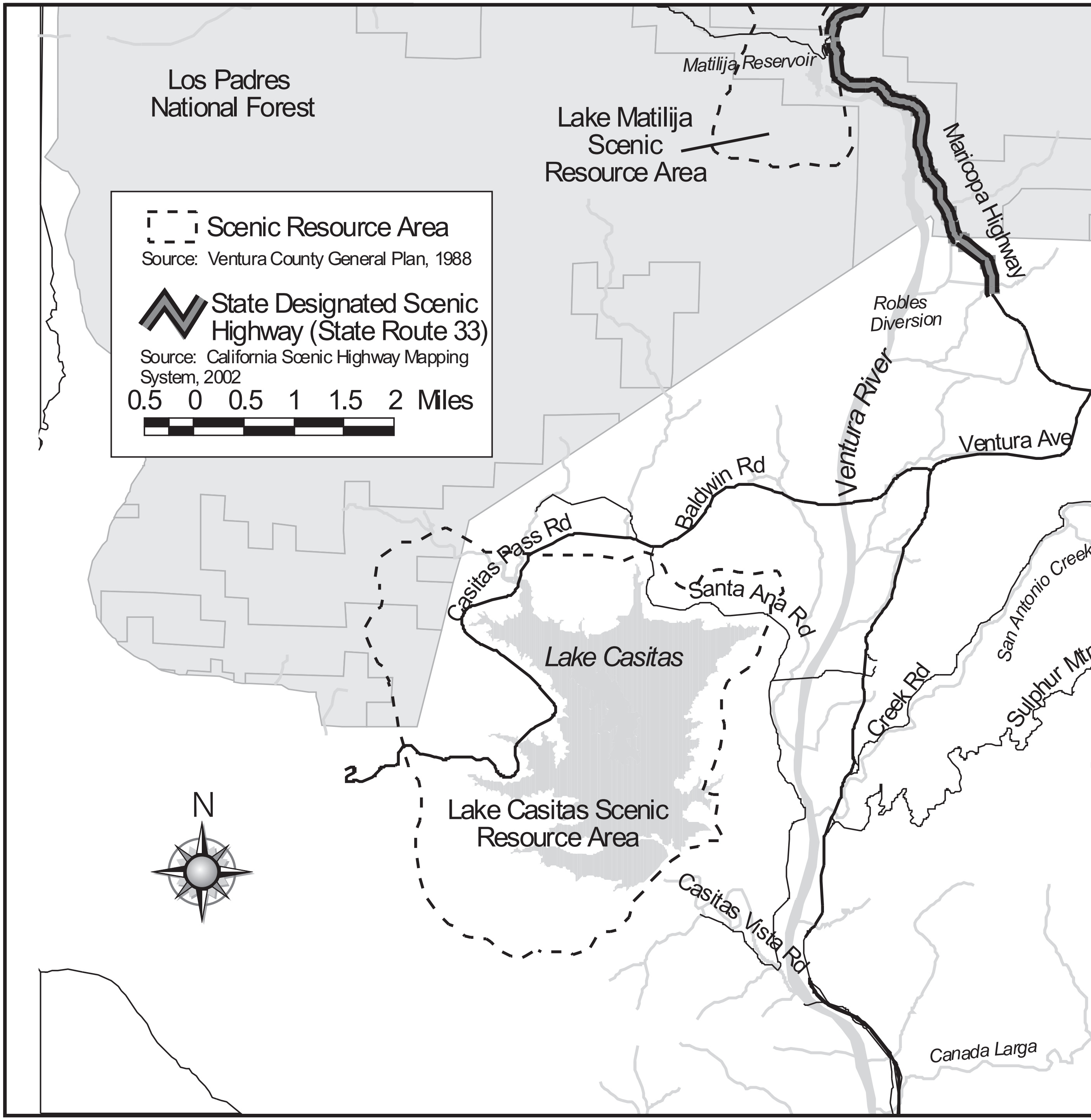
The Forest Plan serves as the overall management plan for Los Padres National Forest. The Plan emphasizes services and commodities provided in response to local and regional needs. The Plan anticipates that increased development to address local and regional needs, such as minerals development and fuelbreak construction, would reduce visual quality by approximately six percent. The Forest Plan suggests methods to offset the reduction in visual quality including the following:

- Encourage diversity resulting from prescribed burning, rehabilitation of approximately 9,000 acres, and enhancement of certain lands, especially those forming visual backdrops for local communities
- Maintain distinctive and sensitive landscapes at natural settings
- Retain primitive visual character for Wilderness Research Natural Areas
- Maintain common landscapes at slightly modified levels and locate more extensive modification projects in seldom seen areas and along some travel routes.

Additionally, the Forest Plan indicates that the sources of the disclosed standards are laws, regulations, and professional knowledge and judgment, and that the plan should be used in conjunction with the management standards and guidelines included in the National Forest Management Act (NFMA) regulations (36 CFR 219.12).

4.5.3.7 Wild and Scenic Rivers Act (16 U.S.C. 1271-1287)

The Wild and Scenic Rivers Act (WSRA) establishes a policy for preserving designated wild and scenic rivers in free-flowing condition, and to protect their immediate environments. Wild and scenic rivers are those listed under the act, which basically must possess "outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic cultural, or other similar values" (WSEA, Section 1(b)). Matilija Creek from its headwaters to its confluence with Murietta Canyon (approximately 16 miles) is listed as a potential addition to the national wild and scenic rivers system. The WSRA states that upon approving a river with the wild and scenic designation, the federal agency responsible for administration of each component of the WSRA shall prepare a management plan for protection of river values within three fiscal years of the designation.



Matilija Dam Ecosystem Restoration Project

Figure 4.5-1

Regional Scenic Resource Areas

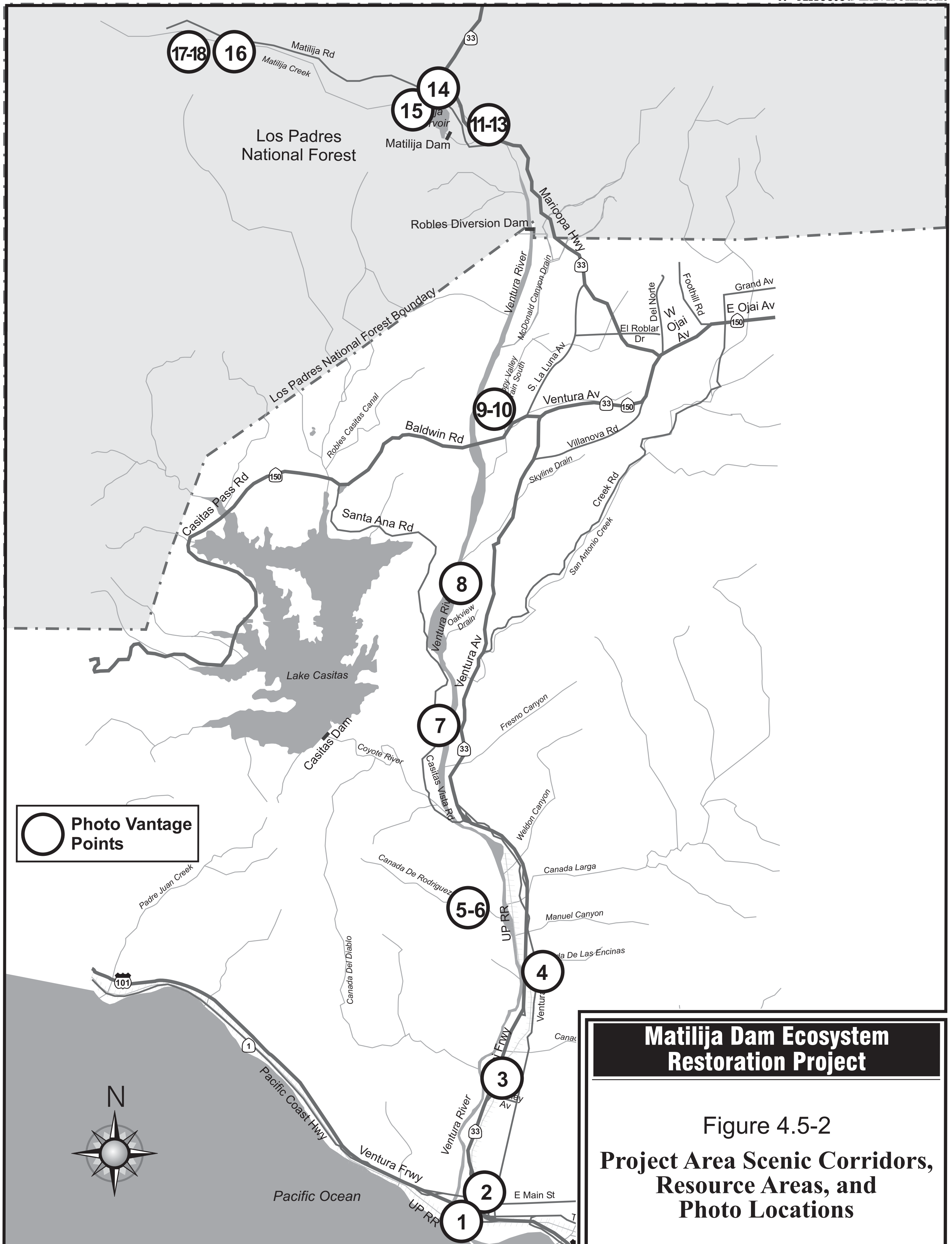


Figure 4.5-2

Project Area Scenic Corridors, Resource Areas, and Photo Locations

1. From San Buenaventura State Beach (Reach 1) facing north, view of the estuary, Railroad Bridge, and Red Mountain.

2. From bike/pedestrian-path parking lot facing north (Reach 1), view of bike/pedestrian path, Railroad Bridge and tracks, and the Ventura River estuary.

3. From SR 33 facing west, view of the levees in the foreground, which obstruct views of the Ventura River (Reach 2a). Slopes and ridgelines in the middleground and background are visible.

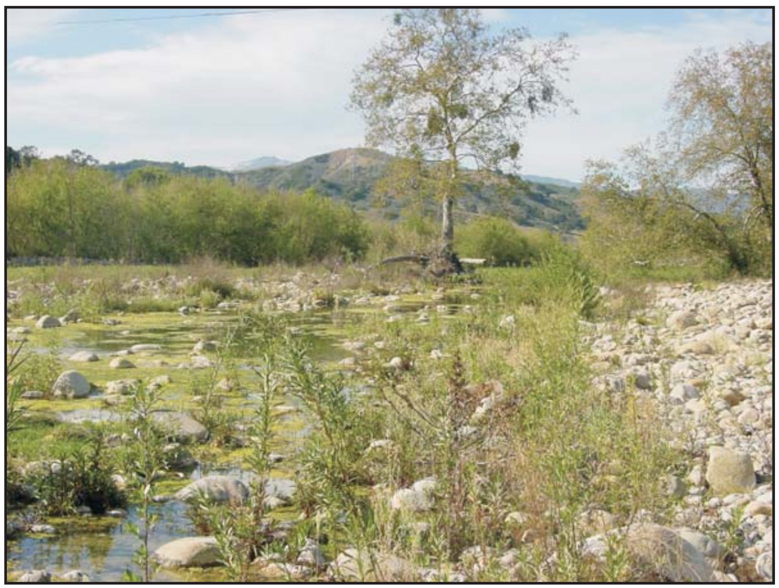
Matilija Dam Ecosystem Restoration Project

Figure 4.5-3

Photos of Reaches 1 and 2a

4. From SR 33 facing west view of the oil fields and tanks located in the northern portion of Reach 2b.

5. From Foster Park facing south (Reach 2b), view of the Ventura River with increased water flow and dense vegetation surrounding the river.



6. From Foster Park facing north (Reach 2b), view of the Ventura River in the foreground, ridge in the middleground, and the ridges of the Santa Ynez Mountains in the background. At this location, the river flow is moderate, sparse vegetation grows in the river, while dense vegetation surrounds the river. The river consists of small boulders and small to medium sized cobbles.

Matilija Dam Ecosystem Restoration Project

Figure 4.5-4

Photos of Reach 2b

7. From Casitas Vista Road Bridge facing north (Reach 3), view of the bullnoses, riverbed, levees, and ridgelines.

8. From Santa Ana Road facing north (Reach 4), view of the Ventura River, slopes, and Santa Ynez Mountains. At this location, the river flow is low and vegetation grows in the riverbed and on the slopes.

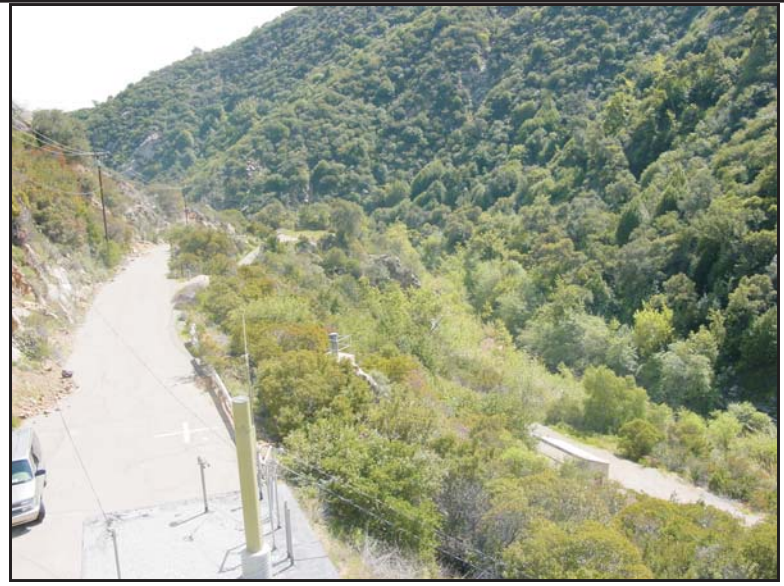
9. Facing south, view of the Ventura River adjacent to the Ojai Refuse Transport Station (Reach 5), Highway 150 (an eligible scenic highway), and Red Mountain ranging in elevation from approximately 200 ft to 2,000 feet.

Matilija Dam Ecosystem Restoration Project

Figure 4.5-5

Photos of Reaches 3, 4, and 5

10. Facing northwest, view of the Ventura River adjacent to the Ojai Refuse Transport Station (Reach 5). The riverbed consists of large boulders, and small and medium sized cobbles. Sparse vegetation grows in the riverbed, while dense vegetation grows on the slopes. The Santa Ynez Mountains, ranging in elevation from approximately 700 to 4,400 feet, and prominent ridgelines are visible.



11. View of the Ventura River canyon area from the dam (Reach 6).

12. View of the dam, fish ladder, reservoir, and beginning of the Ventura River (Reach 6).

Matilija Dam Ecosystem Restoration Project

Figure 4.5-6

Photos of Reaches 5 and 6

13. View from the top of the dam facing the reservoir area (Reach 7a).

14. View of the top of the dam and reservoir area from Matilija Road (Reach 7a).

15. Close up of the top of the dam and surrounding slopes and vegetation (Reach 7a).

Matilija Dam Ecosystem Restoration Project

Figure 4.5-7

Photos of Reach 7a

16. Matilija Creek facing southeast approaching the reservoir (Reach 7a): Dense vegetation throughout the canyon and creek area. Increased volume of water flowing over small cobbles.

17. Matilija Creek facing southeast (Reach 7b): Dense vegetation on the east facing slopes, sparse vegetation on the west facing slopes. Ridges on the south and west are visible.

18. Matilija Creek facing northwest (Reach 7b): Dense vegetation on the east facing slopes, sparse vegetation on the west facing slopes. Ridgelines are visible.

Matilija Dam Ecosystem Restoration Project

Figure 4.5-8

Photos of Reaches 7a and 7b

4.6 AIR QUALITY

4.6.1 Climate

The study area lies in southwestern Ventura County within the South Central Coast Air Basin (SCCAB) and includes the Cities of Ojai and Ventura (Figure 4.6-1 at the end of this section). The SCCAB has a Mediterranean climate characterized by warm dry summers, and cooler, relatively damp winters. The regional climate is dominated by a strong and persistent high-pressure system that frequently lies off the Pacific coast (generally referred to as the Pacific High). The Pacific High shifts northward or southward in response to seasonal changes or the presence of cyclonic storms. Wind speeds in the study area average approximately 10 mph and are typically stronger in the winter and spring months.

4.6.1.1 Factors Affecting Air Quality

The air above Ventura County often exhibits poor vertical and horizontal dispersion characteristics, which limit the dispersion of emissions and cause increased ambient air pollutant concentrations near the ground surface. Persistent temperature inversions limit vertical dispersion of air pollutants. A temperature inversion can act as a “ceiling” that prevents pollutants from rising and dispersing. Mountain ranges can act as “walls” that inhibit horizontal dispersion of air pollutants (VCAPCD, 2000).

The diurnal land/sea breeze pattern common in Ventura County recirculates air contaminants. Air pollutants are pushed toward the ocean during the early morning by the land breeze, and to the east during the afternoon, by the sea breeze. This can create a “sloshing” effect, causing pollutants to remain in the area for several days rather than quickly dispersing. Residual pollutant emissions from previous days can accumulate and may chemically react with new emissions in the presence of sunlight. This pollutant “sloshing” effect occurs most often from May through October. Air temperatures are usually higher and sunlight more intense during this period. Consequently, Ventura County more frequently exceeds of the State and federal ozone standards during this six-month period (VCAPCD, 2000).

4.6.1.2 Temperature and Precipitation

Monitoring stations in Ojai and Oxnard were selected to represent the average climate of the northern and southern portions of the study area, respectively. The Ojai weather station is approximately 4.0 miles (6.4 km) southeast of Matilija Dam. The Oxnard weather station is approximately ten miles (16.1 km) southeast of Ventura. As described in Table 4.6-1, average summer (July) high and low temperatures in the Ojai area are 89.9°F (32.1°C) and 55.4°F (13.0°C), respectively, while the average summer high and low temperatures in Oxnard are 74.0°F (23.3°C) and 58.0°F (14.4°C), respectively. Average winter (January) high and low temperatures in the Ojai area are 66.7°F (19.3°C) and 36.8°F (2.7°C), respectively, while the average winter high and low temperatures in Oxnard are 65.4°F (18.6°C) and 44.3°F (6.8°C), respectively. Annual precipitation averages in Ojai and Oxnard are 21.18 inches (53.80 cm) and 14.77 inches (37.52 cm), respectively.

Table 4.6-1: Monthly Temperature and Precipitation in the Project Area

Month	Ojai						Oxnard					
	Temperature				Precipitation		Temperature				Precipitation	
	Maximum		Minimum				Maximum		Minimum			
	° F	° C	° F	° C	inch	cm	° F	° C	° F	° C	inch	cm
January	66.7	19.3	36.8	2.7	4.78	12.14	65.4	18.6	44.3	6.8	3.34	8.48
February	68.6	20.3	39.0	20.0	5.00	12.70	66.3	19.1	45.3	7.4	3.35	8.51
March	70.3	21.3	40.6	4.8	3.47	8.81	66.2	19.0	46.5	8.1	2.49	6.32
April	74.4	23.6	43.9	6.6	1.51	3.84	67.8	19.9	48.7	9.3	1.03	2.62
May	77.2	25.1	48.0	8.9	0.43	1.09	68.8	20.4	52.0	11.1	0.17	0.43
June	82.9	28.3	51.4	10.8	0.06	0.15	71.2	21.8	55.1	12.8	0.05	0.13
July	89.8	32.1	55.4	13.0	0.02	0.05	74.0	23.3	58.0	14.4	0.02	0.05
August	90.6	32.6	55.6	13.1	0.05	0.13	75.0	23.9	58.8	14.9	0.05	0.13
September	88.0	31.1	53.6	12.0	0.31	0.79	75.1	23.9	57.3	14.1	0.23	0.58
October	81.8	27.7	47.7	8.7	0.46	1.17	74.1	23.4	53.4	11.9	0.29	0.74
November	74.0	23.3	41.3	5.2	2.21	5.61	70.5	21.4	48.3	9.1	1.64	4.17
December	67.9	19.9	36.7	2.6	2.87	7.29	66.6	19.2	44.6	7.0	2.11	5.36
Annual*	77.7	25.4	45.8	7.7	21.18	53.80	70.1	21.2	51.0	10.6	14.77	37.52

Note: The period of record for both of the Ojai and Oxnard stations are from July 1, 1948 to July 31, 2003.
*Annual average temperature or annual total precipitation.
Source: Western Regional Climate Center, 2004.

4.6.2 Air Quality

4.6.2.1 Criteria Pollutants

The quality of surface air is evaluated by measuring ambient concentrations of pollutants that are known to have deleterious effects. Federal and State agencies then compare the degree of air quality degradation to the ambient air quality standards established. The air pollutants that are regulated by these standards are called "criteria pollutants." The current National and State Ambient Air Quality Standards are listed below in Table 4.6-2. Healthy adults can tolerate occasional exposure to air pollutant concentrations above the standards listed in Table 4.6-2 before adverse effects are observed.

Table 4.6-2: National and State Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[a]	National Standards[b]	
		Concentrations[c]	Primary[c,d]	Secondary[c,e]
Ozone (O_3)	1-hour 8-hour	0.09 ppm (180 $\mu g/m^3$) NS	0.12 ppm (235 $\mu g/m^3$)[f] 0.08 ppm (157 $\mu g/m^3$)	0.12 ppm (235 $\mu g/m^3$) NS
Carbon Monoxide (CO)	1-hour 8-hour	20 ppm (23 mg/m^3) 9.0 ppm (10 mg/m^3)	35 ppm (40 mg/m^3) 9 ppm (10 mg/m^3)	NS NS
Nitrogen Dioxide (NO_2)	1-hour Annual Avg.	0.25 ppm (470 $\mu g/m^3$) NS	NS 0.053 ppm (100 $\mu g/m^3$)	NS 0.053 ppm (100 $\mu g/m^3$)
Sulfur Dioxide (SO_2)	1-hour 3-hour 24-hour Annual Avg.	0.25 ppm (655 $\mu g/m^3$) NS 0.04 ppm (105 $\mu g/m^3$) NS	NS NS 0.14 ppm (365 $\mu g/m^3$) 0.03 ppm (80 $\mu g/m^3$)	NS 0.5 ppm (1300 $\mu g/m^3$) NS NS
Respirable Particulate Matter (PM_{10})	24-hour Ann.Arith.Mean	50 $\mu g/m^3$ 20 $\mu g/m^3$	150 $\mu g/m^3$ 50 $\mu g/m^3$	150 $\mu g/m^3$ 50 $\mu g/m^3$
Fine Particulate Matter ($PM_{2.5}$)[8]	24-hour Ann.Arith.Mean	NS 12 $\mu g/m^3$	65 $\mu g/m^3$ 15 $\mu g/m^3$	NS NS
Sulfates (SO_4)	24-hour	25 $\mu g/m^3$	NS	NS
Lead (Pb)	30-day Avg. Calendar Qtr.	1.5 $\mu g/m^3$ NS	NS 1.5 $\mu g/m^3$	NS 1.5 $\mu g/m^3$

Notes: NS = no standard; ppm = parts per million; $\mu g/m^3$ = microgram per cubic meter; mg/m^3 = milligrams per cubic meter

[a] California Standards for ozone, carbon monoxide, sulfur dioxide (1- and 24-hour), nitrogen dioxide, and respirable and fine particulate matter (PM_{10} and $PM_{2.5}$) are values that are not to be exceeded.
[b] National standards, other than ozone, fine particulate matter ($PM_{2.5}$), and those based on annual averages or annual arithmetic mean, are not to be exceeded more than once a year. The 1-hour ozone standard is attained when the expected number of days per calendar year with maximum hourly concentrations above the standard is equal to or less than one. The 8-hour ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over three years, is equal to or less than the standard. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.
[c] Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 mm of mercury (1,013.2 millibar). Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 mm of mercury; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
[d] National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
[e] National Secondary Standards: The levels of air quality necessary to protect the public welfare from any know or anticipated adverse effects of a pollutant.
[f] New national 8-hour ozone and fine particulate matter standards were promulgated by USEPA on July 18, 1997. The national 1-hour ozone standard continues to apply in areas that violated the standard.
Source: CARB, 2004.

Air quality standards are designed to protect those people most susceptible to further respiratory distress, such as asthmatics, the elderly, very young children, people already weakened by other disease or illness, and people engaged in strenuous work or exercise. Table 4.6-3 provides a summary of potential health effects associated with the major criteria air pollutants.

Table 4.6-3: Summary of Health Effects of the Major Criteria Pollutants

Air Pollutant	Adverse Effects
Ozone	Eye irritation Respiratory function impairment Aggravation of respiratory and cardiovascular diseases
Carbon Monoxide	Impairment of oxygen transport in the bloodstream, increase of carboxyhemoglobin Aggravation of cardiovascular disease Impairment of central nervous system function Fatigue, headache, confusion, dizziness Death at high levels of exposure Aggravation of some heart diseases (angina)
Nitrogen Dioxide	Risk of acute and chronic respiratory disease
Suspended Particulates	Increased risk of chronic respiratory disease Reduced lung function With SO_2, may produce acute illness Particulate matter 10 microns or less in size (PM_{10}) may lodge in and/or irritate the lungs

Source: SCAQMD, 1993.

4.6.2.2 Monitoring Data

Indications of criteria pollutant levels in the project area can be obtained by reviewing recent data collected by the Ventura County Air Pollution Control District (VCAPCD) at nearby monitoring stations. Monitoring stations in Ojai and the Ventura area were selected to provide a general profile of the air quality within the northern and southern portions of the study area, respectively. Ozone, PM_{10}, and NOx are monitored at the Ojai station, while only ozone and NOx are monitored at the Ventura (Emma State Beach) station. Additional Ventura Area data presented for carbon monoxide, PM_{10}, and $PM_{2.5}$ are from the El Rio station that is located just Southeast of Ventura. Table 4.6-4 provides the monitoring data collected from the subject monitoring stations from 2001 to 2003. During the three-year period, there were 56 exceedances of the California Ambient Air Quality Standard (CAAQS) for ozone in Ojai and no exceedances of the CAAQS in Ventura. The Ojai station recorded three exceedances of the 1-hour ozone National Ambient Air Quality Standard (NAAQS) during the three-year period and 45 exceedances of the 8-hour ozone NAAQS, while there were no recorded exceedances of the 1-hour or 8-hour ozone NAAQS in Ventura. There have been no recorded exceedances of the carbon monoxide or nitrogen dioxide CAAQS or NAAQS within Ventura County since 1994. With regard to PM_{10} and $PM_{2.5}$ the Ojai station recorded no levels that exceeded the 24-hour CAAQS or NAAQS during the three-year study period, and the El Rio station recorded 10 exceedances of the 24-hour PM_{10} CAAQS and no exceedances of the 24-hour PM_{10} and $PM_{2.5}$ NAAQS. The recorded PM_{10} and $PM_{2.5}$ annual arithmetic average concentrations are below the annual PM_{10} and $PM_{2.5}$ NAAQS and are generally above the annual PM_{10} and $PM_{2.5}$ CAAQS.

Table 4.6-4: Air Quality Summary

Pollutant	Ojai			Ventura[a]		
	2001	2002	2003	2001	2002	2003
Ozone (1-Hour)						
Max. Concentration (ppm)	0.128	0.132	0.130	0.093	0.078	0.094
Days>CAAQS (0.09 ppm)	17	15	24	0	0	0
Days>NAAQS (0.12 ppm)	1	1	1	0	0	0
Ozone (8-Hour)						
Max. Concentration (ppm)	0.106	0.109	0.114	0.079	0.069	0.078
Days>NAAQS (0.08 ppm)	11	12	22	0	0	0
CO (1-Hour)						
Max. Concentration (ppm)	NA	NA	NA	2.3	1.7	7.2
CO (8-Hour)						
Max. Concentration (ppm)	NA	NA	NA	1.6	1.2	3.5
NO_2 (1-Hour)						
Max. Concentration (ppm)	0.066	0.033	0.038	0.080	0.048	0.052
NO_2 (Annual)						
Annual Concentration (ppm)	0.008	0.007	0.007	0.009	0.009	0.009
PM_{10} (24-Hour)[b]						
Maximum Concentration (µg/m^3)	50	42	57	51	97	124
Days > CAAQS (50 µg/m^3)	0/57	0/58	2/59	3/61	2/60	5/56
Days > NAAQS (150 µg/m^3)	0/57	0/58	0/59	0/61	0/60	0/56
PM_{10} (Annual)						
Annual Concentration (µg/m^3)	23	22	21	28	28	31
$PM_{2.5}$ (24-Hour)						
Max. Concentration (µg/m^3)	NA	NA	NA	41	29	38.5
Days > NAAQS (65 µg/m^3)	NA	NA	NA	0/116	0/114	0/113[c]
$PM_{2.5}$ (Annual)						
Annual Concentration (µg/m^3)	NA	NA	NA	13.1	13.0	11.1

Source: VCAPCD, 2004b
Notes: ppm=parts per million; µg/m^3=micrograms per cubic meter; NA=not available
[a] Ventura data presented for CO, PM10 and PM2.5 is from the El Rio station located just southeast of Ventura.
[b] "Days" for PM_{10} are given as exceedances/number of annual measurements
[c] Excludes one value measured October 27th considered invalid for attainment purposes, pending approval from USEPA.

4.6.2.3 Air Quality Attainment Status

Non-attainment is a term used to indicate violations of an air quality standard (see Table 4.6-2). A summary of the air quality status within Ventura County relative to meeting the NAAQS and CAAQS is provided in Table 4.6-5. As shown in Table 4.6-5, air quality in Ventura County is designated as severe non-attainment for both the 1-hour ozone NAAQS and the 1-hour ozone CAAQS, and has recently been designated as moderate non-attainment for the 8-hour ozone NAAQS. In addition, the County is designated as non-attainment of the CAAQS for PM_{10}. State and federal designations for $PM_{2.5}$ attainment/non-attainment have not yet been completed.

Table 4.6-5: Attainment Status of the Study Area

County	O_3		CO, NO_2 and SO_2		PM_{10}	
	State	Federal	State	Federal	State	Federal
Ventura	SN	SN/MN[a]	A	UA	N	UA

Source: CARB, 2004.
Notes: A= Attainment of Standards; N= Nonattainment of Standards; SN= Severe Non-Attainment of Standards; MN = Moderate Non-Attainment of Standards; UA=Unclassified/Attainment of Standards
[a] First designation is for the 1-hour standard the second designation is for the 8-hour standard.

The General Conformity Rule (40 CFR Part 93, Subpart B) addresses both non-attainment areas and maintenance areas (former non-attainment areas now in attainment). Ventura County is not currently maintenance area for any pollutant but could potentially become a maintenance area for ozone prior to project initiation. Additionally, the current 1-hour ozone NAAQS non-attainment area designation applies for the project's conformity determination; however, the 8-hour ozone NAAQS non-attainment designation will apply starting June 15, 2005 (USEPA 2003, 2004).

4.6.3 Applicable Plans, Policies, and Regulations

Federal, State, local, and regional agencies have established air quality standards, regulations, and plans that affect projects, proposed or existing, within their jurisdictions. The following federal and State regulatory considerations apply to Proposed Action within the study area.

4.6.3.1 Federal

The federal Clean Air Act of 1970 directs the attainment and maintenance of NAAQS. The 1990 Amendments to this Act determine attainment and maintenance of NAAQS (Title I), motor vehicles and fuel reformulation (Title II), hazardous air pollutants (Title III), acid deposition (Title IV), operating permits (Titles V), stratospheric ozone protection (Title VI), and enforcement (Title VII). The USEPA also implements the NAAQS and determines attainment of federal air quality standards on a short- and long-term basis.

The federal General Conformity Rule (40 CFR Part 93, Subpart B) requires that any actions to be funded, approved, or licensed by the Federal Government conform with the applicable implementation plan. For this project, this rule requires that the project's direct and indirect emissions be less than 25 tons per year of NOx and VOC (emission limits for a severe ozone non-attainment area), or if those emission limits cannot be complied with that the project's direct and indirect emission be fully offset within the same non-attainment area.

4.6.3.2 State

The California Air Resources Board (CARB) established the CAAQS and determines attainment status for criteria air pollutants. The California Clean Air Act (CCAA) went into effect on January 1, 1989, and was amended in 1992. The CCAA mandates achieving the health-based CAAQS at the earliest practicable date.

Portable stationary engines, such as dredge pump engines or diesel engine powered portable rock/crushing and screening plants, would have to either obtain local air quality construction and operating permits or they would have to be registered under the Statewide Portable Equipment Registration Program administered by CARB. This statewide program allows the owner of portable engines to register them one time to avoid having to permit them each time they are moved from site to site. For portable engines to be allowed to be registered under this statewide program they must comply with certain criteria such as meeting emission concentration limits and annual emission limits for non-attainment pollutants (i.e., NO_x and VOC for this project).

4.6.3.3 Ventura County APCD

Ventura County Air Quality Management Plan. The 1991 Air Quality Management Plan (AQMP) was prepared by the VCAPCD in response to the CCAA. The 1991 Plan elaborated on information contained in the VCAPCD's 1982 and 1987 AQMPs. It also included new and modified control measures designed to move the county further toward achieving State clean air standards. The 1994 AQMP was prepared to satisfy the planning requirements of the CAAA and to outline a strategy for meeting the federal one-hour ozone clean air standard while accommodating anticipated growth. The Plan indicated that Ventura County would attain the federal one-hour air quality standard for ozone by 2005 (VCAPCD, 2000).

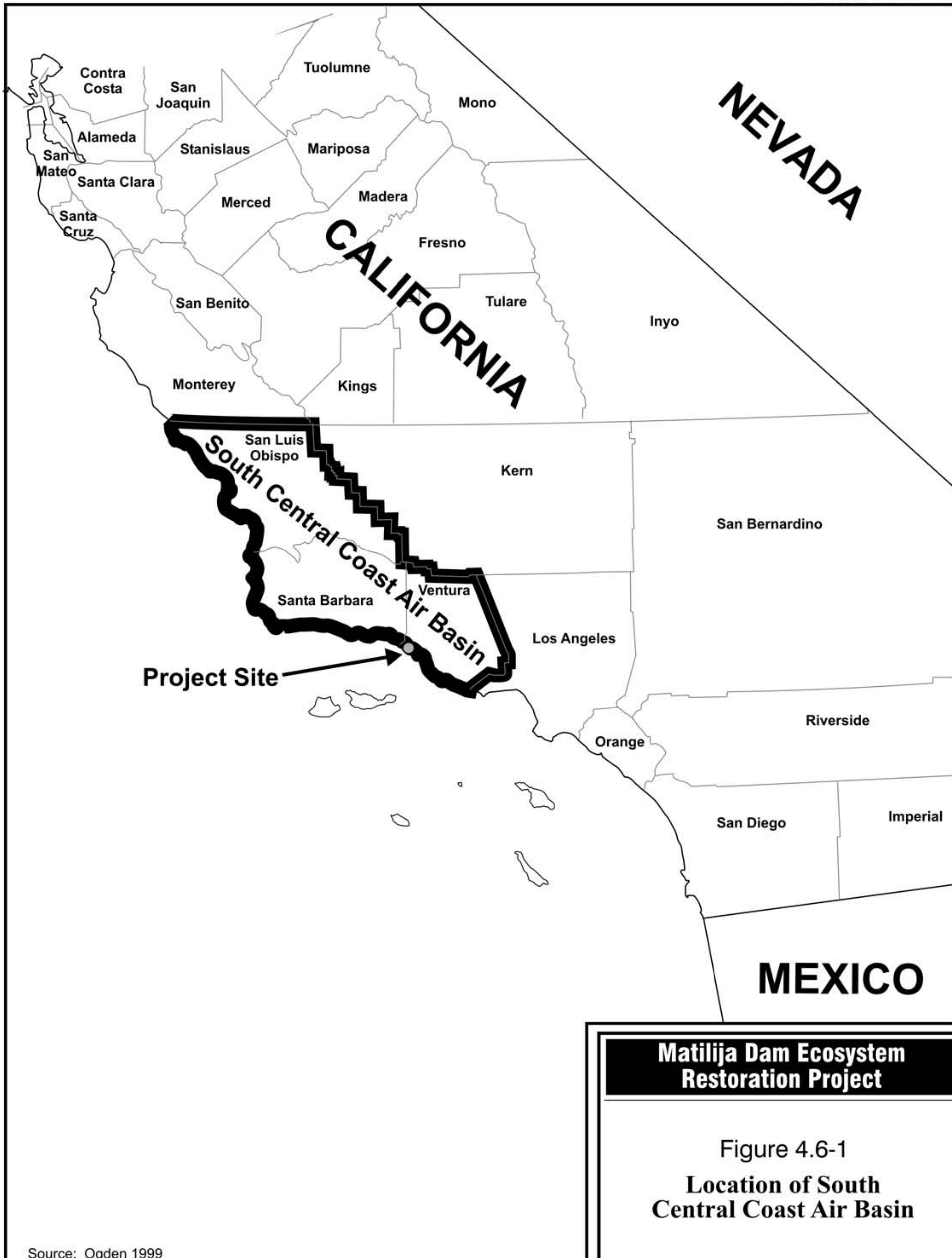
The VCAPCD prepared a revision to the 1994 AQMP in 1995. This revision updated information that had changed since the 1994 AQMP, including minor adjustments to the 1990 baseline emission inventory, action taken by CARB to improve additional control strategies, changes to the photochemical modeling, and several other changes. The 1995 Plan Revision indicated that Ventura County would attain the federal one-hour standard by 2005. It focused on ways to reduce ozone levels, and did not address PM_{10}, since Ventura County is an attainment area for the federal PM_{10} standard. The USEPA approved the 1994 AQMP and 1995 AQMP Revision on February 7, 1997 (VCAPCD, 2000).

The VCAPCD prepared a 1997 AQMP Revision to update the proposed adoption and implementation dates for nine control measures that were included in the 1995 Plan Revision. The USEPA approved the 1997 AQMP on April 12, 1998 (VCAPCD, 2000).

VCAPCD Rules and Regulations. The following rules and regulations would likely apply to specific project actions or components (VCAPCD, 2004a):

Regulation II – Permits. This regulation includes the rules for obtaining an Authority to Construct and permit to operate, and includes rules that define the requirements for Best Available Control Technology (BACT) and emission offsets. Portable stationary equipment that cannot be registered under the Statewide Portable Equipment Registration Program may be required to obtain air quality permits from the VCAPCD.

***Regulation IV – Prohibitions*.** This regulation includes rules that specify emission limits and operating requirements for various types of pollutant generating equipment and operations. Specific rules that would apply to this project include: Rule 50 - Opacity; Rule 51 - Nuisance; Rule 52 - Particulate Matter - Concentration; and Rule 53 Particulate Matter – Process Weight (for aggregate screening operations).



Matilija Dam Ecosystem Restoration Project

Figure 4.6-1

Location of South Central Coast Air Basin

4.7 NOISE

This section describes the existing noise environment in the study area, which includes the area and transportation routes from the Ventura River Estuary to Matilija Canyon. Section 4.7.1 provides a background on the fundamentals of environmental acoustics. Section 4.7.2 defines the existing noise environment by outlining major noise sources, analyzing noise measurements, and describing the location of sensitive noise receptors. Section 4.7.3 describes policies and regulations related to noise.

4.7.1 Environmental Baseline

A brief background in acoustics is helpful in understanding how humans perceive various sound levels. Some useful definitions include:

- Acoustics refers to the study of sound wave generation and transmission.
- Sound is the physical oscillation or vibration of a medium, such as air, that can be perceived by an instrument, such as the human ear or a microphone.
- Noise has commonly been categorized as loud, disruptive sounds that can annoy or cause harm to people.
- Background noise is the aggregation of all perceptible, but not necessarily identifiable, sound sources (such as traffic, airplanes, and environmental sounds) that create a static ambient noise baseline.

Although extremely loud noises can cause temporary or permanent damage, the primary environmental impact of noise is annoyance. The objectionable characteristic of noise often refers to its *loudness*. Loudness represents the intensity of the sound wave or the amplitude of the sound wave height (measured in decibels [dB]). Decibels are calculated on a logarithmic scale; thus, a 10 dB increase represents a tenfold increase in intensity, while a 20 dB represents a hundredfold increase in intensity. Decibels are the preferred measurement of environmental sound because of the direct relationship between a sound's intensity and the subjective "noisiness" of it. The A-weighted decibel system (dBA) is a convenient sound measurement technique that weights selected frequencies based on how well humans can perceive them (Figure 4.7-1, note all figures are at the end of this section).

The range of human hearing spans from the threshold of hearing (~3 dBA) to past the threshold of pain (120 dBA). In general, humans will notice a change of sound greater than 3 dBA. Noise levels are generally considered low when they are below 45 dBA, moderate in the 45 to 60 dBA range, and high above 60 dBA. Noise levels greater than 85 dBA can cause temporary or permanent hearing loss if exposure is sustained. Examples of low daytime levels are those observed in isolated natural settings, such as the Grand Canyon (20 dBA), and quiet suburban residential streets (43 dBA). Examples of moderate level noise environments are urban residential or semi-commercial areas (55 dBA) and commercial locations (60 dBA). Although people often accept the higher levels associated with very noisy urban residential and residential-commercial zones (63 dBA), as well as industrial areas (65 to 70 dBA), the levels are nevertheless considered adverse (USEPA, 1971; Berenek, 1971). Further examples of noises and their associated A-weighted decibels are shown in Figure 4.7-2.

Ambient environmental noise levels can be characterized by several different descriptors. *Noise Equivalent Level* (L_{eq}) describes the average noise level over a specified period of time. L_{eq} provides a useful measure of the impact of fluctuating noise levels on sensitive receptors over time. Other descriptors of noise incorporate a weighting system that accounts for human's susceptibility to noise irritations at night. *Community Noise Equivalent Level* (CNEL) is a measure of cumulative noise exposure over a 24-hour period, with a 5 dB penalty added to evening hours (7:00 p.m. to 10:00 p.m.) and a 10 dB penalty added to night hours (10:00 p.m. to 7:00 a.m.). *Day/Night Average Noise Level* (L_{dn}) is essentially the same as CNEL, with the exception that the evening penalty is dropped. Further, A-weighted noise levels that are exceeded a selected percentage of time can be classified as L_x, where x is the percentage of time that the noise level is exceeded during a given interval. Sound levels associated with L_{10} typically describe transient or short-term events (these noise levels occur about 10 percent of the time), while L_{90} levels generally describe background noise conditions. L_{dn} and CNEL values rarely differ by more than 1 dB. In general, human sound perception is such that a change in sound level of 3 dB is just noticeable, while a change of 5 dB is clearly noticeable. A change of 10 dB is perceived as doubling or halving of sound level.

4.7.2 Noise Setting

A description of the existing noise setting is provided in three parts below. First, the major noise sources are qualitatively described. Second, the noise measurements that were taken at key locations are presented. And third, the locations of sensitive noise receptors in the study area are described.

4.7.2.1 Major Noise Sources

Vehicle Traffic. Vehicular traffic noise is the primary noise source in the study area. A brief description of the primary traffic routes is given below (for a more complete description of traffic use on highways and roads and locations, refer to the Transportation section of this report).

- The 101 Freeway, which cuts across the Ventura River just north of the Ventura River Estuary, is a major State freeway that generates heavy traffic use throughout the day, resulting in substantial noise generation.
- SR 33 parallels the Ventura River (to the east) for most of the distance between the ocean and Matilija Canyon Road, which provides access road to Matilija Canyon. SR 33 generates a moderate to heavy level of traffic use during parts of the daytime, with low traffic use during the night and off-peak hours.
- Highway 150 crosses the Ventura River east of Lake Casitas. Highway 150 joins SR 33 until they separate again in the City of Ojai. Highway 150 generates low to moderate traffic levels during most of the day. The Highway 150 bridge crossing represents a high noise-generating source relative to surrounding river areas.
- Burnham Road, which intersects with Santa Ana Road, parallels the west side of the Ventura River, north of the Casitas Vista Road bridge at Foster Park. Burnham Road and Santa Ana Road receive moderate to low traffic use throughout most of the day.
- Matilija Road in Matilija Canyon traverses east of the Matilija Dam, with light traffic.

Seaside Park Racetrack. Seaside Park sponsors many recreational events, including the annual Ventura County Fair and vehicle racing activities. Racing events, which generally occur on weekend evenings, generate temporary high-level noise events for 1 to 3 hours.

Railroads. Amtrak and freight railcars frequently traverse the railroad route near the 101 Freeway, just north of the Ventura River Estuary. The trains represent a substantial but brief noise source throughout most hours of the day.

Airports. The nearest airports to the study area are the Santa Barbara Municipal Airport (approximately 30 miles north), Oxnard Airport (approximately 8 miles south), Camarillo Airport (approximately 15 miles south), Santa Paula, private airport (approximately 15 miles east), and the Point Magu Naval Air Weapons Station (approximately 19 miles south). These do not generate major noise events in the study area, although overhead aircraft flights are perceivable.

4.7.2.2 Noise Measurements

Using an impulse-integrating sound-level meter (Quest Technologies-Model 2800), noise measurements were recorded at 13 locations (see Figures 4.7-3a-c for monitoring locations) surrounding the project site on April 15, 2002, to quantify existing noise conditions. Table 4.7-1a provides the recorded ambient noise conditions in the study area.

Table 4.7-1a: Ambient Measured Noise Levels of the Study Area

Location		Survey Period	L_{eq} (dBA)	L_{max} (dBA)	L_{min} (dBA)	Notes
#	Description					
1	At the gate of the Matilija Wildlife Sanctuary on South Matilija Road, near Matilija Creek	10:00 am – 10:20 am	44.6	68.4	40.3	Quiet spot south of the Matilija Dam, with no traffic during test. Sounds represent creek and natural noises
2	In the Matilija Creek Channel, one 0.5 mile north of Matilija Dam, away from the low-flow channel.	10:50 am – 11:10 am	40.7	72.9	33.9	Quiet setting inside channel north of the Matilija Dam, away from the low-flow channel. Approximately 100 meters to the road. Birds and natural noises were present.
3	In the Matilija Creek Channel, at the start of the Matilija Reservoir, near the low-flow channel	11:20 am – 11:40 am	46.8	67.3	38.8	Similar setting as Site #2 but near the low-flow channel.
4	First residence north of Matilija Dam, just off of Matilija Road. Approximately 1 mile north of the Matilija Dam.	11:45 am – 12:05 pm	48.2	75.9	32.8	Most of the noise was generated by traffic on Matilija Road.
5	At the entrance of the Matilija Environmental Science Area (MESA), just of Matilija Road, approximately 0.75 miles north of Matilija Dam.	12:20 pm – 12:40 pm	50.6	76.7	33.2	Most of the noise was generated by traffic on Matilija Road.
6	Just north of Matilija Dam, on the east side of the reservoir.	12:50 pm – 1:10 pm	49.1	69.2	35.8	Most of the noise generated by water released from Matilija Dam.
7	Intersection of Camino Cielo and SR 33, at the first residence south off Matilija Road.	1:25 pm – 1:40 pm	62.2	85.3	35.4	Most of the noise was generated by traffic on SR 33
8	Ojai Valley Community Hospital, on SR 33, in the Meiners Oaks area.	2:00 pm – 2:15 pm	61.8	80.4	50.8	Most of the noise comes from SR 33. This site is representative of current noise conditions in the north Ojai area, on route to/from Matilija Canyon. The hospital is across the street from Nordhoff High School another sensitive receptor in the area. This measurement is characteristic of current noise conditions for sensitive receptors along SR 33 within the Ojai area.
9	At the Ojai Valley Baptist Church, just south of SR 33/Highway 150, in the southwest area of Ojai. Approximately 0.25 miles north of the southern intersection of SR 33 and Highway 150.	5:35 pm – 5:50 pm	61.8	78.6	42.9	Most of the noise comes from SR 33. This site is representative of current noise conditions for three types sensitive receptors, (1) sensitive receptors located along the route to/from Matilija Canyon in southern Ojai, (2) nearby residences, and (3) recreational trail users of the Ojai Valley Trail, which is located the same distance from SR 33 as the noise measurement was taken.

Location #	Location Description	Survey Period	L_{eq} (dBA)	L_{max} (dBA)	L_{min} (dBA)	Notes
10	Santa Ana Road, north of the Foster Park Bridge. West side of the Ventura River.	6:00 pm – 6:15 pm	66.9	87.9	41.8	Most noise comes from traffic on Santa Ana Road. This site is representative of current noise levels for residences along the western side of the Ventura River, north of Foster Park.
11	Foster Park, on the east side of Ventura River, approximately 50 meters west of SR 33.	6:15 pm – 6:30 pm	54.6	78.2	48.2	Most noise is from SR 33 and the Ventura River. This site is representative of current noise conditions for two sensitive receptors, (1) park users, and (2) recreational trail users of the Ventura River Trail, which runs along the west side of SR 33 near Foster Park.
12	At the Westpark Recreation Area, less than 50 meters east of SR 33, in the North Avenue area of Ventura.	7:15 pm – 7:30 pm	60.7	77.8	45.9	Most noise is from SR 33 and park users. This site is representative of current noise conditions for three sensitive receptors, (1) park users, (2) adjacent residents, and (3) nearby schools, such as the Sheridan Way School, located 0.25 miles to the north, near SR 33.
13	Ventura River Estuary, west bank.	7:40 pm – 8:00 pm	60.1	69.9	57.2	Most of the noise from surf and wind. A train passed along tracks (approximately 75 ft to the north) during the measurements.

Measurements recorded on April 15, 2002

Since the study area covers a large geographical area, noise measurements were taken at locations that represented typical noise environments in given areas. Noise measurements at or near sensitive receptors were emphasized. The noise measurements provide a general description of the existing noise environment in various portions of the study area, from Matilija Canyon to the Ventura River Estuary.

In addition to the above noise monitoring, noise levels were measured at three locations within the Casitas Springs community on October 28, 2002, as part of the Ventura River Bank Protection Upgrade Project (Padre, 2003). These measurements are presented in Table 4.7-1b, below. Measurements were conducted in the afternoon prior to peak hour (1 to 3 p.m.). The noise monitoring results indicate that the ambient noise environment in the area surrounding the Casitas Levee/Floodwall/Levee is quiet, with noise levels below 51 dBA L_{eq}.

Table 4.7-1b: Ambient Measured Noise Levels of the Casitas Springs Levee/Floodwall/Levee

Location #	Location Description	Survey Period	L_{eq} (dBA)	Notes
14	Southern terminus of Edison Road	15 min. (1-3 p.m.)	47.5	460 feet the Casitas Springs levee, and 140 feet to SR 33.
15	Western terminus of Ranch Road	15 min. (1-3 p.m.)	47.5	180 feet to Casitas Springs levee, and 750 feet to SR 33. Noise environment dominated by high winds moving foliage.
16	Arroyo Mobile Home Park	15 min. (1-3 p.m.)	50.7	250 feet to Casitas Springs floodwall, 200 feet to SR 33, and 20 feet to access road.

Measurements recorded on October 28, 2002 as part of the Final Environmental Impact Report for the Ventura River Bank Protection Upgrade Project (Padre, 2003).

4.7.2.3 Sensitive Receptors

Noise-sensitive receptors are facilities or areas (residential areas, hospitals, schools, parks) where excessive noise may cause annoyance or disruption to users. The *Ventura County General Plan (Goals, Policies and Programs*, p. 49) defines noise sensitive receptors as residential uses, educational uses, health facilities, research institutions, certain recreational and entertainment facilities, and churches.

There are a number of sensitive receptors along the route between the Ventura coast and Matilija Canyon. In the general area of SR 33, there are a number of parks, schools, daycare centers, churches, nature preserves and residential areas. There are numerous residents within the areas of the City of San Buenaventura, City of Ojai, Casitas Springs, Oak View, Meiners Oaks, the west side of the river north of Foster Park, and in the north end of Matilija Canyon. In addition, recreationists using various recreational facilities throughout the study area would be considered sensitive receptors (see Section 4.11, Recreation), along with any other unmentioned sensitive receptors that meet the definition described above. Table 4.7-2 describes some of the sensitive receptors in the study area. Although Table 4.7-2 is not an exhaustive list, it does characterize the type and location of sensitive receptors that would be affected by an increase in noise levels within the study area.

Table 4.7-2: Examples of Some of the Sensitive Receptors in the Study Area

#	Sensitive Receptor	General Location
1	Residents of Matilija Canyon (represented by the closest resident to Matilija Dam)	The first residential dwelling is located approximately 1 mile north of Matilija Dam.
2	Matilija Environmental Science Area	Approximately 0.75 miles north of Matilija Dam.
3	Matilija Wildlife Sanctuary	South of the Matilija Dam, on South Matilija Road.
4	Matilija Hot Springs	Located just south of the Matilija Dam.
6	St. Thomas Aquinas Catholic Church	East El Roblar Drive, off SR 33 in Meiners Oaks.
7	Ojai Valley Community Hospital	On SR 33, just north of Ojai Avenue
8	Nordhoff High School	Across from the Ojai Valley Community Hospital
9	Ojai Valley Community Health Center	On SR 33, just north of Ojai Avenue
10	"New" Park	On Highway 150, near Blanche Street, east of SR 33
11	Ojai Valley Hospital	On Highway 150, near Ventura Street, east of SR 33
12	Ojai Elementary	On Highway 150, near Fox Street, east of SR 33
13	Ojai Valley School	On Highway 150, east of SR 33
14	Ojai Valley Baptist Church	On State Route (SR) 33, just north of southern intersection with Highway 150
15	Arroyo Mobile Home Park	West of SR 33 and the community of Casitas Springs, north of Ranch Road, and adjacent to the Ventura River.
16	Foster park	On SR 33, south of Casitas Springs
17	Tri-County Teen Challenge	On east side of SR 33, south of Foster Park.
18	EP Foster School	On east side of SR 33, in the North Avenue area of Ventura, near School Canyon Road
19	Sheridan Way School	On east side of SR 33, in the North Avenue area of Ventura, on Sheridan Way
20	Westpark Recreation Area	On east side of SR 33, in the North Avenue area of Ventura, near Sheridan Way.
21	Surfers Point park area	Near Ventura River Estuary

4.7.3 Applicable Plans, Policies, and Regulations

4.7.3.1 Federal

There are no federal noise standards that directly regulate environmental noise. Federal regulations safeguard the hearing of workers exposed to occupational noise, and are enforced by the Office of Safety and Health Administration (OSHA). Table 4.7-3 shows the allowable worker exposure levels under OSHA.

The USEPA has developed guidelines on recommended maximum noise levels to protect public health and welfare (USEPA, 1974). A list of permissible noise exposures is given in Table 4.7-4 (Code of Federal Regulations: 29 CFR - Section 1910.95).

Table 4.7-3: OSHA Worker Noise Exposure Standards

Duration of Noise (hrs/day)	A-Weighted Noise Level (dBA)
8.0	90
6.0	92
4.0	95
3.0	97
2.0	100
1.5	102
1.0	105
0.5	110
0.25	115

Source: OSHA Standards: 29 CFR 1910.95, Subpart G (Occupational Noise Exposure, Table G-16).

Table 4.7-4: Summary of Noise Levels Identified as Requisite to Protect Public Health and Welfare With an Adequate Margin of Safety

Effect	Safety Level	Area
Hearing Loss	Leq (24) < 70 dB	All areas
Outdoor Activity Interference and Annoyance	Ldn < 55 dB	Outdoors in residential areas and farms, and other outdoor areas where people spend widely-varying amounts of time, and other places in which quiet is a basis for use.
	Leq (24) < 55 dB	Outdoor areas where people spend limited amounts of time, such as school yards, playgrounds, etc.
Indoor Activity Interference and Annoyance	Ldn < 45 dB	Indoor residential areas
	Leq (24) < 45 dB	Other indoor areas with human activities, such as schools, etc.

Source: USEPA, 1974.

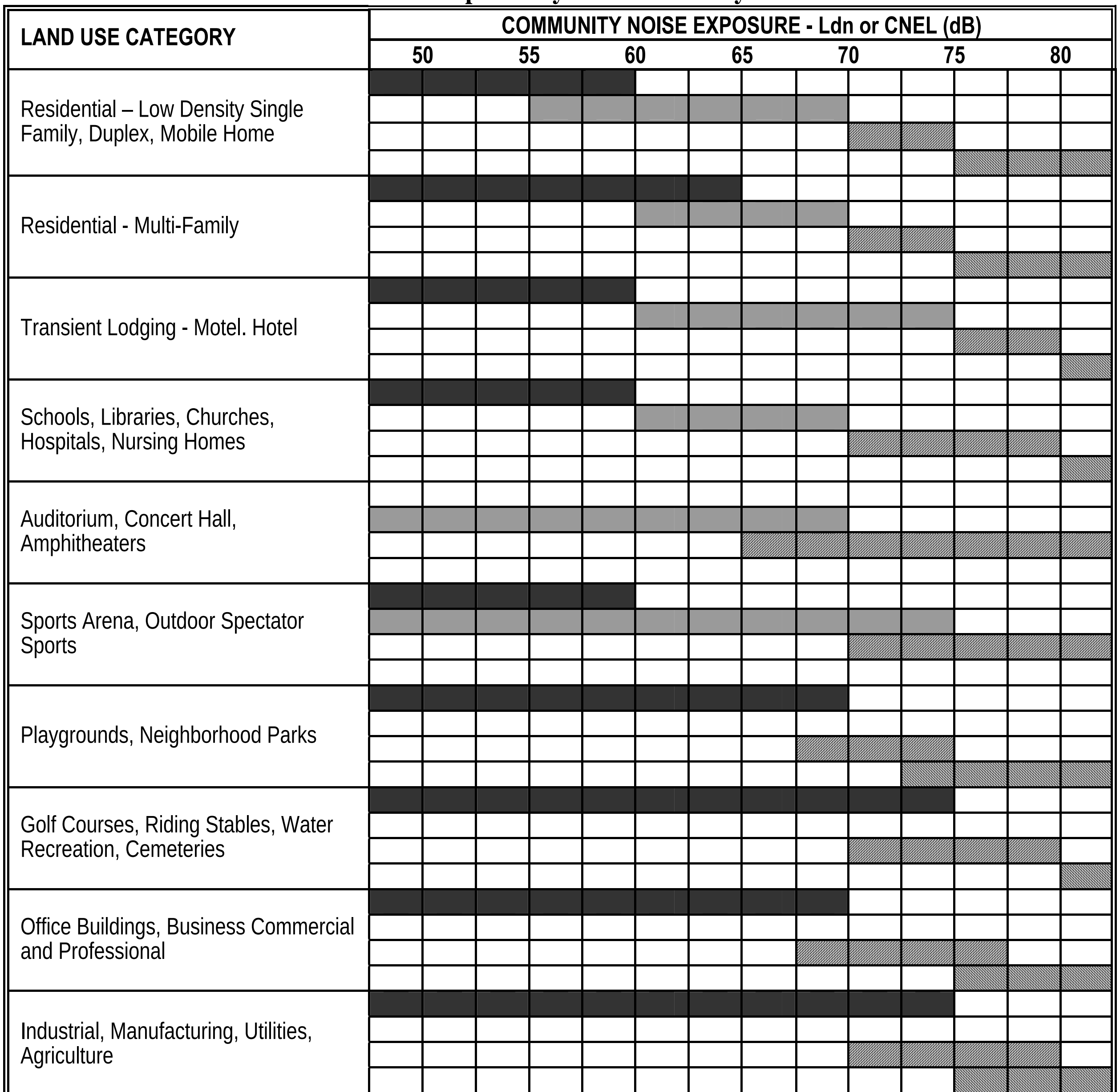
4.7.3.2 State

California requires each local government entity to perform noise studies and implement a noise element as part of their general plan. The California Office of Noise Control administers standards and implementation measures. California Administrative Code, Title 4, has guidelines for evaluating the compatibility of various land uses as a function of community noise exposure. The State land use compatibility guidelines are displayed in Table 4.7-5.

4.7.3.3 Local

Ventura County. According to Section 2.16 of the Ventura County General Plan, noise generation is restricted by the policies described in Table 4.7-6.

Table 4.7-5: Land Use Compatibility for Community Noise Environment



	Normally Acceptable	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
	Conditionally Acceptable	New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features are included in the design.
	Normally Unacceptable	New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirement must be made and needed noise insulation features included in the design.
	Clearly Unacceptable	New construction or development generally should not be undertaken.

Source: State of California General Plan Guidelines, Office of Planning and Research, June 1990.

Table 4.7-6: Ventura County General Plan Noise Policies

Policy Number	Description of Policy
2.16.1	All discretionary development shall be reviewed for noise compatibility with surrounding uses. Noise compatibility shall be determined from a consistent set of criteria based on the standards listed below. An acoustical analysis by a qualified acoustical engineer shall be required of discretionary developments involving noise exposure or noise generation in excess of the established standards. The analysis shall provide documentation of existing and projected noise levels at on-site and off-site receptors, and shall recommend noise control measures for mitigating adverse impacts.
2.16.1(4)	Noise generators proposed to be located near any noise sensitive use shall incorporate noise control measure so that that outdoor noise levels received by the noise sensitive receptor, measured at the exterior wall of the building, does not exceed any of the following standards: L_{eq} 1H of 55 dB(A) or ambient noise level plus 3 dB(A), whichever is greater, during any hour from 6:00 a.m. to 7:00 p.m. L_{eq} 1H of 50 dB(A) or ambient noise level plus 3 dB(A), whichever is greater, during any hour from 7:00 p.m. to 10:00 p.m. L_{eq} 1H of 45 dB(A) or ambient noise level plus 3 dB(A), whichever is greater, during any hour from 10:00 p.m. to 6:00 a.m.
2.16.2	Discretionary development which would be impacted by noise or generate project related noise which cannot be reduced to meet the standards prescribed in Policy 2.16.2(1) shall be prohibited. This policy does not apply to noise generated during the construction phase of a project if a statement of overriding considerations is adopted by the decision-making body in conjunction with the certification of a final Environmental Impact Report.
2.16.3	The priorities for noise control shall be as follows: Reduction of noise emissions at the source. Attenuation of sound transmission along its path, using barriers, landforms, modification, dense plantings, and the like. Reflection of noise at the reception point via noise control building construction, hearing protection or other means.

Source: Ventura County, 1998.

City of Ojai. The City of Ojai Ordinance Number 731, Chapter 11 of Title 5 of the Ojai Municipal Code define the City of Ojai's noise regulations. The noise regulations that are pertinent to the project are described below.

- Pursuant to Section 5-11.04(a)(1)(2), exterior residential noise levels shall not exceed 55 dB(A) in the day (10:00 a.m to 7:00 p.m) and 45 dB(A) at night (7:00 p.m. to 10:00 a.m.) on a cumulative basis per hour. Exterior commercial/industrial noise levels shall not exceed 65 dB(A) in the day (10:00 a.m to 7:00 p.m) and 55 dB(A) at night (7:00 p.m. to 10:00 a.m.) on a cumulative basis per hour. For both residential and commercial/industrial areas, some exceptions are permitted for higher noise levels if they are for durations of under 15 minutes or lower.
- Pursuant to Section 5-11.04(b)(1)(2), interior residential noise levels shall not exceed 45 dB(A) for all hours of the day for more than five minutes of any hour. A 50 dB(A) level shall not be exceeded for a cumulative period of more than one minute in an hour, and a 55 dB(A) shall not be exceeded for any period of time.
- Pursuant to Section 5-11.05(c)(1)(2)(3), construction activities may, as warranted by the project, exceed the noise level limits of Sec. 5-11.04 on a temporary and short-term basis between 7:00 a.m to 5:00 p.m on weekdays. No construction shall be performed on weekends or City of Ojai holidays, and construction equipment shall be operated with standard factory silencer and/or muffler equipment.

City of San Buenaventura. The Ordinance Code of the City of San Buenaventura (codified through Ordinance Number 2001-17, on Dec. 17, 2001) Section 10.650 outlines Noise Control within the City of San Buenaventura. The noise regulations pertinent to the project are described in Table 4.7-7.

Table 4.7-7: City of San Buenaventura Noise Control

Designated Zone	Time Interval	Noise Level dB(A)
Exterior Noise Levels		
Noise Sensitive Properties	7:00 a.m - 10:00 p.m	50
	10:00 p.m. – 7:00 a.m.	45
Residential Properties	7:00 a.m - 10:00 p.m	50
	10:00 p.m. – 7:00 a.m.	45
Commercial Properties	7:00 a.m - 10:00 p.m	60
	10:00 p.m. – 7:00 a.m.	55
Industrial and Agricultural	Anytime	70
Interior Noise Levels		
Residential Properties	7:00 a.m - 10:00 p.m	40
	10:00 p.m. – 7:00 a.m.	45

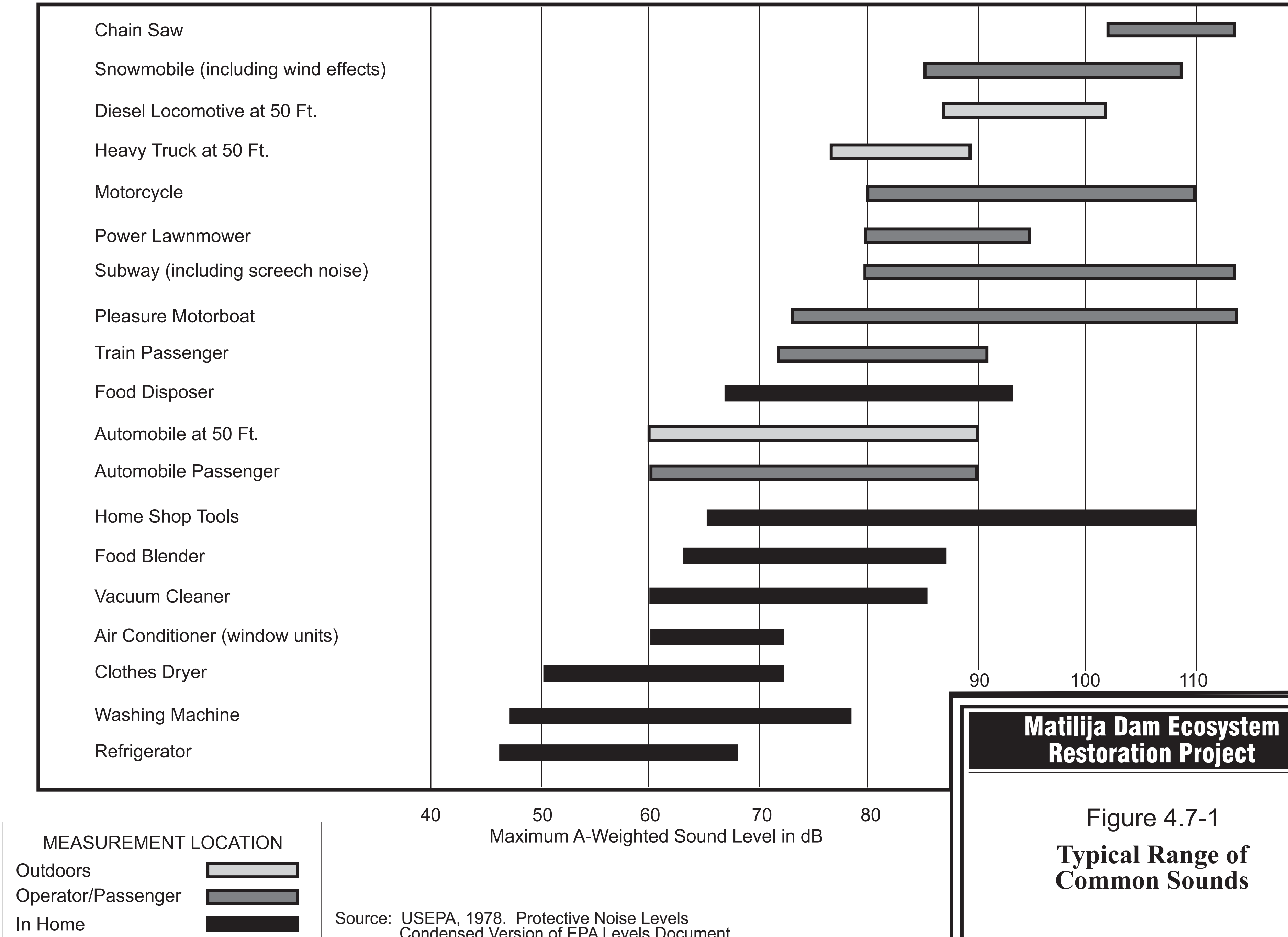
Per Section 10.650.130(B)(2), the exterior noise levels for a particular land use shall not exceed the above limits as follows:

The exterior noise levels for more than 30 minutes in any consecutive 60 minutes
The exterior noise levels plus 5 dB(A) for 15 minutes in any consecutive 60 minutes
The exterior noise levels plus 10 dB(A) for 5 minutes in any consecutive 60 minutes
The exterior noise levels plus 15 dB(A) for 1 minute in any consecutive 60 minutes
The exterior noise levels plus 20 dB(A) for any period of time

Per Section 10.650.130(C)(2), the interior noise levels shall not exceed the above limits as follows:

The interior noise levels for more than 5 minutes in any consecutive 60 minutes
The interior noise levels plus 5 dB(A) for more than 1 minute in any consecutive 60 minutes
The interior noise levels plus 10 dB(A) for any period of time

Source: City of Ventura, 2001. Ordinance Code, Section 10.650.130.

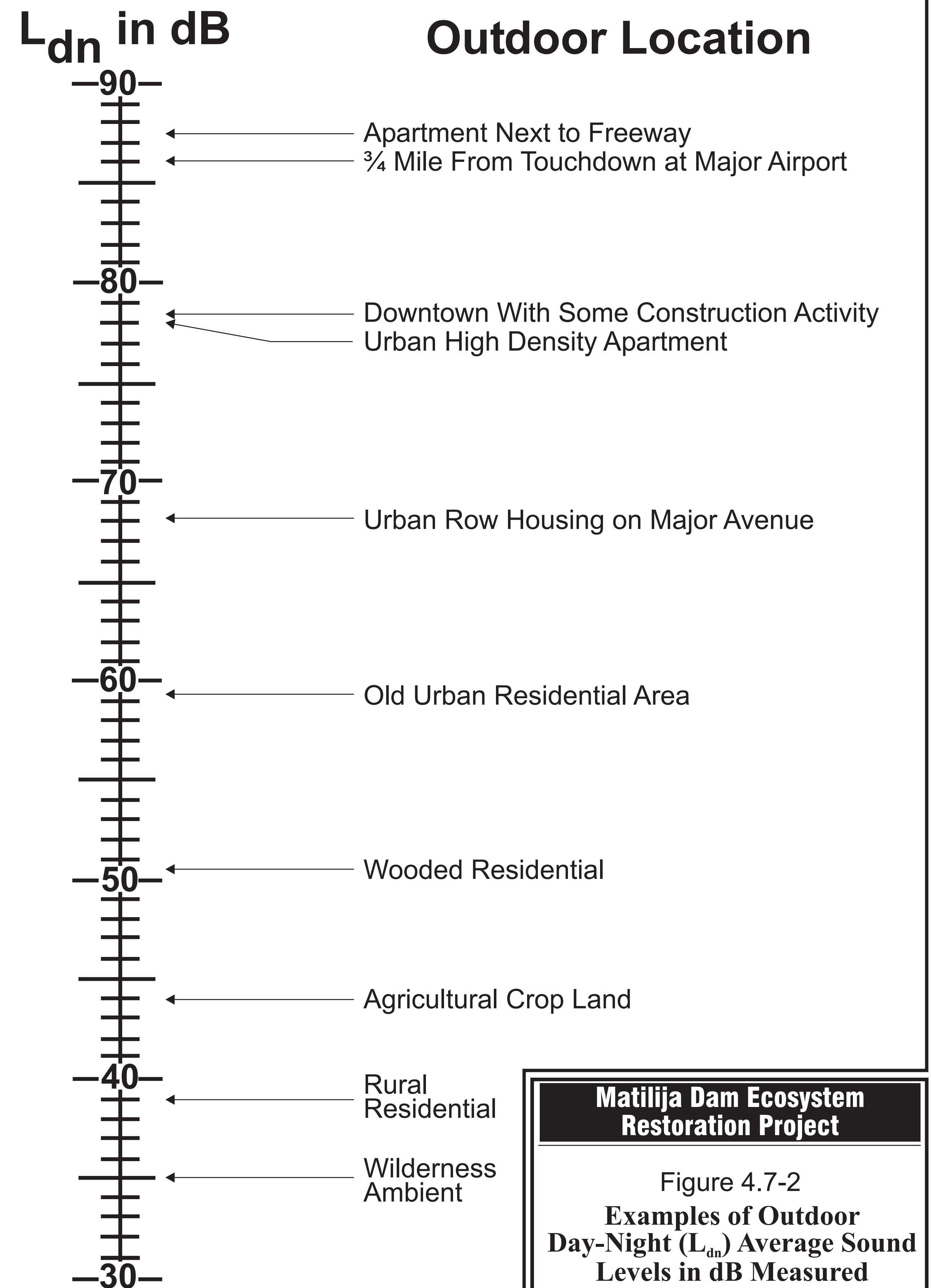


Source: USEPA, 1978. Protective Noise Levels
Condensed Version of EPA Levels Document

Matilija Dam Ecosystem Restoration Project

Figure 4.7-1

Typical Range of Common Sounds



Source: USEPA, 1978. Protective Noise Levels Condensed Version of EPA Levels Document

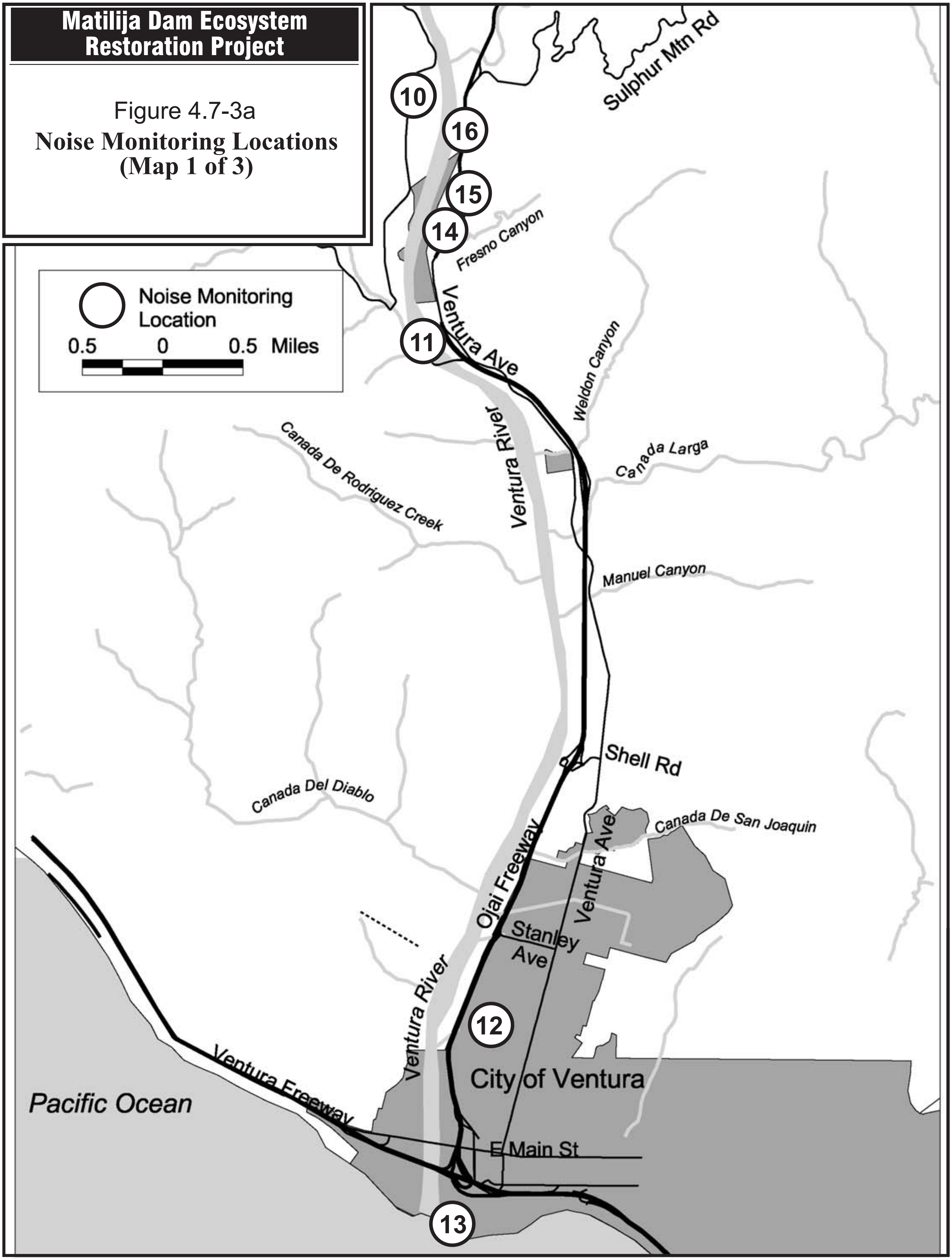
Matilija Dam Ecosystem Restoration Project

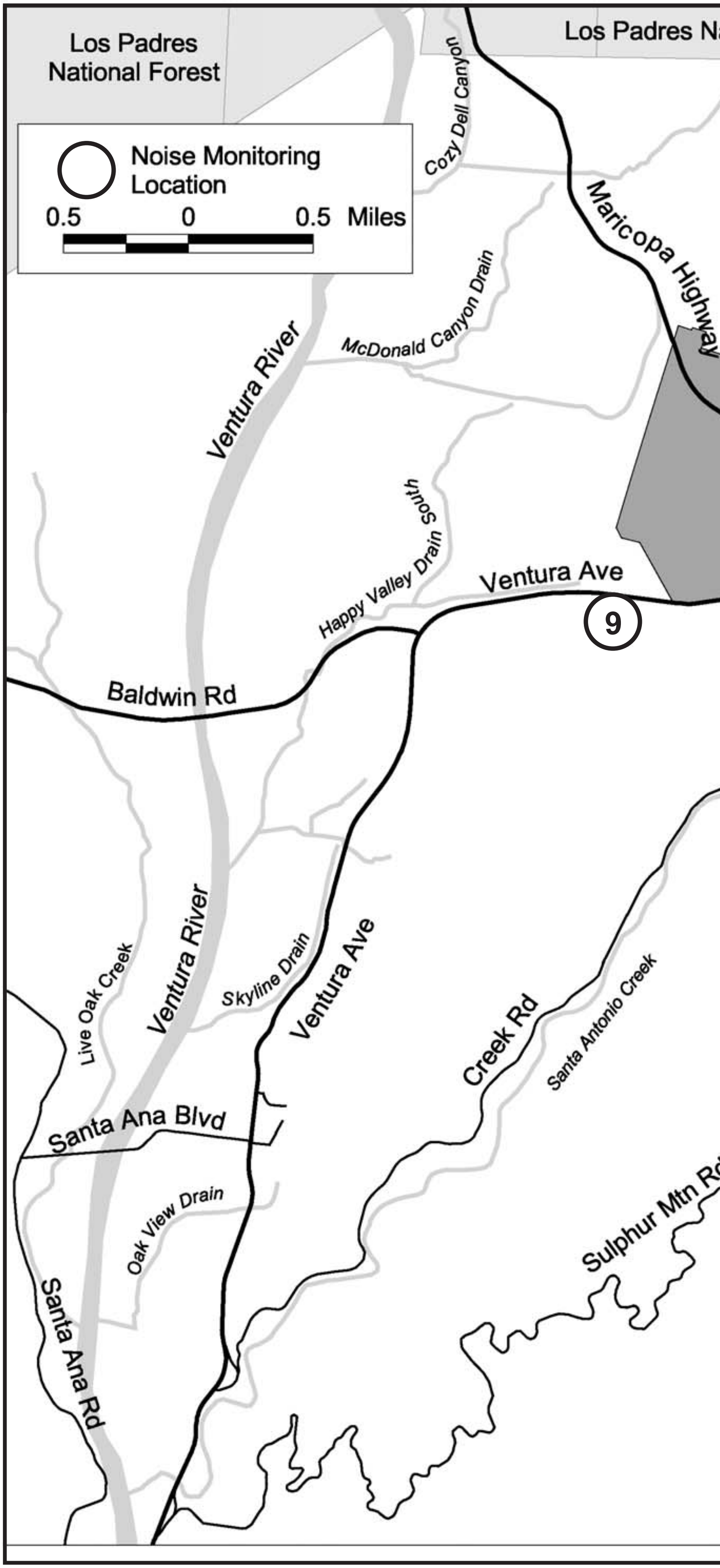
Figure 4.7-2

Examples of Outdoor Day-Night (L_{dn}) Average Sound Levels in dB Measured at Various Locations

Matilija Dam Ecosystem Restoration Project

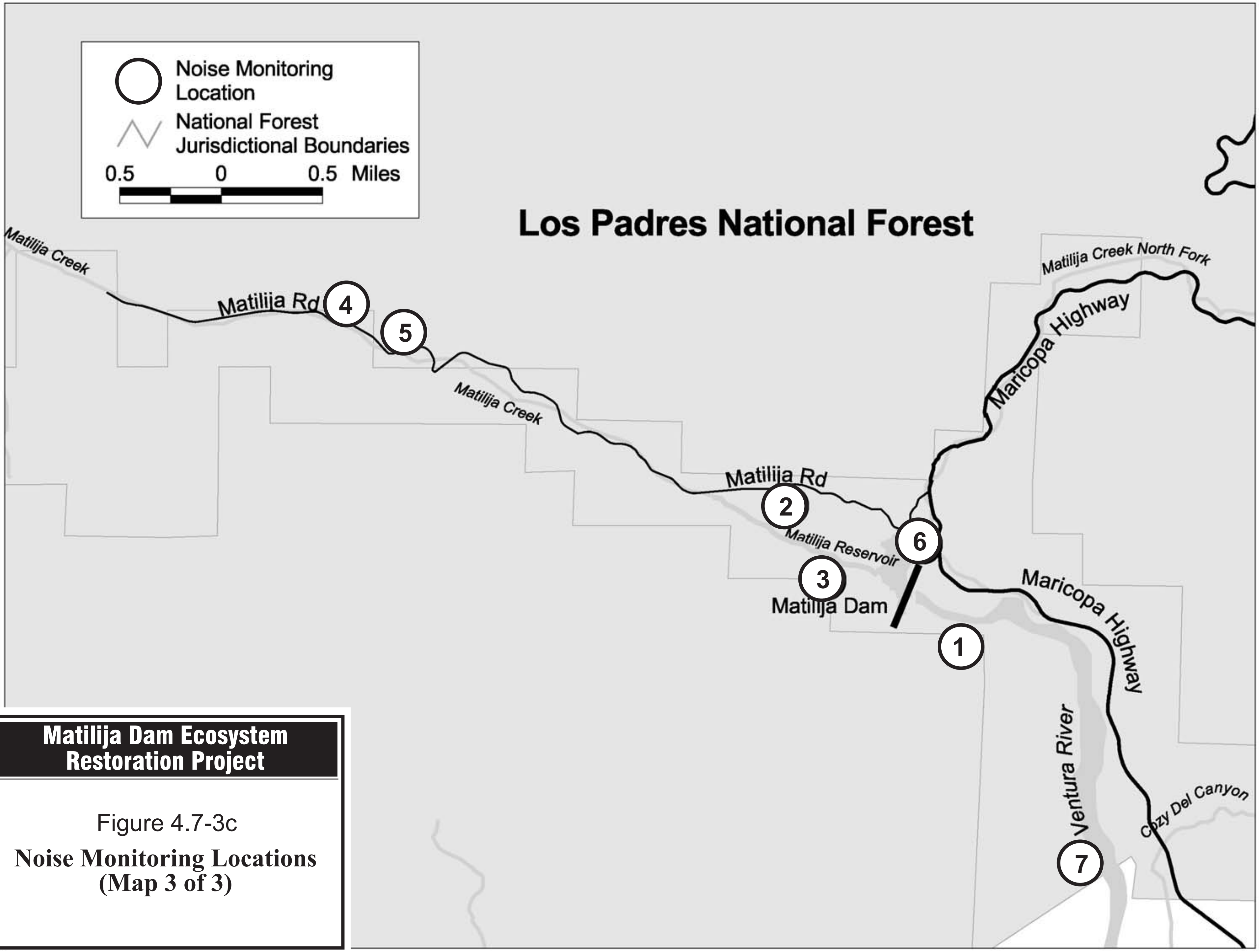
Figure 4.7-3a
Noise Monitoring Locations (Map 1 of 3)





Matilija Dam Ecosystem Restoration Project

Figure 4.7-3b
Noise Monitoring Locations (Map 2 of 3)



Matilija Dam Ecosystem Restoration Project

Figure 4.7-3c

Noise Monitoring Locations (Map 3 of 3)

4.8 SOCIOECONOMICS

4.8.1 Socioeconomic Characteristics

This section describes the social and economic characteristics of Ventura County, the Cities of San Buenaventura and Ojai, as well as the immediate study area. This section also analyzes the area's demographic characteristics for an environmental justice screening analysis.

Matilija Dam is located in an unincorporated portion of Ventura County north of the City of Ventura, and northwest of the City of Ojai. For purposes of the socioeconomic analysis, the study area includes the Ventura River Basin and Matilija Canyon, the City of Ojai, the Ojai Valley communities of Meiners Oaks, Mira Monte, Live Oaks Acres, Oak View and Casitas Springs, and the coastal area of the Cities of San Buenaventura, Oxnard, and Port Hueneme. The study area includes portions of the following census tracts: 000100, 001001, 001101, 001102, 000901, 000902, 001204, 001205, 002300, 002400, 002500, 002902, 003603, and 003604.

4.8.1.1 Population Characteristics

Recent population figures for Ventura County, the Cities of San Buenaventura and Ojai, and the project study area are summarized in Table 4.8-1.

Table 4.8-1: Population Characteristics, 2000

Area	2000 Population	2000 Minority Population
Ventura County	753,197	226,476 (30.1%)
City of San Buenaventura	100,916	21,405 (21.2%)
City of Ojai	7,862	943 (12.0%)
Study Area	50,681	14,324 (28.3%)

Sources: U.S. Census, 2002. Year 2000 data.

Within the study area, the City of San Buenaventura has the largest year 2000 population within Ventura County as a whole (100,916 persons), while the immediate project study area contains 50,681. Also shown within Table 4.8-1 are the minority populations contained within the study area. As shown, Ventura County as a whole contains a 30.1 percent minority population, while the Cities of San Buenaventura and Ojai contain less (21.2 and 12.0 percent, respectively). The immediate project study area has a total year 2000 minority population of 28.3 percent. Ojai is the smallest city in the County with a population approaching 8,000.

4.8.1.2 Employment Characteristics

Table 4.8-2 identifies labor force characteristics for Ventura County, the Cities of San Buenaventura and Ojai, as well as the project study area for the year 2000. The statistics for all areas indicate a civilian labor force with an unemployment rate below the State's unemployment rate of five percent (EDD, 2002). The civilian labor force represents all residents between 18 and 55 years of age that are currently employed.

As shown within Table 4.8-2, Ventura County as a whole contains the largest unemployment sector with 4.5 percent of the labor force unemployed. In comparison, the project study area contains a 3.9

percent unemployment rate while the Cities of San Buenaventura and Ojai have unemployment rates of 3.6 and 2.4 percent, respectively.

Table 4.8-2: Labor Force Characteristics, 2000

Area	2000 Labor Force	2000 Unemployment
Ventura County	411,400	18,700 (4.5%)
City of Ventura	59,200	2,140 (3.6%)
City of Ojai	4,450	110 (2.4%)
Study Area	30,784	1,201 (3.9%)

Sources: California Employment Development Department Labor Market Information Division: 2002.

Recreation is an important aspect to the regional economy. According to the California Division of Tourism, visitors to Ventura County spent over one billion dollars in 2000. The majority of these visitors stayed overnight at local hotels. Day visitors from Southern California and the Central Coast generated approximately $330 million dollars. Campers generated approximately $40 million dollars. The Bureau further estimates that the tourism industry employs 19,000 people, of which 4,300 are tied to recreation (California Division of Tourism, 2002). According to the Ventura Visitors and Convention Bureau, there are over 2,000 hotel and motel units along the City of San Buenaventura's coast, as well as convention facilities capable of accommodating 1,000 conventioneers.

The south coast of the County is host to a thriving agricultural industry, encompassing 100,000 acres, grossing an annual average of $800 million and employing 17,000 to 25,000 people. Leading crops are citrus, cut flowers, nursery products, and vegetable and field crops. There are citrus groves inland along the Ventura River, primarily immediately downstream of Matilija Creek.

Historically, there were sand and gravel and oil and gas operations along the lower Ventura River. These operations have ceased in the lowlands, but offshore and hillside oil and gas wells still produce more than 19 million barrels per year.

4.8.1.3 Housing Characteristics

Table 4.8-3 summarizes the households and housing unit totals for Ventura County, the Cities of San Buenaventura and Ojai, as well as the project study area as of January 1, 2000. The vacancy rate for all areas is below the federal housing standard of five percent. According to the federal housing standards, an area with vacancy rates above five percent is not considered to be in short supply of housing (Federal Housing Authority, 2000).

Table 4.8-3: Housing Characteristics, 2000

Area	Households	Housing Units	Vacancy
Ventura County	243,234 (3.04 PPH[1])	251,712	8,478 (3.4%)
City of Ventura	38,524 (2.56 PPH)	39,803	1,279 (3.2%)
City of Ojai	3,088 (2.48 PPH)	3,229	141 (4.4%)
Study Area	19,647 (2.66 PPH)	20,299	652 (3.3%)

[1] PPH – Average Persons Per Household.
Source: U.S. Census, 2002. Year 2000 data.

As of January 2000, there were approximately 251,712 total housing units in Ventura County, with 39,803 total housing units within the City of San Buenaventura and 3,229 within the City of Ojai. The project study area contained 20,299 housing units. These totals include single-family, multi-family, and mobile home residences. Ventura County had a vacancy rate of 3.4 percent, while the City of San Buenaventura had a vacancy rate of 3.2 percent. The City of Ojai had a 2000 housing vacancy rate of 4.4 percent, and the project study area had a 3.3 percent vacancy rate.

4.8.1.4 Public Finance Characteristics

Table 4.8-4 provides the total earnings for Ventura County for 2000. Within Ventura County, services are the largest industry in the county accounting for 27.8 percent of total employment. Other important industry sectors are retail trade at 17.5 percent, government employment at 15.2 percent, and manufacturing of goods at 13.9 percent.

Table 4.8-4: Non-Farm Earnings for Ventura County, 2000

Industry	Ventura County Total	Percent
Services	$6,305,441	27.8%
Wholesale Trade	$997,983	4.4%
Retail Trade	$3,969,253	17.5%
Manufacturing	$3,152,720	13.9%
Government	$3,447,579	15.2%
Transportation & Public Utilities	$861,894	3.8%
Construction	$1,224,798	5.4%
Finance, Insurance & Real Estate	$1,202,116	5.3%
Agriculture	$1,519,656	6.7%
Total Non-Farm Earnings	$22,681,446	100%

Source: Economic Development Department (EDD), Regional Economic Information System, 1999

4.8.1.5 Public Services

The County Sheriff and city police departments provide law enforcement services. The Sheriff's Department serves the unincorporated areas of the County, the City of Ojai and the coastal area of the City of Oxnard. The City of San Buenaventura maintains its own police force.

Fire protection services are provided by the City of San Buenaventura and by the County fire department. Ojai contracts with the County for its fire protection services. The County of Ventura provides paramedic and emergency ambulance response. Ojai Ambulance Company services the City of Ojai. Major hospitals include the Community Memorial Hospital of San Buenaventura, the City of San Buenaventura County Medical Center, and the City of Ojai Valley Community Hospital.

4.8.2 Environmental Justice

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (1994)*, directs federal agencies (as well as State agencies receiving federal funds) to assess the effects of their actions on minority and/or low-income populations within their region of influence. The order requires agencies to develop strategies to identify and address any disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and/or low-income populations. In response,

The USEPA has published its *Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses* (USEPA, 1998), which indicates that a minority population exists when either:

- The minority population of the affected area is greater than fifty percent of the affected area's general population
- The minority population percentage of the affected area is meaningfully greater than the population percentage in the general population or other appropriate unit of geographic analysis.

This analysis will follow the USEPA guidance for determining minority populations. In addition, although not specifically in the USEPA guidelines, this analysis will use the 50 percent threshold to determine the presence of low-income populations in the study area.

An environmental justice screening analysis must determine whether any significant impacts of the project (if any) would disproportionately and adversely impact local low-income and/or minority populations. If a disproportionate impact is determined, mitigation measures must be implemented to reduce the adversity of the impact to a less-than-significant level.

As shown in Table 4.8-1, the Ventura County's minority populations are well below 50 percent, both in the County as a whole and in the Cities of San Buenaventura and Ojai, as well as in the study area of the project. According to the 1990 U.S. Census (most recent data available), 7.3 percent of the population was below the poverty level (U.S. Census, 2002). Therefore, it is unlikely that minority and/or low-income population of the study area is higher than 50 percent.

4.9 TRANSPORTATION

4.9.1 Environmental Baseline

4.9.1.1 Existing Roadway Network

Matilija Dam is accessed from Matilija Hot Springs Road via State Route (SR) 33 in Ventura County. The Dam is located approximately one mile west of SR 33. For the purposes of this transportation baseline conditions description, the "existing roadway network" is roughly defined as the SR 33 corridor that extends from the general area north of Matilija Dam, to U.S. 101 in Ventura to the south, and the local roads that are adjacent to the subject corridor of SR 33. SR 33 roughly parallels the Ventura River through this area. See Figure 4.9-1 (at the end of this section) for an illustration of the existing roadway network.

SR 33 originates to the south at the 6-lane U.S. 101 (Ventura Freeway) in Ventura and exists as a four-lane freeway until Casitas Vista Road, approximately 7 miles north of U.S 101. This portion of SR 33 is referred to as the Ojai Freeway. North of Casitas Vista Road and for the remainder of the subject corridor, SR 33 is a two-lane highway. In the community of Mira Monte, SR 33 joins Highway 150 and heads east for approximately 2.5 miles through the City of Ojai. In the City of Ojai, SR 33 branches off to the north, while Highway 150 continues east through central Ojai and then south to the City of Santa Paula. North of the City of Ojai, SR 33 is designated as a State of California Scenic Route and is referred to as Maricopa Highway. South of Ojai, to a location north of Casitas Vista Road, SR 33 is referred to as Ventura Avenue. North of the study area, SR 33 serves as a pass through the rugged Los Padres National Forest to Interstate Highway 5, north of Coalinga in Fresno County.

The California Department of Transportation (Caltrans) and Ventura County collect peak hour and average daily traffic data for the major roadways within Ventura County. The names and jurisdictions of the roadways, the general roadway classification, the number of lanes, and the peak hour and daily traffic volumes for most of the roads in the existing roadway network are presented in Table 4.9-1. Traffic volumes for roadways under Caltrans jurisdiction (i.e., U.S. 101, SR 33, and Highway 150) were collected in 2002, while traffic volumes under the jurisdiction of the County were collected in 2003, with the exception of the identified volumes for North Matilija Road, which the County collected in 2002 (Ventura County, 2004).

Neither Caltrans nor Ventura County maintains level of service (LOS) data for the subject roadways. Traffic engineers retained by project applicants calculate LOS designations on a project-by-project basis.

4.9.1.2 Bus Transit

Local bus services are provided in most of the cities in the County, including Ventura and Ojai. South Coast Area Transit (SCAT) operates 14 regular bus routes that serve western Ventura County, including the cities of Ojai, Oxnard, Port Hueneme, and Ventura, and the unincorporated areas between these cities (VCTM, 2002). SCAT connects to Metrolink, Amtrak, and Greyhound at the Oxnard

Transportation Center located at 201 E. 4th Street in Oxnard. SCAT service to and from Ojai utilizes SR 33.

Table 4.9-1: Summary of Study Area Roadway Characteristics

Roadway	Jurisdiction	Class	No. of Lanes	Measurement Location	Traffic Volume	
					Peak Hour	Daily
US Route 101 (Ventura Freeway)	Caltrans	Freeway	6	North of SR 33	6,100	72,000
	Caltrans	Freeway	6	South of SR 33	8,800	96,000
	Caltrans	Freeway	6	South of California Street	10,000	112,000
SR 33 (Ojai Freeway)	Caltrans	Freeway	4	North of U.S. Route 101	3,850	42,000
	Caltrans	Freeway	4	North of Stanley Avenue	2,850	31,000
	Caltrans	Freeway	4	North of Shell Road	2,600	28,500
Casitas Vista Road	County	Collector	2	West of SR 33 (Ojai Freeway)	330	2,600
SR 33 (Ventura Ave.)	Caltrans	Highway	2	North of Casitas Vista Road	2,350	26,000
Creek Road	County	Collector	2	East of SR 33 (Ventura Avenue)	250	2,500
SR 33 (Ventura Ave.)	Caltrans	Highway	2	North of Creek Road	2,050	22,600
	Caltrans	Highway	2	North of Santa Ana Boulevard	2,000	22,600
Villanova Road	County	Minor	2	East of SR 33 (Ventura Avenue)	170	1,800
Highway 150 (Ojai Av.)	Caltrans	Highway	2	East of SR 33	2,200	23,400
Highway 150 (Baldwin Rd.)	Caltrans	Highway	2	West of SR 33	930	10,300
SR 33 (Maricopa Hwy.)	Caltrans	Highway	2	North of Highway 150 (Ojai Avenue)	1,300	12,100
El Roblar Drive	County	Collector	2	West of SR 33 (Maricopa Highway)	770	8,400
SR 33 (Maricopa Hwy.)	Caltrans	Highway	2	North of El Roblar Drive	450	2,950
	Caltrans	Highway	2	North of Fairview Avenue	330	2,000
	Caltrans	Highway	2	South of Matilija Hot Springs Road	270	1,350
Matilija Hot Springs Road	County	Local	2	West of SR 33 (Maricopa Highway)	10	200
SR 33 (Maricopa Hwy.)	Caltrans	Highway	2	North of Matilija Hot Springs Road	160	720
	Caltrans	Highway	2	North of Wheeler Hot Springs	160	700

Notes: SR = SR; NA = Data Not Available.
Sources: Caltrans, 2002; Ventura County, 2004.

In addition, the Ojai City Trolley provides service between Meiners Oaks and Ojai. The trolley utilizes portions of SRs 33 and 150, county roads (e.g., El Roblar, Lomita Avenue, and Rice Road), and some local city roads.

4.9.1.3 Existing Rail Facilities

Southern Pacific Transportation Company provides intrastate and transcontinental freight rail service to Ventura County. The Southern Pacific Transportation main coast line runs from the Santa Barbara County line along the coast, south through Ventura to Oxnard and then east through Camarillo, Moorpark, and Simi Valley to the Los Angeles County line. The tracks cross the Ventura River on a rail and pedestrian trestle less than one-quarter mile north of the ocean and approximately 15 miles south of Matilija Dam.

Passenger rail service is available on Amtrak. Amtrak uses Southern Pacific's main coast line stopping at Oxnard and Simi Valley stations daily, with one run that heads north and the other that heads south (Ventura County, 1998).

4.9.1.4 Airport Facilities

There are two County owned and operated public airports in Ventura County, which are located at Oxnard (approximately 21 miles south-southeast of Matilija Dam) and Camarillo (approximately 23 miles southeast). A private airport exists in Santa Paula (approximately 18 miles east-southeast of Matilija Dam), and there are a few privately owned landing strips scattered throughout the County (Ventura County, 1998).

4.9.1.5 Harbors

There are three harbors in Ventura County: Ventura, Channel Islands, and Port Hueneme. Ventura and Channel Islands harbors provide facilities for recreational boating and commercial fishing and are approximately 18 and 26 miles south-southeast of Matilija Dam, respectively. The Port of Hueneme is approximately 27 miles south-southeast of Matilija Dam. Serving as California's only deepwater port between Los Angeles and San Francisco, the Port of Hueneme's influence extends far into the southwestern United States and Western Canada. The Oxnard Harbor District, which has jurisdiction over approximately 70 acres of onshore area and 10 acres of waterway, administers the Port; the remainder of the harbor is under U.S. Navy jurisdiction (Ventura County, 1998).

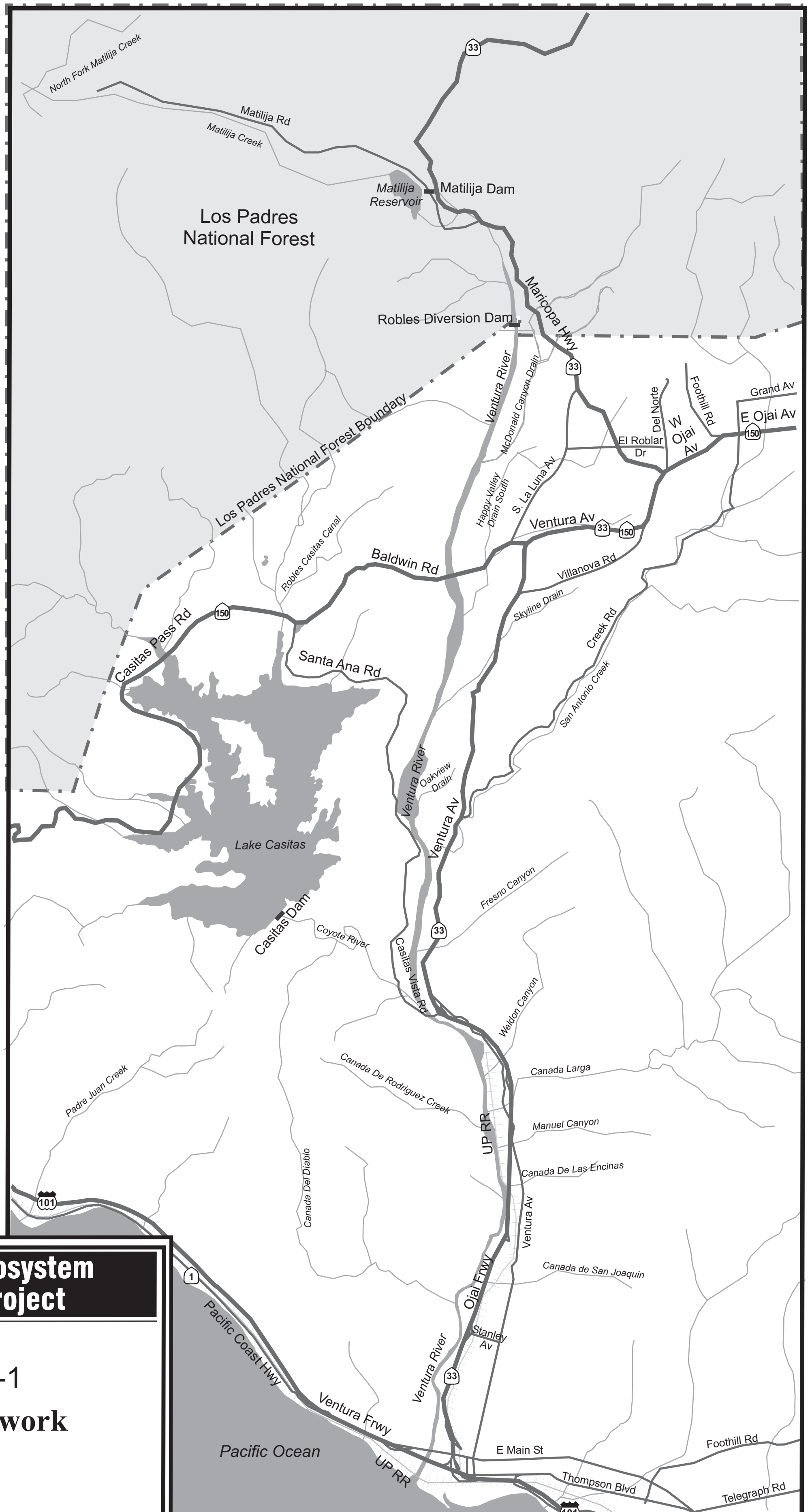
4.9.2 Applicable Plans, Policies, and Regulations

Construction activities associated with the removal of Matilija Dam could potentially affect roadway traffic flow on public streets, highways, and freeways. Therefore, it would be necessary to obtain encroachment permits or similar legal agreements from the public agencies (i.e., Caltrans and Ventura County) responsible for each affected roadway. Such permits would be needed for roads that would be utilized for hauling illegal loads, as defined by each of the jurisdictions.

Caltrans and the County would also require transportation management plans for each location where a State or County roadway would be directly affected by construction activities, and such plans would be subject to approval by the responsible jurisdictions. These transportation management plans would be required to incorporate the standards and techniques presented in such references as the Caltrans Traffic Manual, Chapter 5, "Manual of Traffic Controls for Construction and Maintenance Work Zones," the Work Area Traffic Control Handbook, the Standard Specifications for Public Works Construction, and/or the Manual on Uniform Traffic Control Devices, Part VI, "Traffic Controls for Street and Highway Construction, Maintenance, Utility and Emergency Operations," (U.S. Department of Transportation, Federal Highway Administration). The transportation plans would include traffic control measures and other procedures that may be necessary during construction projects.

In addition, Ventura County requires that a detailed traffic study be performed by a registered civil engineer (or registered traffic engineer) who is qualified to perform traffic engineering studies and is familiar with Ventura County for all of the following types of proposed projects:

- Any project located in the Ojai area that impacts SR 33
- Any project estimated to generate ten or more peak hour trips or if the project would cause peak hour impacts to County roads and intersections operating at or below LOS D.
- Any project that would require safety considerations on County roads.



Matilija Dam Ecosystem Restoration Project

Figure 4.9-1

Roadway Network

4.10 LAND USE

4.10.1 Current Land Use Patterns

This section examines the land use patterns and policies in the project area, which includes the Cities of Ojai and San Buenaventura (Ventura); unincorporated communities including Oak View, Matilija Canyon, Live Oak Acres, Meiners Oaks, and Casitas Springs; upstream of the Matilija Dam in the Los Padres National Forest; the Ventura River floodplain; and the Ventura River Estuary. The entirety of the project is within Ventura County, California.

For incorporated cities, land use and land development is controlled by the policies of each city's General Plan and the regulations set forth in each city's zoning ordinance. The County's General Plan and zoning ordinance control land use and development in unincorporated areas. Use of land within the boundaries of the Los Padres National Forest is controlled by the USDA Forest Service.

While the Ventura River, Matilija Dam, and Matilija Creek are all designated Open Space or Floodplain under different applicable General Plans, the land use designations for adjacent lands vary widely, ranging from rural to residential to industrial. Existing development patterns generally coincide with the land use designations in the General Plans. This section examines both existing land use patterns and current General Plan land use designations for each reach as shown in Figure 1-2. Figure 4.10-1 (at the end of this section) illustrates the planning boundaries for the land use plans analyzed in this section.

4.10.1.1 Reach 1: Ventura River Estuary

Reach 1 extends from the coast upstream to the Main Street Bridge and consists primarily of the Ventura River Estuary. The Ventura River Estuary is located within the County's Coastal Area Plan, which has been adopted as part of the County General Plan. Land use to the east, within the boundaries of the City of San Buenaventura, is guided by the Ventura General Plan. Under the Coastal Area Plan, the estuary beach is designated for Recreation. Upstream and to the north and west is designated Open Space (County of Ventura, 1980). The City of San Buenaventura General Plan designates the estuary and beach as Park and the area adjacent to the northeast as Downtown Specific Plan (City of San Buenaventura, 1989). The beach to the west of the river is zoned Park, with portions covered by a Sensitive Habitat overlay zone.

The Ventura Main Street on-ramp/off-ramp bridge to U.S. 101 and a railroad bridge, each running east-west, roughly trisect the estuary from north to south. The beach at the mouth of the Ventura River extends to the east of the estuary as a City of San Buenaventura public park. To the north and west, the beach is included in Emma Wood State Park. The Ventura County Fairgrounds and Ventura Raceway Seaside Park are located in the Downtown Specific Plan area adjacent to the estuary to the east and adjacent to the public beach to the north.

4.10.1.2 Reach 2a: Ventura

Reach 2a extends from the Main Street Bridge upstream to the Shell Road Bridge. Upstream of the estuary, the Ventura River crosses through the western edge of the City of San Buenaventura for another 0.5 mile before leaving the city limits, then forming the western boundary of the city for another mile. Taylor Ranch, on the western side of the Ventura River, is designated by the City and Coastal Area Plan as Agriculture and beyond the city limits, by the County, as Open Space (City of San Buenaventura, 1989; County of Ventura, 1980; County of Ventura, 1988). While the majority of Taylor Ranch is undeveloped open space, the northern third of the property is cut with a winding network of access roads to numerous wells for oil extraction.

A levee runs along the west side of State Route (SR) 33, running parallel to the eastern edge of the Ventura River. Land in the southeastern portion of the Reach is designated by the City as Downtown Specific Plan. From south to north, land use designations north of the Downtown Specific Plan passes from park to transitional residential to industrial and planned mixed development before shifting to open space (City of San Buenaventura, 1989).

Mobile homes and scattered single-family homes comprise the transitional residential neighborhoods and are located adjacent to industrial areas on the east side of the river. Oil wells, fields, and auxiliary oil extraction industries spread east to the base of the foothills, intermingled with degraded open space.

A 70.5-acre portion of the agricultural parcel to the northwest of the estuary, in Taylor Ranch, is designated by the Department of Conservation as Prime Farmland (California Department of Conservation, 2002). Prime Farmland is land that has soils that meet physical and chemical quality criteria set by the USDA Natural Resources Conservation Service (NRCS).

4.10.1.3 Reach 2b: North Ventura Avenue

From the Shell Road Bridge, Reach 2b extends north upstream to the Casitas Vista Road Bridge. County designated Open Space continues along the western edge of the river, climbing into chaparral covered hillsides dotted with oil wells on terraces cut into the hillsides (County of Ventura, 1988).

The North Ventura Avenue Plan designates the land immediately east of the river as Floodplain and is designated by the County as Open Space. A strip of Industrial-designated land runs between the Floodplain area and SR 33 to the east. Industrial land uses dominate the southern portion of the reach on the east side of SR 33, but land use in the northeastern section of the reach includes Single-Family Residential and Open Space, punctuated with small areas of Commercial (County of Ventura, 1984).

Oil fields and petroleum industries dominate the plain between the floodplain and highway, most notably including the USA Petrochem refinery. On the east side of the highway, a large medium-density tract housing neighborhood of approximately 100 two-story, single-family homes is separated by a wall from adjacent industrial and low-density residential neighborhoods.

The Department of Conservation Farmland Mapping and Monitoring Program shows a 16.1-acre parcel of Unique Farmland at the north end of the Reach on the east side of the Ventura River while a 118.7-acre parcel of Unique Farmland is located approximately one-half mile downstream on the west side of the river. A 46.1-acre parcel of Prime Farmland is also located approximately one-quarter mile south of the 118.7-acre parcel (California Department of Conservation, 2002).

4.10.1.4 Reach 3: Casitas Springs

Reach 3 runs from Casitas Vista Road Bridge in the south to the intersection of Sulphur Mountain Road and SR 33 in the north and consists primarily of the community of Casitas Springs and agricultural land. Land uses in this reach are guided by the Ojai Valley Area Plan and are designated on both sides of the river as Open Space and Existing Community. The Plan recognizes the communities of Casitas Vista on the west side of the river at the southern end of the reach and Casitas Springs on the east side of the river at the northern end of the reach (County of Ventura, 1995).

At the southern end of the reach, Foster Park, a public recreation facility on the river, is located on the east side of the river off of SR 33. A steep slope rises up from the Ventura River to the west, up to Santa Ana Road which roughly follows the west bank of the river, and continues sloping upward as wooded hillside. On the east side of the river, Casitas Springs spans both sides of SR 33 and consists largely of a community of single-family dwellings spaced along the highway and its intersecting roads.

The river floodplain extends northward with steep-sided terraces on both sides, forming the river valley. The west side of the valley exhibits a steeper slope down to the river below, with Santa Ana Road climbing nearly 100 feet above the river surface. The east valley slope climbs more gradually up terraces used for agriculture and dotted with farmhouses, neighborhoods of rural ranchette-style homes, and a small mobile home park.

4.10.1.5 Reach 4: Oak View

Reach 4 extends from the Sulphur Mountain Road/SR 33 intersection in the south to the Highway 150 bridge in the north. The community of Oak View, designated as Urban Reserve by the Ojai Valley Area Plan, dominates this reach with a rural character. Open Space and Rural Residential land use designations comprise large parcels in the southern portion of the reach on the west side and in the northern portion of the reach on the east side (County of Ventura, 1995).

Sparse rural residential development on the rising east valley slope changes from south to north into regularly spaced, low-density single-family homes, while on the other side of the river, agricultural fields with farmhouses and storage structures spread across wide alluvial terraces. Santa Ana Boulevard crosses the river in an east-west direction and connects Oak View to Live Oak Acres, an area of low-density residential development on the western side of the river. Neighborhoods on the western side of the river consist of ranchette-style housing on large, open parcels. In the northeastern portion of the reach, neighborhoods return back to light, rural residential.

On the west side of the river, a 17.5-acre parcel of Prime Farmland is located at the northern end of the reach. Two parcels of Prime Farmland, 26 acres and 23 acres each, are located at the southern end of the reach on the west side of the river across from Oak View. An 18.2-acre parcel of Prime Farmland is located south of Oak View on the east side of the river (California Department of Conservation, 2002).

4.10.1.6 Reach 5: Ojai Valley

Reach 5 is bound by the Highway 150 bridge in the south and the Robles Diversion in the north. North of Highway 150 crossing the Ventura River, land adjacent to the river to the west is designated by the Ojai Valley Area Plan as Rural Neighborhood and by the County as Open Space (County of Ventura, 1988; County of Ventura, 1995). To the east, the Ojai Valley Area Plan has designated the area as Existing Community in the southern portion of the reach and Rural Residential in the north. The Existing Community designation under the Ojai Valley Area Plan is area within the City of Ojai and included in the Ojai General Plan as Open Space/Resources and Very Low Residential (County of Ventura, 1995; City of Ojai, 1997). An area designated by the Ojai General Plan as Institutional Recreational (IR) extends approximately two miles west from Ojai towards the Ventura River. Typical uses for the Institutional Recreational designation include public and private educational facilities, churches, golf courses, cultural and social service facilities, and hotels, but the IR area closest to the river corridor has not been developed (City of Ojai, 1997).

The river basin here is wide and flat, rising slowly to the west and east up a series of alluvial terraces. Land uses on the west side of the river consist of sparse development set back from the river by a region of scrub and woods. A former landfill site and wood recycling facility are located just north of Highway 150 on the east side of the river. North of the wood recycling facility, a rural residential area acts as buffer to low- and medium-density residential development alongside the floodplain. An open space park is located adjacent to the residential area to the north. Agricultural fields, primarily citrus orchards, grow on alluvial terraces and slopes on both sides of the river north of the residential area and park, west of Ojai and extending up to the Robles Diversion.

The Department of Conservation Farmland Mapping and Monitoring Program shows that a 65.6-acre parcel of Unique Farmland and a 124.9-parcel of Prime Farmland are located on the west side of the Ventura River in this reach, while located on the east bank of the river are a 41.2-acre parcel of Unique Farmland and three parcels of Prime Farmland ranging from 14.4 acres to 81.1 acres (California Department of Conservation, 2002).

4.10.1.7 Reach 6: Upper Ventura River

From the Robles Diversion, Reach 6 extends north and west to Matilija Dam. The reach of the Upper Ventura River north of the Robles Diversion is designated as Open Space by the Ventura County General Plan and the Ojai Valley Area Plan (County of Ventura, 1988; County of Ventura, 1995). The southern edge of the reach remains within the Ojai Valley Area Plan, but the rest of the reach is contained within the Los Padres National Forest Management Area 37a. The Forest Plan for Management Area 37a has no particular land use designation for the area, but has a management emphasis on visual resources. Agricultural uses may be accommodated under the Forest Plan when evaluation shows they are in the public interest and support the management area's emphasis (LPNF, 1988).

The west side of the valley slopes up in a series of gradual terraces, used for small citrus orchards, vineyards, and other agricultural uses. Hillsides vegetated with woods and chaparral rise up behind the agricultural regions to the east and south. While the slope on the east side of the river valley is steeper than the west, similar agricultural uses have been developed on the terraces and hillside between the perennial river basin and SR 33. Rocky scrub extends east and north above SR 33, closing in on both sides and becoming increasingly wooded as the highway approaches Matilija Dam. Sparse rural residential single-family dwellings are spaced along both sides of SR 33 as it runs roughly parallel and to the east of the river.

4.10.1.8 Reach 7a: Matilija Dam and Lake Influenced Matilija Creek

Reach 7a consists of the Matilija Reservoir and lake-influenced Matilija Creek, extending west from Matilija Dam upstream to the Matilija Canyon community. The Ventura County General Plan designates the Matilija Dam area and upstream into Matilija Creek as Open Space (County of Ventura, 1988). The area is under the Los Padres National Forest Management Area 28 and has no particular land use designation for the area, but has a management emphasis on non-motorized general forest recreation, water yield enhancement, and wildlife (LPNF, 1988).

Matilija Road extends west from SR 33, running north of the Matilija Dam, Reservoir, and Creek. The Matilija Dam is a prominent feature in the reach and extends 620 feet in width, 165 feet in height (after incremental dam removal), and 198 feet on the sides. A few small auxiliary structures remain in the water management area on the downstream side of the dam. Behind the dam, most of the reservoir has been filled by sediment to form a flattened plain vegetated with willow woodlands and riparian scrub. Steep sides bound the remaining open water in the reservoir to the north and south and marshy wetlands rises from the water to the west. Small numbers of single-family dwellings cluster together along Matilija Road in pockets, forming loose neighborhoods along the wooded sections of road. The Matilija Environmental Science Area, an outdoor environmental education facility sponsored by the Matilija Environmental Science Area Society and the Ventura County Superintendent of Schools office, extends south from Matilija Road through thick woods towards Matilija Creek. The Matilija Canyon community is located at the west end of this reach along Matilija Road adjacent to the Los Padres National Forest wilderness area.

4.10.1.9 Reach 7b: Matilija Creek and Watershed

Reach 7b extends above the lake influence of the Matilija Reservoir and upstream to the boundary of the Los Padres National Forest Wildlife area. The Matilija Creek above the lake influence of the dam is designated by the Ventura County Plan as Open Space (County of Ventura, 1988). As with Reach 7a, the eastern half of Reach 7b continues to be in Los Padres National Forest Management Area 28. The western half of Reach 7b, however, extends into Los Padres National Forest Management Area 64. Management Area 64 is a designated wilderness area and has a management emphasis on wilderness preservation and management (LPNF, 1988).

The portion of the reach within the Los Padres National Forest Management Area 64 is wilderness area with recreational hiking trails in the southern portion of the Matilija Creek watershed. Matilija Creek extends north upstream into the Los Padres National Forest Condor Sanctuary, which is closed to the public.

4.10.2 Planned Uses

The County of Ventura Planning Division, City of San Buenaventura Planning Division, and City of Ojai Planning Department reported no plans or permits applied for projects or development along the Ventura River corridor (Vogelbaum, 2002). The City of Ojai has plans for condominiums and affordable housing well within the city limits, but the Planning Department reported no projects on the west side of the city, which would be within the study area (Seltzer, 2002). The City of San Buenaventura Planning Division reported that there is no planned projects or developments along the Ventura River of which they had knowledge (Alvarado, 2002).

4.10.3 Applicable Plans, Policies, and Regulations

The majority of the length of the study area traverses unincorporated Ventura County and as such, land use and development in these areas are governed by the Ventura County General Plan and its associated area plans. The study area also includes western portions of the Cities of Ojai and Ventura, which have their own City General Plans. Finally, land use in the study area upstream of the Matilija Dam is largely within National Forest boundaries and under the auspices of the Los Padres National Forest Land and Resource Management Plan.

4.10.3.1 Ventura County General Plan

The Ventura County General Plan was adopted by the Ventura County Board of Supervisors in 1988 and has been amended up to September 2000. Under California State planning law, each incorporated City and County must adopt a comprehensive, long-term General Plan that governs the physical development of all lands under its jurisdiction (Government Code § 65301). The general plan is a broadly scoped planning document and defines large-scale planned development patterns over a relatively long timeframe.

The General Plan consists of a statement of development policies and must include a diagram and text setting forth the objectives, principles, standards, and proposals of the document. At a minimum, a General Plan has seven mandatory elements including Land Use; Circulation; Housing; Conservation; Open Space; Noise; and Safety.

Land Use goals described in the General Plan emphasize developing the county in a reasonable, well-organized manner, utilizing planning in city boundaries and spheres of influence to control urban sprawl and over-expansion (see Table 4.10-1).

The Land Use Appendix of the General Plan designates the unincorporated Ventura River Valley as a Growth Area in which development has or is expected to occur and has been identified by the Local Area Formation Commission (LAFCO) as an area of interest (County of Ventura, 1988).

County Area Plans such as the Ojai Valley, North Ventura Avenue, and Coastal Area Plans specify plans for geographic sub-areas within Ventura County and may be adopted as part of the County General Plan. Area Plans are to be consistent with the General Land Use Map, but may be more specific (see Table 4.10-2).

Table 4.10-1: Applicable Ventura County General Plan Land Use Designations Along the Ventura River

Applicable General Plan Land Use Designations
Existing Community – Identifies existing urban residential, commercial, or industrial uses outside Urban designated areas. Established to recognize existing uses in unincorporated areas developed with urban building intensities and urban land uses.
Existing Community Urban Reserve – Identifies Existing Community land use designations within a city's adopted sphere of influence.
Open Space – Encompasses unimproved lands dedicated to the preservation of natural resource, managed production of resources, outdoor recreation, and/or management of public health and safety.
Open Space Urban Reserve – Identifies Open Space land uses designations within a city's adopted sphere of influence.
Rural – Describes areas suitable for low-density or low-intensity land uses such as residential estates on two or more acres, uses in conjunction with horticultural or agricultural uses, and/or the keeping of farm animals for recreation.
Urban – Utilized to depict existing and planned urban centers and applied to all incorporated lands within a city's adopted sphere of influence.

Table 4.10-2: Applicable Ventura County Area Plans and their Applicable Land Use Designations Within the Study Area

Coastal Area Plan
Agricultural – Identifies and preserves agricultural land for the cultivation of plant crops and the raising of animals. Lands in this designation include existing agricultural land, existing agricultural preserves, and land with prime soils.
Open Space – Identifies land for preservation and enhancement of valuable natural and environmental resources while allowing reasonable and compatible uses of the land. The designation also includes hazardous areas such as flood plains, fire prone areas, or landslide prone areas.
Recreation – Recognizes facilities within the Coastal Zone which provide recreational opportunities or access to the shoreline. Structures or facilities are limited to those necessary to support the recreational uses.
North Ventura Avenue Plan
Agriculture – Identifies lands designated for agricultural use based on the City of San Buenaventura's Open Space Element and the Important Farmlands Inventory Map.
General Commercial – Designates lands intended for the development and continuation of commercial services for the residential neighborhoods and support commercial uses for industrial areas.
Floodplain – Recognizes lands adjacent to the Ventura River inappropriate for urban uses as they are designated as 100-year floodplains by the Flood Insurance Rate maps prepared for the United States Department of Housing and Urban Development. Underlying land use designations outside the floodway but within the 100-year floodplain are "Industrial."
Industrial – Identifies current industrial land uses consistent with the County and City's manufacturing zoning. Impacts of new or expanded industrial uses shall be evaluated on a case-by-case basis.
Residential, Single- and Multiple-Family – Recognizes existing residential development and the encouraged upkeep and maintenance of single-family residential neighborhoods. Two existing mobile home parks currently comprise the multiple-family residential areas, one which is to be designated as industrial after the park ceases to exist, and one which shall remain in multiple-family residential use if the existing park ceases to exist.
Ojai Valley Area Plan
Commercial – Designates commercial property to meet the shopping and service needs of Ojai Valley residents, minimize land use incompatibility with other designations, and discourages the expansion of strip commercial development.
Industrial – Recognizes current industrial uses, locates and designs industrial land uses to minimize incompatibilities and aesthetic impacts, and provide for uses that are sensitive to the environment.
Open Space – Designates undeveloped lands to be preserved to retain the existing natural, scenic, and agricultural resources of the area; and prevent development from occurring in areas where public facilities and services would be exceeded.
Rural Residential – Recognize and plan for low-density, large lot residential development, provide for compatible rural uses, and provide a transitional land use to buffer agricultural and open space lands from more developed land uses.
Urban Residential – Promotes the development of existing and future residential land uses that result in cohesive and consolidated neighborhoods, provide a diversity of adequate housing opportunities and housing types for people of all income levels.

The Coastal Area Plan serves as a Ventura County land use plan, as well as the Local Coastal Program (LCP) for unincorporated coastal areas within the County. The Plan was adopted by the Ventura County Board of Supervisors in 1980 and has been amended by the County through December 1996. The Plan was certified in 1982 by the California Coastal Commission and has since been certified through 1997. As the LCP for unincorporated Ventura County, the plan implements the California Coastal Act of 1976 and calls for the protection, maintenance, and where feasible, enhancement and restoration of the quality of the coastal zone environment. In particular, the Plan recognizes the protection of intertidal and nearshore habitats from development and the vulnerability of beaches to erosion and wave damage through sand transport. The Plan also recognizes agricultural land along the coast, including the Taylor Ranch Reserve, within Reach 1 and 2a of the study area (County of Ventura, 1980).

The North Ventura Avenue Plan is a joint County of Ventura Area Plan and a City of San Buenaventura Comprehensive Plan Amendment for the North Ventura Avenue area that was adopted by the City and County in 1984 and was last amended in December 1990. The plan was prepared with the intent to eventually annex the region, but that until annexation, development would occur slowly under the County's jurisdiction, recognizing the difficulties of integrating the current area industries into the City (County of Ventura, 1984).

The Ojai Valley Area Plan was originally a part of the Ventura County General Plan Land Use Element and was adopted by the County in 1963. Concerns over the cumulative impacts of development in the Ojai Valley on air quality, traffic, and water supply prompted the County Board of Supervisors to prepare a report on the status of services and quality of the environment in the Valley in 1977. This effort combined with work on a separate Ojai Valley Area Plan, which was adopted in August 1979. A revised version of the plan was adopted in 1995 and most recently amended in July 1999. The goal of the area plan was to maintain quality of life for Ojai Valley residents by protecting and maintaining a healthful and attractive environment while ensuring that growth and development are consistent with existing valley resources. The plan puts great emphasis on maintaining the rural, small town character of the area (County of Ventura, 1995).

4.10.3.2 City of San Buenaventura Comprehensive Plan Update to the Year 2010

The Comprehensive Plan Update to the Year 2010 for the City of San Buenaventura (Ventura) was adopted by the City Council in August 1989 and most recently amended in 1998. The Comprehensive Plan contains the seven State-mandated elements: Open Space, Land Use, Conservation, Circulation, Housing, Safety, and Noise. The Open Space and Conservation elements are combined into one element in the Comprehensive Plan in the form of the City's Resources Element, and the Land Use Element of the Comprehensive Plan incorporates the Coastal Commission certified Local Coastal Program. The Plan also includes Parks and Recreation, Economic Development, and Community Design elements. The goals and policies of the Comprehensive Plan emphasize maintaining Ventura as an attractive location for tourism with a low physical profile, low development density, and regard for the City's coastal resources.

The Comprehensive Plan does not include a land use designation for the Ventura River floodway, but designated land uses adjacent to the floodway include: Parks, Agricultural, Transitional Residential, Industrial, Commercial, Single-Family Residential, and Multiple-Family Residential (City of San Buenaventura, 1989).

The Downtown Specific Plan is an amendment to the Ventura Comprehensive Plan adopted in 1993 aimed at revitalizing downtown Ventura. Among the areas of emphasis is the improvement of the shoreline area adjacent to the study area. The Plan proposes upgrading the Ventura County Fairgrounds facilities at Seaside Park or moving it to a new site and replacing it with a conference center/resort, a cultural/performance center, high-end housing, a regional park, or a multi-modal transportation station. The plan states that regardless of the fate of the Fairgrounds, plans for the area should include protection of the beach and dunes and incorporation of ecologically oriented facilities such as a botanic garden or environmental education center (City of San Buenaventura, 2000).

4.10.3.3 City of Ojai General Plan Land Use and Circulation Element

The City of Ojai's General Plan includes the seven State-mandated elements: Open Space, Land Use, Conservation, Circulation, Housing, Safety, and Noise. In addition, the Plan includes a Recreation element. Each element is a separate document and the City adopted each at different times. The Ojai City Council adopted the City of Ojai General Plan Land Use and Circulation Element in May 1997. The Land Use Element is structured around a general theme of maintaining a small town atmosphere through limits on growth and development.

Ojai city limits follow the Ventura River for a distance less than one mile on the northwestern-most edge of the city boundary. Land uses designated by the Land Use Element along the western boundary of Ojai near the Ventura River include Open Space/Resources; Very Low Density Residential; and Institutional, Recreational (City of Ojai, 1997)

4.10.3.4 Los Padres National Forest Land and Resource Management Plan (Forest Plan)

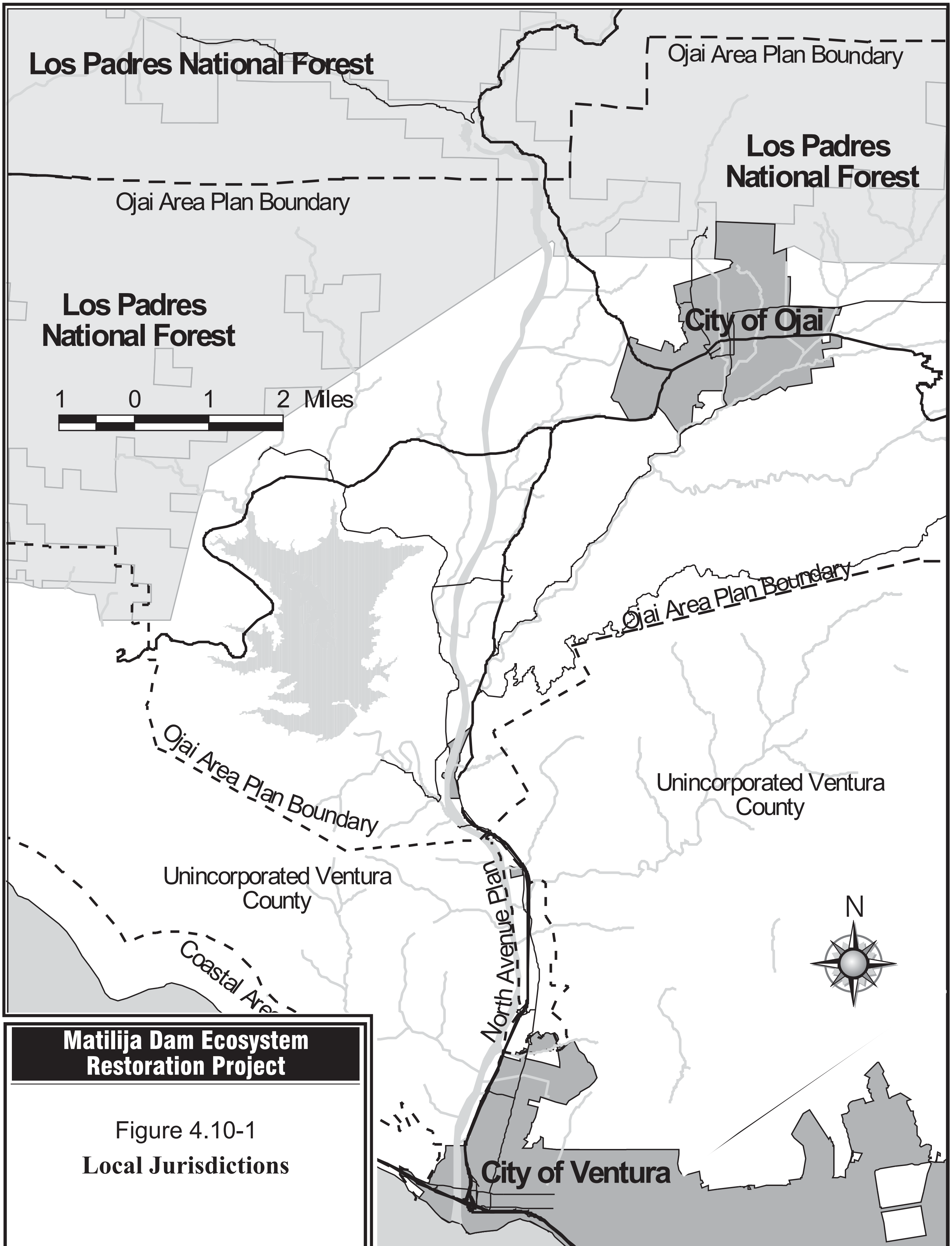
The Matilija watershed and parts of Matilija Creek are contained within Management Area 64 of the Los Padres National Forest. Management Area 28 contains the remainder of Matilija Creek and Matilija Dam. The confluence of Matilija Creek and North Fork are within Management Area 37a. The Land and Resource Management Plan (Forest Plan) serves as the overall plan for Los Padres National Forest and replaces all previous land and resource management plans for the area. The Forest Plan is ordinarily revised on a 10-year cycle and is currently under review for revision.

The Forest Plan recognizes that approximately 10.7 percent of lands within Los Padres are privately, State, County, or municipally owned, and cites the Ojai region as an area with considerable private land holdings. Special use permits and easements authorize private uses subject to administrative and legal considerations. Memorandums of Understanding (MOUs) control use of forest land by public agencies. Consideration is given for special uses in the public interest and compatible with Forest resource plans.

Forest lands unavailable for special uses, however, include areas designated Wilderness, Wildlife Critical Habitat and Sanctuaries, and Recreation and Administrative Sites. Transportation and utility corridors may be established, if in the public interest, though utilization of existing right-of-ways is preferable to creating new right-of-way designations where suitable.

Management Area 64 is managed to preserve wilderness values and provide for activities authorized in the Wilderness Act of 1964, with protection focused on critical areas. The Forest Plan provides management guidelines for Area 64 calling for the removal of existing improvements not essential to management of the Wilderness as soon as reasonable and practicable. The Management Area containing the Matilija watershed is designated by the Forest Plan as Wilderness Area and includes Condor Sanctuary areas. Management Area 28 is managed for non-motor general forest recreation, water yield enhancement, and wildlife. Management Area 37a has a management emphasis on visual resources (LPNF, 1988).

A 1993 amendment to the Forest Plan created Management Area 71, which identifies study rivers for eligibility and suitability for wild and scenic status (Dahl, 1993). The Matilija Creek is identified to be studied for eligibility prior to the Forest Plan revision as a Congressionally designated study river. Under the Wild and Scenic Rivers Act Section 9(b), the Congressional designation withdraws the river from all forms of appropriation under mining laws (Dahl, 1996).



Matilija Dam Ecosystem Restoration Project

Figure 4.10-1
Local Jurisdictions

4.11 RECREATION

This section presents information on recreational facilities, activities and opportunities within the project study area, which ranges from the coastal regions near the Ventura River Estuary to the Matilija Canyon. The study area traverses the County of Ventura, City of San Buenaventura, City of Ojai, and Los Padres National Forest (LPNF). Nearby Lake Casitas, which provides a variety of water-related recreational opportunities, is not included in the study because it is geographically separated from the Ventura River and Matilija Canyon, and recreational opportunities at Lake Casitas are not expected to be affected by the Proposed Action.

Section 4.11.1 describes the recreational facilities that are provided by public agencies in the study area, with Figures 4.11-1a through 4.11-1c illustrating most of the facility locations (note: figures are at the end of this section). Section 4.11.2 reviews the most common types of recreation activities in the study area, and gives a general description of where they typically occur. Section 4.11.3 presents policies and regulations related to recreation.

4.11.1 Recreational Facilities

Six public agencies and a non-profit community group maintain recreational facilities in the study area, including the U.S. Department of Agriculture - National Forest Service (USFS), California Department of Parks and Recreation (California State Parks), California Department of Agriculture, County of Ventura, City of San Buenaventura, City of Ojai, and the Ojai Valley Land Conservancy. A description of the recreational facilities maintained by each public agency is given below.

4.11.1.1 U.S. Department of Agriculture - National Forest Service (Los Padres National Forest)

Matilija Creek originates in Los Padres National Forest, Ojai Ranger District (LPNF-ORD) in the Matilija Wilderness area. Running southward it exits the forest approximately seven miles north of the Matilija Dam. As shown in Figure 1-1, the LPNF-ORD and the Matilija Wilderness surround Matilija Creek and the Matilija Dam, although most of the creek and the dam itself are not in USFS lands.

The LPNF-ORD consists of 311,294 acres, located in the northern half of Ventura County. Elevations range from a low of 240 feet at Rincon Creek to the high point of 7,570 feet on Reyes Peak (LPNF, 2002). The LPNF-ORD offers over 211 miles of trails with opportunities for day hiking, horseback riding, mountain bicycling, fishing, rock climbing, backpacking, camping, hunting, and nature-viewing. The Matilija Wilderness Area was designated by Congress in 1992, and includes the canyons of Matilija Creek, as well as its North Fork, for a total of 29,600 acres. The Matilija Wilderness Area is steep and brushy, overgrown with alder and maple in the canyons with a few stands of conifers in the higher country. Black bears, deer, coyotes, bobcats, mountain lions, rattlesnakes, hawks, eagles, and California condors may be spotted, among other wildlife. Sixteen miles of Matilija Creek have been nominated for Wild and Scenic River designation.

The most recent recreation capacity and use numbers for the LPNF are provided by the Environmental Impact Statement for the LPNF Land and Resource Management Plan, which was finalized in 1988 (LPNF, 1988). The recreational capacity and use figures are based on the LPNF Recreation

Opportunity Spectrum (ROS) for the entire forest. Two types of recreation are analyzed—developed recreation and general forest recreation. Developed recreation comprises 30 percent of recreation use in LPNF, which includes facilities constructed and operated by the LPNF, such as campgrounds, picnic grounds and observation sites (LPNF, 1988). General forest recreation represents 70 percent of the recreation in LPNF, which includes undeveloped areas, roads, and trails. Table 4.11-1 shows the developed recreation and general recreation capacities and projected uses for 1990-2030. No current figures are available for recreational use, although LPNF is in the process of revising their Land and Resource Management Plan (Robertson, 2002).

Table 4.11-1: Developed and General Recreation Capacity and Projected Use: 1990 – 2030

ROS Class	Estimated Capacity (MRVDs)*	1982	Projected Demand (MRVDs)*				
			1990	2000	2010	2020	2030
Developed Recreation							
Primitive	0	0	0	0	0	0	0
Semi-Primitive Non Motorized	7	1	2	2	2	2	3
Semi-Primitive Motorized	23	9	11	12	14	16	17
Roaded Natural	1630	902	1153	1300	1464	1632	1746
Rural	768	414	527	595	670	747	799
Total	2428	1326	1693	1919	2150	2396	2565
General Forest Recreation (Non-Highway)							
Primitive	251	N/A	149	170	193	215	234
Semi-Primitive Non Motorized	512	N/A	282	320	370	431	668
Semi-Primitive Motorized	659	N/A	336	386	458	533	604
Roaded Natural	2305	N/A	791	894	1059	1230	1390
Rural	210	N/A	115	134	158	184	209
Total	3936	N/A	1673	1904	2244	2593	2915

Source: LPNF, 1988. Los Padres National Forest Land and Resource Management Plan
* MRVD represents one thousand Recreation Visitor Days (RVDs)
N/A – Not Available

Much of LPNF-ORD that surrounds the upper study area is in Management Area 28, as specified by the Land and Resource Management Plan (LPNF, 1988). Management Area 28 has a management emphasis on *Non-motorized General Forest Recreation, Water Yield Enhancement and Wildlife*. General forest recreation management guidelines include:

- Maintain and improve developed recreation sites
- Permit general forest camping when not in conflict with acceptable resource protection
- Maintain existing trail system, trailhead facilities and staging areas
- Utilize opportunities to provide low-density off-road vehicle use so that it does not conflict with other emphasized uses.

The following describes the allowable recreational uses in the LPNF-ORD. The location of each recreational activity is shown on Figures 4.11-1a through 4.11-1c.

Hiking. Hiking on designated trails is the most common form of recreational use in the LPNF-ORD. LPNF actively manages several trails that traverse the study area, which are described in Table 4.11-2.

Table 4.11-2: Trails Around Matilija Dam Within Los Padres National Forest*

Designated Trail**	Length	Start Location	Description of Trailhead Location and Route
Gridley Trail (4)	5.8 Miles	0.2 miles east of Ojai Ranger Station on Highway 150	This trail starts at the north end of Gridley Road and ends on top of Nordhoff Ridge. **Gridley Springs Camp**, at 2.7 miles, is the only camp along the trail. It has a water trough for horses. This is the most popular hike from Ojai to Nordhoff ridge
Matilija Canyon Trail (1)	8.9 Miles	In Matilija Wilderness Area. North of Ojai 5 miles on SR 33, left on Matilija Road.	Drive to a locked gate with parking adjacent. Hike beyond the gate on a dirt road. After the second stream crossing, the trail goes off to your right, entering the wilderness and follows the year-round creek. **Matilija Camp** is 1.3 miles from the gate, **Middle Matilija** another 2.7 miles, and **Maple Camp** is an additional 3.3 miles further. The trail ends 1.6 miles further where it connects with a dirt road that leads 2.9 miles down Cherry Canyon to SR 33.
Murrieta Trail (2)	2.1 Miles (along easier route)	North of Ojai 5 miles on SR 33 and turn left on Matilija Road.	Drive up Matilija Road to a locked gate with parking adjacent. Hike on road 0.6 miles through private property. About 200 yards past the second stream crossing, the trail will be on your left. It will take you to **Murrieta Camp** after 0.85 miles. The trail continues another 0.7 miles to its intersection with Murrieta Road. If you follow Murrieta Road instead of the trail, you will reach Murrieta Divide after 4.4 miles, with steep sections toward the end.
Wheeler Gorge Trail (3)	1.0 Mile	North of Ojai on SR 33, 8.5 miles.	Park on right just past bridge over north fork of Matilija Creek; which is a 0.5 miles north of entrance to **Wheeler Gorge Campground** along SR 33.
Pratt Trail (5)	4.6 Miles	Signal Street north of downtown Ojai.	**Valley View Camp** is located 3.2 miles up trail. The trail's lower section ties into the Cozy Dell and Foothill Trails, as well as the Ojai Front Fuelbreak Road. Trail ends on Nordhoff Ridge, 0.9 miles west of the old Nordhoff Lookout Tower. This system of trails and the fuel-break provide many different loop opportunities, all open to hiking, mountain biking and horseback riding.

Source: National Forest Service, Official Website, Accessed March 2002, www.r5.fe.us.lospadres/visitor/ojai/visitojhike_rd.html
* Bolded campsites represent first-come, self-service campsites, except for Wheeler Gorge Campground (described below).
** Locations shown on Figures 4.11-1a through 4.11-1c.

Camping. The majority of camping opportunities in LPNF-ORD are first come, first serve. A fire permit is required for camping in Wilderness areas. Some of the camping locations along major trails within the study area are listed in bold in Table 4.11-2.

Only five percent of the campgrounds in the LPNF are reservable. Wheeler Gorge Campground is the only reservable campground in the Ojai Ranger District, which is privately run by the Rocky Mountain Recreation Company for a user fee. The Wheeler Gorge Campground is located off SR 33, north of Ojai, with 70 campsites (including six double sites and five handicap sites).

Fishing. Fishing is allowed in most portions of the LPNF, as limited by specified catch restrictions.

Hunting. Hunting is generally allowed in LPNF, as restricted by hunting regulations. However, no hunting is allowed in a large portion of the forest around Matilija Canyon, as specified by the Special Forest Area Restriction Order Number 81-15-6700-5. The order covers Matilija Canyon and the area on either side for approximately one mile, west from the confluence with Lime Canyon.

Mountain Biking. LPNF has many trails and roads that are suitable for bicyclists. Mountain bikes are allowed on most forest trails, except in designated Wilderness areas or if otherwise posted.

Water Sports. The LPNF-ORD does not have any major lakes within its boundaries where motorized boating activities are allowed; hence, water sports are limited to playing in rivers, swimming, and general use.

Equestrian. Equestrian use is allowed on most trails.

Off-Road Vehicles. Off-road vehicles are permitted only on designated roads, as shown on the LPNF OHV map. They are not permitted in wilderness areas.

4.11.1.2 California Department of Parks and Recreation (California State Parks)

California Department of Parks and Recreation (California State Parks) operates six parks in Ventura County, five of which are coastal parks in the general vicinity of the Ventura River Estuary. Two of the parks are located within a mile of the Ventura River estuary: Emma Woods State Beach to the north and San Buenaventura State Beach to the south. California State Parks also maintains the Omer Rains Trail, which runs west of Emma Wood State Beach Park to five miles east of the Ventura Pier. A more detailed description of the facilities available at the parks is given in Table 4.11-3.

Table 4.11-3: Coastal California State Parks in Ventura County

State Beach or Park*	Location	Uses/Facilities
Emma Woods State Beach (29)	Two miles west of Ventura, via Main Street or Highway 101. The beach is located immediately north of the Ventura River Estuary.	Swimming, fishing, surfing, camping and bird watching. A freshwater marsh at the southwest end of the beach attracts wildlife. The beach also features ruins of a World War II artillery site. Camping is available.
San Buenaventura State Beach (30)	Within Ventura, on Pedro Street off of Highway 101. The beach is located south of the pier, about 1 mile south of the Ventura River Estuary.	Swimming, surfing, and picnicking. The park consists of two miles of sand beach, sand dunes, picnic sites, parking lot, snack bar and equipment rental shop. Bike trails connect to nearby beaches.
McGrath State Beach	Five miles south of Ventura, off Highway 101, via Harbor Boulevard.	One of the best bird-watching areas in California, with riverbanks and the Santa Clara River sand dunes along the shore. A nature trail leads to the Santa Clara Estuary Natural Preserve. Two miles of beach provide surfing and fishing opportunities. Campsites are available near the beach.
Mandalay State Beach	Located in the City of Oxnard, off of Harbor Boulevard.	Picnicking and barbequing facilities are available, as well as general beach use.
Point Mugu State Park	15 miles south of Oxnard, on Highway 1.	Located in the Santa Monica Mountains, the park offers miles of ocean shoreline, two major river canyons, and grassy valleys. Includes the 15,000-acre Boney Mountains State Wilderness Area, as well as over 70 miles of hiking trails.

Source: California State Parks Department, 2002.
* Locations shown on Figures 4.11-1a through 4.11-1c.

4.11.1.3 California Department of Agriculture

Seaside Park is 62-acre oceanfront property that hosts the annual 12-day Ventura County Fair, located on the western edge of the City of San Buenaventura, just north of Surfer's Point. Seaside Park also hosts a wide variety of events throughout the year, ranging from business meetings, teleconferences and major trade shows to concerts, vehicle racing events, expositions and equestrian events (Seaside Park, 2002). Seaside Park is owned by the State of California, California Department of Agriculture, and administered by the 31st District Agricultural Association under the direction of the Division of Fairs and Expositions, Department of Food and Agriculture (Seaside Park, 2002).

4.11.1.4 County of Ventura

Ventura County offers a wide range of recreational opportunities, from surfing in the ocean to hiking in the mountains. There are several county parks and trails within the vicinity of the project area, which are summarized in Table 4.11-4.

Table 4.11-4: Ventura County Parks and Trails in Project Area

County Park/Trail *	Location	Uses/Facilities
Camp Comfort (6)	11969 North Creek Road, Ojai, Hwy 33, S.E. on Hermosa Road	San Antonio Creek flows through the park. It has barbeque areas and a large clubhouse, with shower/laundry and firepits for campers. Electrical hookups are available at 16 campsites.
Foster Park (7)	438 Casitas Vista Road, Ventura, Hwy 33	1906 historic park. Trailhead for Ojai Valley Trail. Family barbeque areas and small amphitheater available for non-amplified events.
Soule Park (8)	1301 Soule Park Drive, Ojai	Most frequently used Ventura County park. Tennis courts, equestrian trails, softball fields, barbeque areas, and playgrounds are available.
Ojai Valley Trail (9)	Parallels Hwy 33 from Foster Park to Soule Park.	Equestrian, bicycle and pedestrian trail, which receives 66,000 users a year.
Sulfur Mountain Trail (10)	Sulfur Mountain Road, just south of Ojai.	12.3-mile hiking and bicycling trail.
Faria Beach (11)	4350 West Pacific Coast Hwy	42 oceanside campsites. Bathrooms, showers, and full hookups are available.
Hobson Beach (12)	5210 Pacific Coast Hwy	31 oceanside campsites. Bathrooms, showers, some full hookup sites are available.
Rincon Parkway (13)	Pacific Coast Hwy, between Faria Beach and Hobson Beach	127 sites for oceanside RV camping.

Source: Ventura County Parks Department, Parks and Beaches Descriptions. Accessed online in March 2002.
Locations shown on Figures 4.11-1a through 4.11-1c.

4.11.1.5 City of San Buenaventura

The City of San Buenaventura is a coastal community that offers a wide range of recreational activities and facilities. A mild year-round temperature (average 65 degrees Fahrenheit) and miles of accessible beaches offer uses such as fishing, surfing, windsurfing, yachting, sailing, kayaking, snorkeling, scuba diving, volleyball (and other beach sports), picnicking, barbecuing, hiking, jogging, bird watching, and general beach activities. The City of San Buenaventura also sponsors a range of recreational facilities, such as hiking/jogging/biking paths, community parks, historical parks, golf courses, and camping facilities. A brief summary of the City of San Buenaventura's recreational facilities that are given in the study area is offered in Table 4.11-5.

4.11.1.6 City of Ojai

The City of Ojai supports a wide range of recreational activities, cultural events, and sporting events. Currently, Ojai has three city parks, but a fourth park is planned to open within the next several years. The three parks in Ojai are Libby Park (26), Sarzotti Park (27), and Daly Park (28). (See Figure 4.11-1a through 4.11-1c for location of parks.) Ojai also maintains Shelf Road as a hiking/bicycling trail.

Table 4.11-5: Recreational Facilities in the City of San Buenaventura

Parks and Facilities*	General Location	Uses/Facilities
Beachfront Parks		
Surfers' Point at Seaside Park (14)	Figueroa Street near Promenade	Surfing, beach, picnic facilities, restrooms. Is connected to Ventura Pier by the Promenade.
Seaside Wilderness Park (15)	Beach south of Ventura River mouth	24-acres of undeveloped beach habitat.
Promenade Park (16)	Figueroa Street at the Promenade	1-acre oceanfront park.
San Buenaventura City Pier (17)	Harbor Boulevard near California Street	Built in 1872, second oldest pier in southern California, it offers restaurants, walking and fishing.
Harbor Cove Beach (18)	West end of Spinnaker Drive	Swimming beach.
Marina Park (19)	Neath Street and Swansea Avenue	15-acre park with beach, play area, sailing facilities, restrooms, and picnic facilities.
Trails		
Ventura River Trail** (20)	The trail runs north/south along the eastern edge of the Ventura River, using the old Southern Pacific Railroad corridor. The trail extends 6.3 miles from Foster Park to Main Street.	Opened in 1999, this pedestrian and bicycle path links the Ojai Valley Trail and the coastal Omer Rains Trail, creating a 17-mile urban bike trail from the Ventura Pier to Fox Street in Ojai.
Parks Near Ventura River or the Beach		
Eastwood Park (21)	Poli Street and Wall Street	Historical water filtration building with picnic facilities.
Mission Park (22)	Main Street and Figueroa Street Mall	Large open grass area, benches and restrooms.
Downtown Mini-Park (23)	300 block, East main Street	Landscaping, benches and picnic tables.
California Street Mini-Park (24)	California and Santa Clara Streets	Concrete stage area.
Plaza Park (25)	Santa Clara and Chestnut Streets	4-acre park with gazebo, restrooms, and picnic area.

Source: City of San Buenaventura, Public Works Department, Parks Division, "City of San Buenaventura Parks".
* Locations shown on Figures 4.11-1a through 4.11-1c.
** Information came from City of San Buenaventura, "Trial Guide."

4.11.1.7 Ojai Valley Land Conservancy

The Ojai Valley Land Conservancy (OVLC) is a community-based non-profit group dedicated to the goal of protecting and restoring open space in the Ojai Valley. The organization preserves open space by working with landowners to acquire conservation easements while the title and daily management of the property remains with the landowner. The OVLC also coordinates with local governments, provides education programs, and strives to develop habitat restoration and enhancement projects (OVLC, 2004).

The OVLC maintains seven preserves, six of which are open to public use for pedestrians. Cyclists, dog-walkers, and equestrians may also use the trails in some of the preserves (OVLC, 2004). A brief summary of the OVLC's recreational facilities that are given in the study area is offered in Table 4.11-6.

4.11.2 Recreational Activities Within the Study Area

The Matilija Dam and reservoir area are closed to public use and so are unavailable for recreational uses. Other portions of the study area, however, experience high levels of recreational use, from coastal to mountain activities. Common recreational activities include jogging, sightseeing, bird watching, horseback riding, picnicking, bicycling, hiking/walking, various beach activities, surfing, windsurfing, various types of fishing (surf and river), and various organized sports and activities.

Table 4.11-6: Recreational Facilities Maintained by the Ojai Valley Land Conservancy

Parks and Facilities*	General Location	Uses/Facilities
Ventura River-Rancho El Nido Preserve (31)	In the western half of the Ojai Valley and bordered by 3 miles of the Ventura River adjacent to Meiners Oaks, Rancho Matilija, and Mira Monte	1,591 acres with 3 existing trails: East/West River Bottom Loop Trails, Rice Canyon Trailhead, and Riverview Trailhead. Seven additional trails are proposed. Hikers, cyclists, and equestrians are all allowed on trails. Dogs must be on leashes.
Ojai Meadows Preserve (32)	Adjacent to Nordhoff High School off of SR 33 between Ojai and Meiners Oaks	56 acres with walking trails for hikers and cyclists. Dogs must be on leashes. The site is also used for bird-watching and other uses.
Ventura River-Confluence Preserve (33)	Adjacent to SR 33 opposite of Sulphur Mountain Road, just north of Casitas Springs and south of the San Antonio Creek Bridge	The Ojai Valley Bike and Bridle Path passes through the preserve, allowing for use by pedestrians, cyclists, and equestrians.
Ilvento Preserve	Located in the east end of the Ojai Valley and accessed through the Thacher School Campus and just east of the Horn Canyon Trailhead	80 acres of preserve with an unmaintained 2-mile loop trail. Local schools use the site for field science and the OVLC offers hikes and educational programs at the Preserve.
San Antonio Creek Preserve (34)	Adjacent to San Antonio Creek Road and 0.3 miles south of Camp Comfort County Park.	For public safety and protection of sensitive habitat, the Preserve is only open for special tours upon prior written request.
Cluff Vista Park (35)	Located west of downtown Ojai at the corners of El Paseo, Rincon, and Ojai Avenues.	Walking paths with views of the downtown area and surrounding mountains.
Fuelbreak Road Trail Easement	Accessible from the Gridley Trail at the top of Gridley Road	Provides a public access route that allows hikers, cyclists, and equestrians a link between the Gridley and Pratt Trails.

Source: OVLC, 2004.
* Locations shown on Figures 4.11-1a through 4.11-1c.

As part of the first public meeting for the *Matilija Dam Ecosystem Restoration Feasibility Study* on January 31, 2002, the Recreation Access Working Group queried participants about their recreational preferences in Matilija Canyon. The informal survey provided a proxy gauge for what recreational uses are valued by those who attended the public meeting, as shown in Table 4.11-7.

Table 4.11-7: Informal Survey of Recreational Preferences in Matilija Canyon

Recreation Activity	Number of Responses
Biking/Mountain Biking	1
Camping	1
Fishing	8
Horseback Riding	2
Hunting	0
Nature Observation	9
Outdoor Education	9
Picnicking	1
Walking/Hiking	11
Other (not specified)	1

Source: Recreation Access Working Group;
Public Meeting #1 Summary; January 31, 2002

As noted, hiking, fishing, nature observation, and outdoor education were the most popular responses. In addition to this list, there are a number of other popular recreational activities in the study area as a whole, such as biking, off-road vehicle use, rock climbing, surfing, etc. A more complete description of the various types of recreational uses within the study area is given in Table 4.11-8, including a general description of where in the study area these uses would likely occur.

Table 4.11-8: Recreational Activities in Study Area

Recreation Type	Description	Typical Locations
Trails	Hiking, Bicycling, Jogging, Nature-viewing, etc	Nature viewing, hiking, backpacking and bicycling on trails is a common recreation use throughout the study area. In particular, the Ojai Valley Trail and the Ventura River Trail experience a high level of use. Since Matilija Canyon is very steep and heavily vegetated, it precludes most recreational uses other than trail activities. Since Matilija Canyon is a fairly undeveloped area that is popular with recreationists, it has an extensive trail system.
Park	Uses include picnicking, walking, nature viewing, and other park activities.	The parks described above experience a high level of recreational use
Fishing	River and surf fishing.	Surf fishing is common at coastal parks and the San Buenaventura Pier. River fishing is common through most of the Ventura River and Matilija Creek, with various catch limitations and restrictions for certain fish. The number of fishing recreation users is typically low at any given point or time in the study area.
General Beach Use	General beach use, nature-viewing, wading, etc.	All coastal beaches in study area experience a high level of use, particularly in the summer months on weekends.
Water Sports	Surfing, kayaking, scuba diving, windsurfing, and many other water sports.	Water sports are primarily limited to coastal activities. No boating is permitted in the Matilija Reservoir. Surfer's Point is recognized as one of the most popular surf breaks in the region. The geomorphic "point" of the coastline just south of the Ventura River Estuary makes the area conducive to surfing throughout the year. Surfers' Point consistently picks up waves generated by winter Aleutian Bay storms (northwest) and by summer Antarctic storms (southwest), as well as localized wind-swell surf. Other regional surf breaks are also very popular for surfers and other water sports users. The average number of daily users ranges from 50 to over 300 surfers and other water sports users intermittently throughout the day.
Driving	-	SR 33 is a scenic highway and is a popular recreational route. The portions of the SR that traverse the LPNF are designated as a National Scenic Forest Byway. Highway 150 and the 101 State Freeway also provide recreational driving opportunities.
Swimming	-	Swimming activities are prevalent at the beaches within the Study Area. However, very little, if any, swimming occurs within the Ventura River or Matilija Creek. Swimming in the Ventura River and Matilija Creek is not supervised by lifeguards.
Golfing	-	Although there are a large number of golf courses in Ventura County, no golf courses are located within the immediate study area along the Ventura River or the coastline. However, several golf courses in Ojai are located near the route to/from Matilija Canyon, namely the Soule Golf Course in east Ojai, and the Ojai Valley Inn Golf Course, located near the northern intersection of SR 33 and Highway 150.
Hunting	-	Restricted around Matilija Canyon by LPNF Special Forest Area Restriction Order Number 81-15-6700-5.
Off-road vehicles	-	Permitted only on designated roads and trails as shown on the Forest OHV map or as authorized by a special use permit. Not permitted in the Matilija Wilderness.
Boating	-	Although no boating activities occur in the Matilija Reservoir or in the Ventura River, recreational boating is common in ocean waters up and down the coast from the Ventura River Estuary.
Other	Other recreational activities, such as rock-climbing, hang-gliding, etc.	Since the study area experiences a high level of recreational use, other recreational activities than those listed above are likely to occur throughout the study area. However, these recreational uses are typically less common than those described above.

4.11.3 Applicable Plans, Policies, and Regulations

4.11.3.1 Federal

The LPNF regulates recreational use within the boundaries of the forest. Camping and hiking are permitting within the forest, except where otherwise designated. Mountain biking is restricted in designated Wilderness Areas, such as the Matilija Canyon Wilderness Area. Hunting and fishing are regulated by current restrictions to maintain viable populations. Off-road vehicles and other motorized vehicles are restricted, except for designated off-road vehicle trail routes. Equestrian use is permitted on trails. Pets are allowed, but dogs must be leashed in heavily used areas. No boating activities are allowed in the Matilija Reservoir.

Section 4.3.2.14 of the LPNF Land Use and Resource Management Plan outlines permissible forest-wide policies and regulations for recreation. Recreational regulations relevant to the study area include:

- Seasonal fire closures will be lifted to increase available recreation concurrent with reductions in fire hazard.
- Separation of conflicting recreational uses will be provided, consistent with Management Area objectives.
- Recreation (target) shooting will be regulated as needed to minimize user conflicts on public and private lands and to ensure compatibility with Management Area objectives.
- OHV use will be permitted only on designated roads and trails as shown on the Forest OHV map or as authorized by a special use permit.
- Bicycle use of LPNF trails will be regulated when one of the following occurs, (a) trail does not accommodate wheeled vehicles, (b) bicycle use causes unacceptable conflicts with emphasized uses or activities, (c) bicycle use is incompatible with Management Area objectives, (d) unacceptable tread or other resource damage is likely to occur from use during inclement weather.

In addition to the regulations cited in Section 4.3.2.14 of the LPNF Land Use and Resource Management Plan, hunting is restricted in and around Matilija Canyon by LPNF Special Forest Area Restriction Order Number 81-15-6700-5. Passed in 1981, the order restricts gun discharge within Matilija Canyon and within one mile of Matilija Creek on either side, west from the confluence with Lime Canyon and covering the majority of the drainage.

4.11.3.2 State

California State Parks. California State Parks limits recreational uses in the State beaches within Ventura County (Chapin, 2002). The Santa Clara Estuary Natural Preserve at McGrath State Beach has the strongest level of conservation, with only passive recreation allowed, such as bird-watching and walking. At other State beaches, no dogs, fires, equestrian use, off-road vehicles, or disruption of natural resources is allowed. Camping is only permitting in allocated spaces.

California Department of Fish and Game (CDFG). The CDFG has special expertise and responsibilities defined in the State Fish and Game Code and other statutes (Fish and Game Code, §§ 1801 and 1802; CCR Title 14 §§ 15209, 15386) with regard to the State's fish and wildlife resources. It is the objective of CDFG to encourage the preservation, conservation, and maintenance of wildlife resources under the jurisdiction and influence of the State and provide for the beneficial recreational use and enjoyment of wildlife by all citizens of the State.

4.11.3.3 Local

County of Ventura. The County of Ventura General Plan has several recreation policies that pertain to the study area and Proposed Action. Policy 4.10.2(2) states that, "Discretionary development which would obstruct or adversely impact access to a public recreation resource shall be conditioned to provide public access as appropriate." Policy 4.10.2(6) states that, "New recreation facilities shall be consistent with the General Plan and Zoning Ordinance."

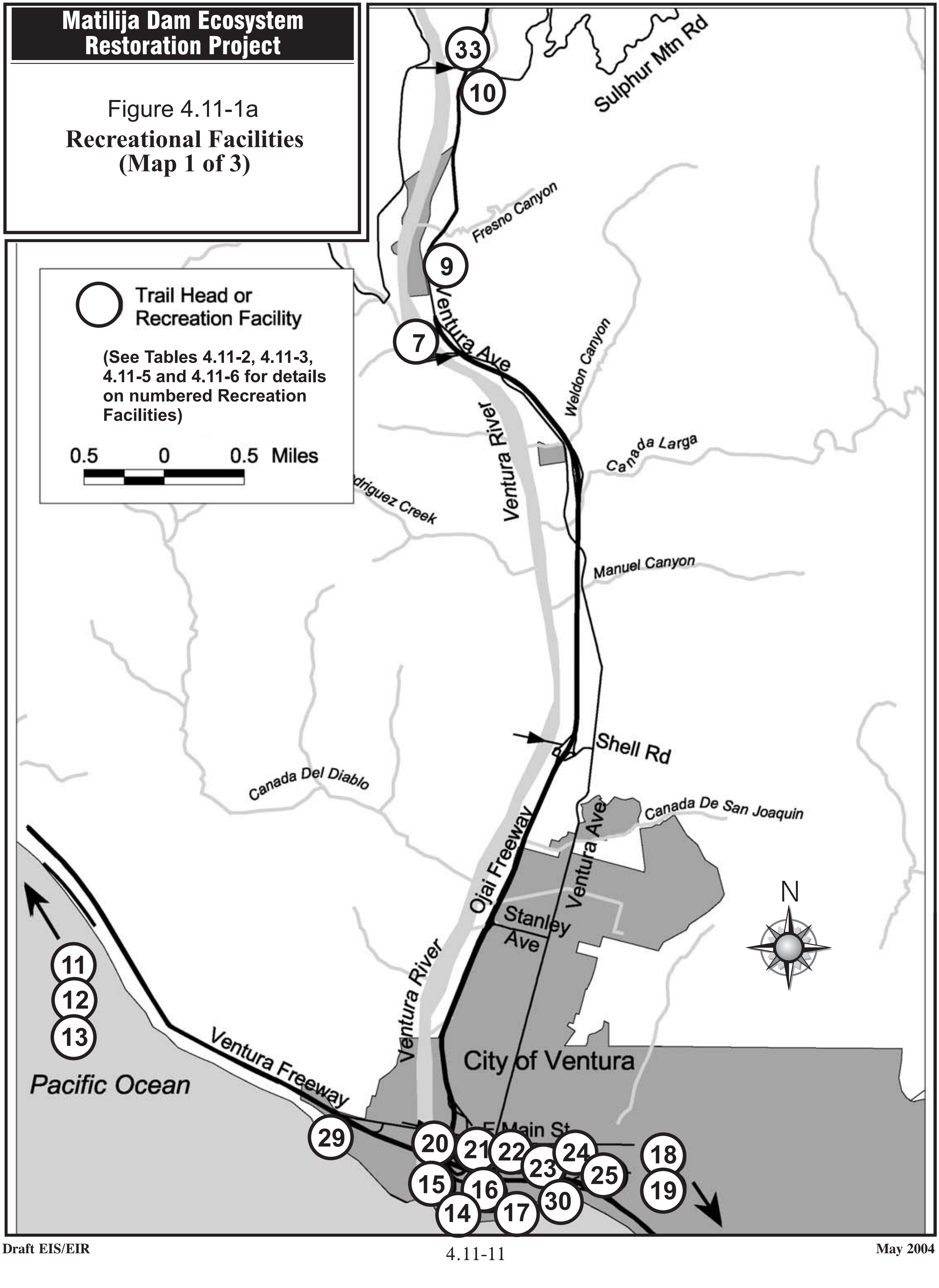
City of San Buenaventura. The City of San Buenaventura Comprehensive Plan (City of San Buenaventura, 1989) contains a Parks and Recreation Element, which describes the City of San Buenaventura's recreational goals, objectives, and policies. Several recreation policies pertain to the study area and the Proposed Action.

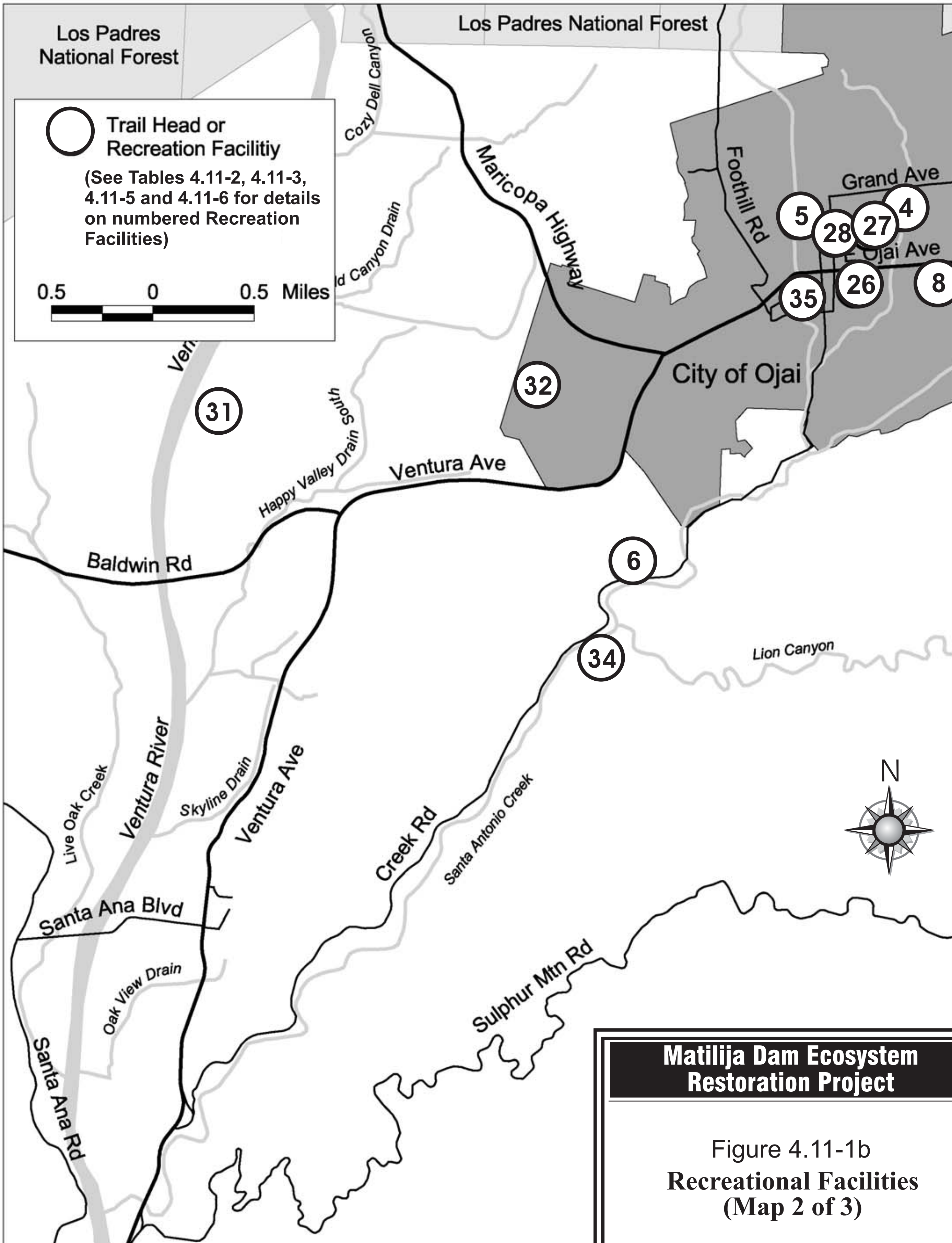
- Resource Management Policy 3.1 states: "Park and recreation areas should be maintained so that the special and important natural, historic, and cultural resources which they contain and which constitute a public trust are protected and interpreted for the benefit of future generations. Development adjacent to these properties should be compatible and not conflict with the purpose of protecting the nature of the park and/or recreation area."
- Coastal Areas Policy 6.2 states: Stabilization and preservation of resources and facilities in the coastal area is critical...the City should employ necessary stabilization and/or preservation measures to ensure that such parks and associated improvements do not suffer significant losses.

City of Ojai. Recreational activities and management goals are described in the Ojai General Plan. None would directly pertain to the study area.

Matilija Dam Ecosystem Restoration Project

Figure 4.11-1a
Recreational Facilities (Map 1 of 3)





Matilija Dam Ecosystem Restoration Project

Figure 4.11-1b
Recreational Facilities (Map 2 of 3)

Matilija Dam Ecosystem Restoration Project

Figure 4.11.1c

Recreational Facilities (Map 3 of 3)

5. ENVIRONMENTAL CONSEQUENCES OF PROPOSED ACTION AND ALTERNATIVES

This section of the EIS/EIR examines and describes the anticipated environmental impacts associated with the implementation of the proposed Matilija Dam Ecosystem Restoration Project (the Proposed Action). The impact analysis has been divided into subsections addressing individual environmental topics. The potential environmental impacts are evaluated based on significance criteria presented at the beginning of the impact analysis for each environmental topic. In determining the significance of impacts, the ability of existing regulations and other public agency requirements to reduce potential impacts is taken into consideration. If an adverse impact is potentially significant despite existing regulations and requirements, mitigation measures are proposed to reduce or avoid the impact, where feasible.

A significant impact is a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the Proposed Action. Various agencies provide guidance for determining the significance of impacts; however, the determination of impact significance is based on the independent judgment of the Lead Agencies (the U.S. Army Corps of Engineers and the Ventura County Watershed Protection District). Similarly, the establishment of any criteria used to evaluate the significance of impacts is the responsibility of the Lead Agencies. Criteria used to determine the significance of the Proposed Action's impacts are presented in the sections addressing individual environmental issue areas (Sections 5.1 through 5.11).

In the environmental impact analysis, impacts are classified as either "beneficial," "less than significant," "significant but mitigable," or "significant and unavoidable." These classifications are based on the significance criteria presented for each environmental topic and take into consideration mitigation measures proposed to reduce the significance of impacts. The following classification system is used to describe the potential effects of the proposed project:

- **Class I: Significant Unavoidable Impact.** Class I impacts are significant adverse effects that cannot be mitigated below a level of significance through the application of feasible mitigation measures. Class I impacts are significant and unavoidable.
- **Class II: Significant but Mitigable Impact.** A Class II impact is a significant adverse effect that can be reduced to a less-than-significant level through the implementation of mitigation measures presented in the EIS/EIR.
- **Class III: Less-than-Significant Impact.** A Class III impact is a minor change or effect on the environment that does not meet or exceed the criteria established to gauge significance. Less-than-significant impacts do not require mitigation.
- **Class IV: Beneficial Impact.** Class IV impacts represent beneficial effects that would result from project implementation.

The determination of whether or not a potential impact is significant is the key consideration in the environmental impact analysis. It is the intent of NEPA and CEQA to focus on the significant effects of a project, and it is the potential for a project to result in such impacts that triggers the requirement to prepare an EIS or EIR. For impacts that are determined not to be significant, the EIS/EIR need only provide sufficient information to indicate why the impacts are not significant. For significant impacts, information and analysis is provided to characterize each impact and provide the public and decision makers with an understanding of the nature and severity of the impact. The level of detail and analysis needed to adequately characterize significant impacts varies depending on the nature of the impact. Certain types of impacts require quantitative analysis in order to determine impact significance, characterize adverse effects, and formulate appropriate mitigation measures. Other types of impacts require more qualitative analysis with the determination of impact significance based on the independent judgment of the Lead Agencies.

5.1 EARTH RESOURCES

5.1.1 Impact Significance Criteria

In accordance with NEPA and CEQA, the effects of a project are evaluated to determine if they would result in a significant adverse impact on the environment. This EIS/EIR focuses on the potential effects of the Recommended Plan and seven other alternatives, including the No Action Alternative, and offers mitigation measures to reduce or avoid any significant impacts. The significance criteria are partially based on the Ventura County Initial Study Assessment Guidelines. Activities of the Recommended Plan or one of the other alternatives would have a significant adverse impact on the environment if they meet any of the criteria listed below.

- Disturbs or otherwise adversely affects unique geologic features or geologic features of unusual scientific value for study or interpretation
- Contributes to increased soil instability such that conditions pose an increased risk to human health or property from landslides, mudslides, and/or seismically induced geologic movements
- Exposes people or structures to geologic hazards, soil and/or seismic conditions so unfavorable that they could not be overcome by special design using reasonable construction and/or maintenance practices
- Substantially increases long-term wind or water erosion of soils, either on or off site
- Results in soil contamination that exceeds federal and State hazardous waste limits established by 40 CFR Part 261 and Title 22
- Involves construction activities that could result in mobilizing contaminants currently existing in the soil, creating potential pathways of exposure to humans or wildlife
- Exposes workers and/or the public to contaminated or hazardous materials that would exceed permissible exposure levels set by DOSH in Title B of the California Code of Regulations and federal OSHA in Title 29 CFR Part 1910
- Results in an increase in the generation of hazardous substances that would require disposal at regional landfill and/or treatment facilities.

5.1.2 No Action Alternative (Future Without-Project)

Under the No Action Alternative, geologic and soil conditions within the study area are expected to remain essentially the same as current conditions. Sediment from Matilija Creek would still be blocked behind the Matilija Dam, preventing sediment from sources in the upper Matilija Creek watershed from moving downstream. An additional 3,500,000 cubic yards of sediment beyond what currently is trapped may continue to be trapped under the No Action Alternative over the next 50 years, leading to further alteration of upstream habitat and channel areas. The deposition rate is not constant and would, therefore, progress in steps based on when large storm events occur. More, larger material will pass over the dam as the structure becomes less efficient in trapping material during storm events. In approximately 40 years, sand and gravel sized sediment would begin passing over the dam crest. At that time, sediment from the upper Matilija Creek watershed would begin migrating downstream, eventually being deposited along the mainstem of the Ventura River and into the Pacific Ocean along the coast. The increased sediment flow would alter stream topography and would change habitat. In approximately 100 years, the Ventura River would be in approximate sediment equilibrium. Matilija

Dam would be expected to remain in place until some unspecified future time when structural degradation may necessitate removing all or part of the dam.

Under the No Action Alternative, no improvements to increase flood level protection would be planned or implemented. In addition, after sediment is re-supplied downstream of the dam, areas such as the Matilija Hot Springs may be susceptible to hazards associated with the 100-year flood. Flood hazards are discussed under Hydrology and Water Resources in Section 5.2.

Because there would be no construction under the No Action Alternative, there would be no impacts to workers or the public from potential hazardous substance spills or from encountering or mobilizing contaminated soil during construction.

5.1.3 Alternative 4b (Recommended Plan): Full Dam Removal - Short-Term Transport Period

In Alternative 4b, Matilija Dam would be removed and most of the sediment that has accumulated behind the dam would be temporarily stabilized behind the dam with soil cement slope protection. Fine sediments would be transported by slurry to one of three potential disposal areas downstream of the Robles Diversion Dam. A channel would be excavated along the southern side of the reservoir basin to convey flows along Matilija Creek and the excavated materials would be placed upstream of the dam along the north side of the reservoir basin adjacent to the channel. Storm events would begin to erode material over the top of the wall and release the sediments downstream. After a sufficient amount of material erodes, the soil cement protection would be removed to allow for more natural erosion of the material to occur. Erosion impacts under Alternative 4b would be greater than Alternative 4a (see Section 5.1.9 below). However, with the construction of the soil-cement slope protection, monitoring of sediment degradation, and implementation of Mitigation Measures ER-1 and ER-2, erosion impacts associated with Alternative 4b would be less than significant (**Class II**).

ER-1 Implement Best Management Practices (BMPs). An erosion control and sediment transport control plan shall be prepared in association with the Storm Water Pollution Prevention Plan (SWPPP) and the revegetation plan. This plan shall be prepared in accordance with RWQCB guidelines and other applicable BMPs. Implementation of the plan will help to reduce erosion and sediment degradation. The plan will designate BMPs that will be followed during construction activities. Erosion-minimizing efforts may include measures such as avoiding excessive disturbance of steep slopes; using drainage control structures (e.g., coir rolls or silt fences) to direct surface runoff away from disturbed areas; strictly controlling vehicular traffic; implementing a dust-control program during construction; restricting access to sensitive areas; using vehicle mats in wet areas; and revegetating disturbed areas following construction.

ER-2 Reduce off-site erosion. During excessive wet and muddy site conditions, the contractor shall implement wheel washing strategies and street cleaning in the project vicinity to reduce off-site erosion from construction vehicles leaving the sites.

Implementation of these mitigation measures would reduce the construction impacts due to erosion to a less-than-significant level. As with the other alternatives, the restoration of the pre-dam topography (see

Aesthetics, Section 5.6) and replenishment of sediment to the Ventura River (see Hydrology and Water Resources, Section 5.2) would be considered beneficial impacts (**Class IV**).

Implementation of the proposed action would potentially impact erosion along the waterways downstream of the dam. However, lateral migration is a natural process and the river is naturally braided in many sections. Additional bank protection and/or grade control would degrade the current habitat over time and over-constriction of the river by bank protection could cause bed coarsening and decrease the connectivity of the river with the flood plain. Grade control may also induce scour downstream of the structures and impede fish passage. Thus, these measures are not recommended, except where it has been determined that bank protection is necessary to protect property and structures. The downstream flood control protection proposed for Alternative 4b would in large part expand upon existing flood protection measures in those areas. These flood protection measures are designed to reduce the exposure of people and structures to hazards resulting from storm events and are discussed under Hydrology and Water Resources, in Section 5.2.

Alternative 4b would not result in any substantial soil contamination or involve activities that would mobilize contaminants. Initial soil samples performed by the U.S. Bureau of Reclamation in March 2002 and included in the Geotechnical Field Investigations of the Feasibility Study indicated that sediments stored behind the dam are not toxic (BOR, 2002). However, it is possible that unexpected soil and/or groundwater contamination could be encountered during grading or excavation. Additional tests would be conducted in later stages of the planning process to ensure that no undiscovered contaminates are exposed during construction. Mitigation Measures ER-3 and ER-4 (shown below) would ensure that potentially significant impacts are reduced to less-than-significant levels (**Class II**).

ER-3 **Observe exposed soil.** During trenching, grading, or excavation work for the project, the contractor shall observe the exposed soil for visual evidence of contamination. If visual contamination indicators are observed during construction, the contractor shall stop work until the material is properly characterized and appropriate measures are taken to protect human health and the environment. The contractor shall comply with all local, State, and federal requirements for sampling and testing, and subsequent removal, transport, and disposal of hazardous materials. In the event that evidence of contamination is observed, the contractor shall document the exact location of the contamination and shall immediately notify the Corps of Engineers' construction manager. The Corps shall be responsible for formulating and implementing plans to characterize and remediate any contamination encountered during construction. These plans shall specify procedures for monitoring, identifying, handling, and disposing of hazardous waste in accordance with federal and State regulations.

Significant impacts from previously unknown contamination that could be encountered during construction would be avoided with the implementation of Mitigation Measure ER-3.

During construction operations, hazardous materials such as vehicle fuels, oils, and other vehicle maintenance fluids would be used and stored in construction staging yards. Spills of hazardous materials and during construction activities could potentially cause soil or groundwater contamination. Improperly maintained equipment could leak fluids during construction operation and while parked, resulting in soil contamination. The following mitigation measure would ensure that any accidental spills (associated with construction equipment) would be properly contained and that potentially significant impacts would be reduced to less-than-significant levels (**Class II**).

ER-4 Hazardous substance control. The Corps of Engineers, or its construction contractor, shall prepare a Hazardous Substance Control and Emergency Response Plan that will include preparations for quick and safe cleanup of accidental spills. The Plan will prescribe hazardous-materials handling procedures to reduce the potential for a spill during construction, and will include an emergency response program to ensure quick and safe cleanup of accidental spills. The plan will identify areas where refueling and vehicle-maintenance activities and storage of hazardous materials, if any, will be permitted.

The Proposed Action would not generate any hazardous materials or expose workers to conditions that exceed permissible levels. With the temporary stabilization of sediments, sediment could be transported downstream under this alternative, providing beneficial impacts (**Class IV**) to local beaches, but to a lesser degree than Alternatives 1, 2a, 2b, 3a, and 3b.

5.1.4 Alternative 1: Full Dam Removal/Mechanical Sediment Transport – Dispose of Fines, Sell Aggregate

Under Alternative 1, construction activities (i.e., slurrying of fine sediments, excavation for marketable aggregate, dam removal, etc.) and the natural re-supply of sediments would substantially alter the topography of the existing dam and reservoir site, as discussed in Section 5.5 (Aesthetics). Fine sediment trapped behind the dam would be slurried downstream to one of three potential disposal sites. Commercially valuable material and residual fine sediment would be trucked off site, and non-salvageable material would be hauled to Toland Landfill.

As discussed in Section 5.2, Hydrology and Water Resources, the construction of a containment dike, access roads, and other structures, the excavation of a 60-foot wide channel, as well as the slurrying and trucking of materials to the disposal site would potentially increase erosion, but in relatively minimal amounts (**Class III**) since all of the trapped sediment (5.8 million cubic yards) would be mechanically removed from the riverine system. Overall, Alternative 1 would not cause substantial off-site erosion (i.e., higher levels of erosion either farther upstream or downstream of the site). Regardless, implementation of BMPs laid out in Mitigation Measures ER-1 and ER-2 would further reduce any potential for erosion impacts during construction and the hauling of aggregate off site. One of the primary project objectives for removing the dam is to release sediment trapped behind Matilija Dam. Sediments allowed to migrate downstream would assist in the replenishment of sediment to scoured areas in the Ventura River (**Class IV**). No unique or valuable geologic features would be adversely affected.

Soil contamination impacts from unknown contamination or from accidental spills of hazardous substances would largely be the same as described for Alternative 4b, which are potentially significant, but mitigable to a less-than-significant level (**Class II**) with the implementation of Mitigation Measures ER-3 and ER-4.

Implementation of this alternative is not anticipated to have substantial adverse effects on earth resources on the lower reaches of the Ventura River or the ocean shoreline in the vicinity of the Ventura River estuary. Over time, it is expected that the pattern of erosion and deposition along the mainstem of the river, at the river delta, and along nearby ocean beaches would return to a more natural, pre-dam condition. With the relatively small amounts of sediment that would be transported downstream under this alternative, deposition of sediment is not expected to have a dramatic impact on the Ventura River or the estuary. As more sediment would be allowed to migrate down river and eventually enter the near shore zone of the ocean, it could result in more deposition of sand onto local beaches and contribute to increased beach width over time. This would be considered a beneficial impact (**Class IV**).

5.1.5 Alternative 2a: Full Dam Removal/Natural Sediment Transport – Slurry "Reservoir Area" Fines Off Site

In general, many of the effects on earth resources for Alternative 2a would be similar to Alternatives 4b and 1. Although Alternative 2a would include the slurrying of fine sediments to a disposal area as described for Alternatives 4b and 1, earth resource impacts under this alternative would be greater than Alternatives 4b and 1 because this alternative does not include the stabilization of sediments and would rely upon storm events and natural flows to erode the trapped sediment and to transport sediment downstream. Two groundwater-supply wells would be built at the City of Ventura water supply facilities at Foster Park in response to increased turbidity impacts from suspended fines (silts and clays). Sedimentation impacts are discussed in Section 5.2, Hydrology and Water Resources.

Alternative 2a would also have a higher potential for impacts associated with erosion because of the larger amounts of sediment that would be washed downstream by larger flood events once the dam was removed (**Class II**). Implementation of Mitigation Measures ER-1 and ER-2 would reduce these impacts to less-than-significant levels. As such, while downstream erosional alterations would be greater than in Alternatives 4b and 1, the restoration of the pre-dam topography (see Aesthetics, Section 5.6) and replenishment of sediment to the Ventura River would still be considered beneficial impacts (**Class IV**). The deposition of sediment transported in this alternative is not expected to have a dramatic impact on the Ventura River or the estuary, but as more sediment is allowed to migrate down river and eventually enter the near shore zone of the ocean, it could result in more deposition of sand onto local beaches and contribute to increased beach width over time. This would be considered a beneficial impact (**Class IV**). No unique or valuable geologic features would be adversely affected.

The downstream flood control protection proposed for the project would in large part expand upon existing flood protection measures in those areas and would be similar to Alternatives 4b and 1. Flooding hazards are discussed under Hydrology and Water Resources, Section 5.2.

Similar to Alternative 4b, this alternative would not result in substantial soil contamination, involve activities that would mobilize contaminants, generate any hazardous materials, or expose workers to conditions that exceed permissible levels. Soil samples analyzed by the Corps indicated that sediments stored behind the dam are not toxic, and additional tests would also be conducted in later stages to ensure that no undiscovered contaminates are exposed during construction. Mitigation Measures ER-3 and ER-4 would be implemented during construction in the event that unknown soil contamination is discovered and to ensure that any accidental spills (associated with construction equipment) would be properly contained. Therefore, potentially significant impacts from soil contamination and hazardous materials associated with this alternative would be mitigable to less-than-significant levels (**Class II**).

5.1.6 Alternative 2b: Full Dam Removal/Natural Sediment Transport – Natural Transport of "Reservoir Fines"

Earth resource impacts under Alternative 2b would be largely the same as described for Alternative 2a, except for the following project features:

- Fine sediments under this alternative would be excavated and stockpiled upstream of the reservoir area and would be transported downstream during successive storm events;
- As sediments would be transported by storm events and not by slurry, this alternative does not include impacts to any of the three slurry disposal sites.

With greater sediment transported downstream under this alternative (approximately 2.0 million cubic yards in the first year), beneficial impacts (**Class IV**) of sediment replenishment to the Ventura River and local beaches would also be slightly greater than under Alternative 2a. Project construction could cause erosion impacts (**Class II**); however, implementation of Mitigation Measures ER-1 and ER-2 would reduce these impacts to less-than-significant levels. Flood control measures are similar to those described for Alternatives 4b, 1, and 2a, and flood risk is discussed under Hydrology and Water Resources, Section 5.2.

Soil contamination impacts from unknown contamination or from accidental spills of hazardous substances would be the same as described for Alternatives 4b, 1, and 2a, and are expected to be potentially significant, but mitigable to less-than-significant levels (**Class II**) with the implementation of Mitigation Measures ER-3 and ER-4.

5.1.7 Alternative 3a: Incremental Dam Removal/Natural Sediment Transport - Slurry "Reservoir Area" Fines Off Site

Earth resource impacts associated with Alternative 3a would be similar to those described for Alternative 2a. However, there would be a reduced potential for impacts associated with erosion because the dam would be removed in stages, allowing for a more gradual erosion of trapped sediment and a greater measure of control over the rate of sediment release. Regardless, implementation of Mitigation Measures ER-1 and ER-2 would ensure that any erosion impacts from construction (**Class II**) would be less than significant. By removing the dam in two phases, the effects downstream would be evaluated between construction phases so that any deleterious effects could be minimized through additional mitigation measures if necessary.

In addition, soil contamination impacts from unknown contamination or from accidental spills of hazardous substances would be similar to the above alternatives. Soil contamination and hazardous materials impacts would be potentially significant, but can be mitigated to less-than-significant levels (**Class II**) with the implementation of Mitigation Measures ER-3 and ER-4.

5.1.8 Alternative 3b: Incremental Dam Removal/Natural Sediment Transport - Natural Transport of "Reservoir Fines"

Just as the impacts resulting from Alternative 3a would be similar to those for Alternative 2a, earth resource impacts for Alternative 3b would be similar to those described for Alternative 2b. Similar to Alternative 3a, there would be a reduced potential for impacts under this alternative associated with erosion because the dam would be removed in stages, allowing for a more gradual erosion of trapped sediment (**Class II**). Regardless, implementation of Mitigation Measures ER-1 and ER-2 would ensure that any erosion impacts from construction would be less than significant. As described above, the effects downstream would be evaluated between construction phases so that deleterious effects could be minimized through additional mitigation measures. Mitigation Measures ER-3 and ER-4 would be implemented to ensure that soil contamination impacts from unknown contamination or from accidental spills of hazardous substances would be less than significant (**Class II**).

5.1.9 Alternative 4a: Full Dam Removal/Long-Term Sediment Transport - Long-Term Transport Period

In Alternative 4a, the dam would be removed and most of the sediment that has accumulated behind the dam would be permanently stabilized in place using slope protection. A 100-foot-wide channel would be excavated along the southern side of the reservoir basin to convey flows along Matilija Creek and the excavated materials would be placed upstream of the dam along the north side of the reservoir basin adjacent to the channel.

As with the previous alternatives, the restoration of the pre-dam topography (see Section 5.6, Aesthetics) and replenishment of sediment to the Ventura River (see Hydrology and Water Resources, Section 5.2) would be considered beneficial impacts (**Class IV**). Erosion impacts would be kept to a minimum due to the stabilization of sediments and would be less than those under Alternative 4b (**Class III**). Regardless, implementation of Mitigation Measures ER-1 and ER-2 would ensure that erosion impacts due to construction would remain less than significant. Although storm events would likely carry material from beyond the stabilized areas, impacts due to erosion would be less than significant (**Class III**). No unique or valuable geologic features would be adversely affected. Flood control protection would be similar to Alternative 1 and impacts resulting from the downstream flood control protection would be slightly less than for Alternatives 2a, 2b, 3a, and 3b, as discussed in Hydrology and Water Resources, Section 5.2. Because the trapped sediment would be permanently stabilized within the Matilija Reservoir, thereby reducing sediment aggradation downstream, only "low-level" flood-control improvements are recommended and potential flood risk would be low (see Section 5.2).

Soil contamination impacts from unknown contamination or from accidental spills of hazardous substances would be the same as described for previous alternatives, and would be potentially significant, but mitigable to less-than-significant levels (**Class II**) with the implementation of Mitigation Measures ER-3 and ER-4.

Because the majority of sediment would be stabilized on site under this alternative, beneficial impacts to local beaches would be minimal.

5.2 HYDROLOGY AND WATER RESOURCES

The information on hydrologic conditions presented in this section is derived from Hydrology, Hydraulic and Sediment Studies of Without-Project Conditions, Matilija Dam Ecosystem Restoration Project (June 2002) prepared by the U.S. Bureau of Reclamation (BOR) (BOR, 2002).

5.2.1 Impact Significance Criteria

The following hydrology and water resources significance criteria are based on CEQA Checklist identified in Appendix G to the CEQA Guidelines. Water resources impacts would be considered significant if the Proposed Action:

- Violates water quality standards or waste discharge requirements or otherwise substantially degrades water quality.
- Causes lateral erosion, streambed scour, or long-term channel aggradation/degradation resulting in damage to private property, utility lines, or structures.
- Increases flood hazards through floodplain encroachment, diversion or obstruction of flows, changes in the rate and amount of surface runoff, or placement of people or structures in areas subject to flooding or mudflow.
- Depletes groundwater or surface water supplies or interferes with groundwater flow or recharge such that there would be a substantial net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).

5.2.2 No Action Alternative (Future Without-Project)

The No Action Alternative represents the continuation of the existing condition at Matilija Dam and the downstream Matilija Creek and Ventura River, with no project-related impacts. Sediment deposition would continue to accumulate behind Matilija Dam. The reservoir capacity is expected to be 150 acre-feet in 2010, less than 50 acre-feet by 2020, and would be in equilibrium by 2038.

Presently, the majority of the silt and clay entering the Matilija Reservoir passes over the top of Matilija Dam. In approximately 40 years, sand and gravel sized sediment would start to pass over the dam crest, at which time it is estimated that over nine million cubic yards of sediment would be stored behind the dam. The sediment loads downstream of the dam would begin to increase. The result would be a slow aggradation of reaches immediately below the dam and an increase in the amount of deposition that occurs in Robles Diversion area. It is expected that in approximately 100 years, the Ventura River would be in approximate equilibrium, meaning that sediment load entering the river system is in approximate balance with the sediment load exiting the system. The approximately 2.2 million cubic yards of sand that is presently trapped behind the dam would not be supplied to the beach and approximately two million cubic yards of additional sand would be trapped behind the dam in the next 40 years.

The No Action Alternative would cause continued deposition behind Matilija Dam. The reservoir capacity is expected to be 150 acre-feet in 2010 and less than 50 acre-feet by 2020. Presently, the majority of the silt and clay entering the Matilija Reservoir passes over the top of Matilija Dam. In approximately 40 years, sand and gravel sized sediment would start to pass over the dam crest, at which time it is estimated that over nine million cubic yards of sediment would be stored behind the dam. The sediment loads downstream of the dam would then increase. The result would be a slow aggradation of reaches immediately below the dam and an increase in the amount of deposition that occurs in Robles Diversion area. It is expected that in approximately 100 years, the Ventura River would be in approximate equilibrium, meaning that sediment load entering the river system is in approximate balance with the sediment load exiting the system. The approximately 2.2 million cubic yards of sand that is presently trapped behind the dam would not be supplied to the beach and approximately an additional two million cubic yards of sand would be trapped behind the dam in the next 40 years. There are current flood concerns along the Ventura River. Several residences downstream of Robles Diversion may be at risk of flooding during a 100-year flood. Also, the levee along the Ventura River at the community of Casitas does not provide protection against the 100-year flood. The concerns would continue unless additional levees are constructed.

Fine sediments (silts and clays) are largely responsible for the turbidity that would result in water quality impacts because of the No Action Alternative. Currently the majority of fine sediment that enters Matilija Reservoir passes over the dam when the reservoir spills and the downstream reaches experience approximately natural concentrations of fine sediment. Under the No Action Alternative, the future fine sediment concentration would be similar to the present condition until 2038, at which time sand and gravel-sized sediment would fully contribute to sediment load passing over the dam. Impacts are expected to be less than significant.

Erosion and sedimentation impacts under the No Action Alternative would affect conditions from Reach 7 downstream to Reach 3. The following describes those impacts:

- **Reach 7a and 7b (Reservoir and Delta Area).** Three million cubic yards would be deposited in the reservoir in the next 50 years and the current active storage of Matilija Reservoir would be lost within ten years. The delta is expected to reach the dam face in approximately 30 to 40 years.
- **Reach 6b (Matilija Canyon).** There would not be substantial changes until coarse sediment begins to pass over the top of the dam (in approximately 40 years). It would take much longer before sediment that is coarse enough to cause bed aggradation start to pass over the dam. It is estimated that approximately 100 years would pass before equilibrium elevations would be needed in this reach.
- **Reach 6a (Robles).** No change to the current deposition is expected for approximately 40 years. After that time, coarse sediment would gradually start to spill over the top of the dam and the deposition at Robles would gradually increase. Equilibrium of sediment supply and transport in the reservoir and reach upstream of Robles is expected to occur in approximately 50 to 70 years.
- **Reach 5 (Robles to Baldwin Road).** No substantial aggradation in Reach 5 is expected until coarse sediment starts to pass over the dam. The reach would then slowly start to aggrade, finally reaching equilibrium in 70 to 100 years. The equilibrium condition would be near the pre-dam condition.
- **Reach 4 (Baldwin Road to San Antonio Creek).** The erosion that has taken place upstream in Reach 5 may progress down into this reach, but modeling indicates that this reach should remain relatively stable for at least 50 years.
- **Reach 3 (San Antonio Creek to Foster Park).** There is some aggradation expected due to the natural sediment loads from the upstream river channel and San Antonio Creek. Approximately two feet of deposition is expected in this reach during the next 50 years.

Impacts to Reaches 2 and 1 would largely be within the range of normal variability and would not result of erosion or sedimentation impacts.

With the continued erosion under the No Action Alternative, flood hazards in some areas would decrease, but Reach 3 would aggrade over time and increase flood risks in that area. In the upstream reaches (Reaches 4 and 5) and in Reach 2, there would be a decrease in the area inundated because of the continued degradation in the upstream reaches. The decrease is due to the continued degradation in these reaches. Reach 3 is expected to aggrade slightly and, therefore, the area inundated would increase. Existing flood protection does not currently protect against 100-year storm events, so any future aggradation would continue to increase flood hazards along the Ventura River.

No major change in groundwater and surface water supplies is expected. While the reservoir fills with sediment within the next 50 years, the turbidity of the water falling over the dam would increase slightly. This could decrease the water quality for water suppliers downstream.

5.2.3 Alternative 4b (Recommended Plan) Full Dam Removal/Long-Term Sediment Transport – Short-Term Transport Period

Alternative 4b requires that a temporarily stable channel be constructed through the trapped sediments behind Matilija Dam. The lower portion of this narrow channel would be stabilized, but the upper part would be allowed to erode. The channel design would allow the low flows to pass through the area of the trapped sediments without picking up any additional sediment. The erosion would only be allowed to take place during the high flow events. The reservoir material would be removed by hydraulic dredge and transported by slurry line to a downstream disposal site. The deposition impacts in the downstream river channel associated with this alternative would be less severe than Alternative 2a. However, because no detailed analysis has been conducted yet, no quantitative estimate of the reduced deposition has been calculated. The turbidity impacts should be confined to the high flow events during which the sediment is allowed to erode.

Sediment Transport and Water Quality

Alternative 4b would not involve the discharge of wastes into the surface water or groundwater such that the project could violate water quality standards or waste discharge requirements or otherwise substantially degrade water quality. The primary water quality concern involves increased turbidity of flows downstream of the dam.

Matilija Dam currently acts as a sediment trap, blocking watershed-generated sediments, including fines, from being transported downstream of the dam. Removal of the dam would result in increases in downstream turbidity in the form of water-borne silts and clays. Temporary increases would result from construction activities disturbing sediment within the flow of Matilija Creek. Removal of the dam, however, which currently inhibits watershed-generated sediment from being transported downstream, would allow erosion and transport of sediments that have been deposited behind the dam over the years. Potential areas of impact include all of Matilija Creek downstream of the dam, all of the Ventura River downstream of the confluence with Matilija Creek, Robles Diversion, the Foster Park Diversion, and Lake Casitas. The Robles Diversion is located approximately two miles downstream of the dam and feeds Lake Casitas by a diversion and canal for the Casitas Municipal Water District (MWD). The Foster Park Diversion is a combination of surface diversion and subsurface wells approximately ten miles downstream of the dam. These wells divert surface water and ground water for use by the City of Ventura. Alternative 4b includes measures to minimize the effect of increased turbidity through: 1) removal of accumulated sediments behind the dam through slurry to a disposal area downstream of the dam; 2) construction of a low-flow channel (ten-year flood capacity) protected with soil cement from erosion through the excavated area behind the dam; and 3) a locally preferred betterment consisting of a desilting basin along the Robles-Casitas canal for the purpose of trapping fine sediments prior to their reaching Lake Casitas.

In the short term, during and shortly after construction, demolition of the dam and the mechanical removal of sediment would introduce fine sediment into the river system. The fine sediment concentrations are estimated to be between two and ten times higher from beginning of dam demolition until the first storm passes through the reservoir area. It would be conservatively assumed that concentrations and turbidity would increase by a factor of ten until the first storm passes.

Under Alternative 4b, the long-term increase in turbidity after construction is completed should only occur during high flow events. The modeling studies for the alternatives show an increase in turbidity levels by up to a factor of two to three times baseline conditions for the first few higher flow events (greater than ten-year recurrence), decreasing to levels not exceeding 50 percent after a few years. The sediment concentration during these events is already high and it is expected that the increase in turbidity may be within natural variability. After a period of five to ten years, turbidity levels for high flows would return to baseline levels. For storms less than ten-year events, the flows would not contain any fine sediment eroded from the trapped materials due to the protection offered by the soil cement revetment in the channel.

It is estimated that project-related turbidity increases would affect Foster Park diversions, which are currently suspended when turbidity levels exceed 10 NTU in the Ventura River. Turbidity increases would cause Foster Park diversions from existing facilities to be reduced by approximately 470 acre-feet the first year after construction. See discussion of groundwater and surface water supplies, below.

Because turbidity impacts are temporary or confined to high flow events of ten-year recurrence interval or greater, and this alternative includes structures to minimize turbidity impacts, impacts to water quality standards, waste discharge requirements, or water quality are considered adverse, but less than significant **(Class III)**. No mitigation is required.

Although it was determined that turbidity impacts would be less than significant, the Ventura County Watershed Protection District proposes inclusion of a desilting basin to minimize any fine sediment introduction and related turbidity problems at Lake Casitas. This additional protection for Lake Casitas would be provided by a desilting basin proposed for the Robles-Casitas canal. The size of the basin is based on the required storage capacity to settle fines for an average annual storm event. Fine sediment would be settled out in the basin by the addition of a flocculating polymer, and the resulting sludge would be removed to a nearby storage site. To prevent infiltration losses in the infiltration basin, a geofabric liner would be installed.

Arsenic has been detected in discrete samples of the trapped sediment obtained in field investigations (July through September 2001), and the Corps and the Ventura County Watershed Protection District assessed the potential threat to Lake Casitas and Mira Monte well. Concentrations levels detected were considered within normal background levels and therefore would be considered less than significant **(Class III)**. Another concern related to water quality is the potential to cause lateral erosion, streambed scour, or long-term channel aggradation/degradation that could result in damage to private property, utility lines, or other structures. The removal of the dam would re-supply sediment to Matilija Creek and the Ventura River downstream of the dam and would change the trend from erosion to deposition in the upper reaches. Deposition would change the channel plan characteristics, channel geometry, and riverbed material. Deposition would continue until the sediment supply equilibrates with the transport capacity. The equilibrium condition would be approximately that of the pre-dam condition that existed prior to 1947.

The portion of Matilija Creek upstream of the dam and the reservoir is upstream of any hydrologic influence of the alternative and therefore no substantial differences between the current condition and the alternatives are expected in this reach. No impacts would occur here.

Within the reservoir and delta area, a 100-foot wide channel would be constructed through the reservoir sediments and the banks of the channel would be temporarily stabilized with three feet of revetment. Erosion would occur when the water elevations exceed the revetment height and erode the banks of the channel. The channel slopes are 4H:1V and therefore erosion would initially occur as surface erosion. After the banks near the channel have been eroded, steeper slopes may result and mass failure of banks may then occur. This erosion would be considered beneficial **(Class IV)**, as the canyon would be returned to a more natural hydrologic condition.

Within Matilija Canyon (downstream of the dam), over ten feet of aggradation is predicted. The large amount of deposition is due to its proximity to the dam and the sudden increase in sediment loads. The ten feet of aggradation may be temporary and the river channel would likely return to elevations similar to pre-dam conditions. These effects would be considered beneficial **(Class IV)**, as the canyon would be returned to a more natural hydrologic condition.

Near Robles Diversion Dam (Reach 6a), deposition would increase considerably. The expected deposition is expected to be approximately twice the current deposition or 22,400 cubic yards/year (14 acre-feet/year) under equilibrium conditions. Currently, operation of the Robles Diversion becomes difficult once 40,000 cubic yards is deposited behind the diversion dam. This volume is presently only exceeded for the floods with a return period at least as long as 20 years, but with the re-supply of sediment from Matilija Creek, this volume may be exceeded for average floods as well. Under equilibrium conditions, it is estimated that floods with a return period larger than three to four years would deposit 40,000 cubic yards or more of material behind Robles Diversion.

In the event that sediment deposition levels at the Robles Diversion facility exceed 40,000 cubic yards, diversion operations to Lake Casitas would be interrupted until the sediment basin is cleared out. Should this occur at the beginning or middle of the diversion season, the facility would miss diversion opportunities for the remaining portion of the season. Environmental regulations do not allow for maintenance during the wet season. Repeated missed diversion opportunities could adversely affect the safe annual yield for Lake Casitas. The safe annual yield is defined as the amount of water that the reservoir can yield for consumption without producing unacceptable negative impacts on the long-term water supply within the jurisdictional boundaries of Casitas MWD. Based on the sediment transport modeling studies for Alternative 4b, the deposition associated with the first few years of storm events would exceed 40,000 cubic yards in the sediment basin. After that, storms would deliver between two to three times the existing condition levels. The safe yield could be impacted for at least the first three major storm seasons, potentially reducing the safe yield in Lake Casitas by 6,000 acre-feet per year, for a total of 18,000 acre-feet.

A sediment bypass structure is included in Alternative 4b to reduce the amount of coarse sediment deposition that occurs at the Robles Diversion sediment basin. The bypass includes four radial gates that, when combined with three existing radial gates, allow for passage of sediments and flows up to 17,000 cfs. Initial modeling shows that a sediment bypass structure placed at the sediment basin would limit the amount of deposition to approximately existing level conditions. This bypass feature would substantially reduce any potential impacts related to water diversions at the Robles Diversion facility. Adverse downstream impacts are not anticipated with this bypass feature in place. With the implementation of this feature, aggradation impacts would be adverse, but less than significant **(Class III)**.

Additionally, a new concrete overflow weir would replace the existing timber crib weir structure to ensure the adjacent sediment bypass structure is not undermined during very large flow events. Selective operations of the bypass sluice gates in conjunction with the existing sluice gates could allow the diversion at Robles to remain in operation in larger flood events than previously possible. In addition, there may be the possibility of enhancement of fish passage at higher flows.

Reach 5, Robles to Baldwin Road, has experienced downcutting of the river channel in the past 30 years and it is located relatively close to Matilija Dam. This reach is therefore expected to substantially aggrade following the re-supply of sediment to this reach. There is considerable deposition expected from River Mile (RM) 15 to RM 13 (Robles Diversion is at RM 14.15). The amount of deposition would decrease in the downstream direction. This aggradation would aid the return of the reach to more natural conditions and would be a beneficial **(Class IV)** impact.

Reach 4, Baldwin Road to San Antonio Creek, has remained relatively stable since 1971 and should continue to remain relatively stable. Even though the reach as a whole may be relatively stable, the reach immediately upstream and downstream of Santa Ana Boulevard may not be because of the severe constriction the bridge places on the river. The bridge is a site of active channel maintenance and the county has a maintenance program to maintain the channel invert at the bridge to an elevation of 393.5 feet. At Live Oaks Levee, it is expected that an additional 2.5 feet of sediment may be deposited on top of what is already being deposited. Because of the additional sediment being deposited in this reach, it is possible that the VCWPD may not have an opportunity to remove sediment before a large flow occurs. As this project includes the removal and replacement of this bridge with a redesigned bridge, which would allow flows to convey more naturally. With replacement of the bridge, impacts in this reach would be adverse, but less than significant **(Class III)**.

In Reach 3, San Antonio Creek to Foster Park, some aggradation would occur with the majority of deposition occurring in the upper portion of the reach. For long-term simulations, the aggradation in this reach is more dependent upon the sediment loads entering from San Antonio Creek than the sediment loads released at the dam. In the Casitas Springs area, it is expected that there would be approximately four feet of additional sediment deposition. It is not expected that this deposition would result in any significant impacts. Any impacts would be adverse, but less than significant **(Class III)**.

Reach 2, Foster Park Bridge to Main Street Bridge, has experienced the most erosion of any reach on the Ventura River. The erosion is likely due to wetter hydrology, constriction of the channel by bridges, and construction of Casitas Dam. The erosion is expected to continue with up to two more feet of additional erosion in this reach over the next 50 years. As erosion would continue without the Alternative, impacts resulting from the project would be adverse, but less than significant **(Class III)**.

Reach 1, the Estuary Reach, is expected to receive approximately one foot of sand deposited over a 50-year period, which would be within the range of natural variability. Any impacts would be adverse, but less than significant **(Class III)**.

Sediment delivery to the ocean would not change substantially until equilibrium is reached. After equilibrium, in approximately ten years, the sediment supply to the ocean would be increased by approximately 32 percent over the without-project condition.

With the exception of induced flooding, evaluated below, sediment related impacts are generally beneficial for the reason that the river channel downstream of the dam would return to sediment equilibrium after approximately ten years. Deposition would occur, which should inhibit the channel erosion that has occurred over the years since the construction of the dam. Sediment delivery to the ocean would be increased. Constructing a sediment bypass would prevent potential adverse impacts at the Robles Diversion and Robles Canal. Because of these potentially adverse impacts at Robles, impacts to private property, utility lines, or other structures caused by lateral erosion, streambed scour, or long-term channel aggradation/degradation are considered adverse, but less than significant **(Class III)**.

Flood Hazards

Alternative 4b would result in a potential increase in flood hazards primarily through sediment deposition that would reduce channel and levee capacity, reduce bridge capacity, and raise flood water surface elevations. Effects would be most notable where aggradation is greatest, as described above.

Current modeling indicates substantial deposition would occur in the channel between the dam (RM 16.5) through the reach occupied by Robles Diversion Dam (at RM 14.15), downstream to San Antonio Creek (RM 13), and further downstream to Casitas Springs (RM 6) during the 50-year project life or during a single, large flood event. The magnitude of the impacts is presented below.

Reach 6, RM 16.5-15.0**,** begins immediately downstream of Matilija Dam and extends downstream to the canyon mouth. The former Matilija Hot Springs facility would be at risk during extremely high flow events, particularly those resulting from debris/mud flow activity. Due to its close proximity to the dam site and channel, the narrowness of the canyon, and the issues related to the volume and proximity of this much sediment, there is no conceivable way of protecting this property. As this property would be purchased and vacated to prevent flood damages, flood hazard impacts would be less than significant **(Class III)**.

All structures at Camino Cielo have a considerable risk of inundation under Alternative 4b. All structures are currently within the 100-year floodplain. About 11 structures cannot be protected by reasonable means and would be purchased due to their close proximity to the channel, the narrowness of the canyon, and the lack of sufficient room for flood conveyance. The location and constricted nature of the Camino Cielo Bridge requires its demolition and restoration of the channel cross section. Removal of this bridge and approaches would improve conveyance through this reach and prevent backwater effects, particularly during high sediment-loaded events. Even in the event of floodway structure and bridge removal, there is the continued threat of inundation to SR 33. A floodwall of approximately 968 feet in length, and a maximum of approximately 11 feet high, would be installed just down slope of the highway. The implementation of these features would reduce flood hazard impacts to less-than-significant levels **(Class III)**.

Reach 5, RM 15.0-14.15, begins at the canyon mouth and extends downstream to immediately upstream of Robles Diversion Dam. Modeling studies indicate sediment deposition of six feet at RM 15.7, ten feet at RM 15.6, and six feet at RM 15.4 downstream of Camino Cielo Bridge. The channel invert elevations would rise an average of approximately four feet between RM 14.2 and 13.7. Plots of the increased water surface elevations caused by sediment deposition indicate approximately six feet at RM 14.4, declining to about one foot at RM 14.2, increasing downstream to over 12 feet at RM 14.1, declining once again to four feet at RM 13.8, increasing once again to 11 feet at RM 13.5, and then declining to 0 feet at RM 13.4.

There are numerous structures located in the Meiners Oaks Area along Oso Road and North Rice Road between RM 14.4 and 14.15 (at Robles Diversion). The first flood elevation of these structures is not drastically above the 100-year floodplain. A combination of levees (2,500 feet) and floodwalls approximately 2,523 feet long is included in the Alternative to reduce the flood-induced impacts. The levee/floodwall feature would extend from approximately RM 14.4 to 13.45 and would tie into high ground at either end. The levee/floodwall would be up to 17 feet high above the existing bank. With these levees and floodwalls, impacts would be less than significant **(Class III)**.

While some deposition does occur between RM 13.4 and 10.4, in Reach 4, no damageable property is located in close proximity to the channel. Plots indicate approximately two to three feet of deposition between RM 10.4 and 9.6, increasing to slightly more than four feet at the bridge at RM 9.38. Plotted increased water surface elevations of slightly less than five feet at RM 7.8 extend downstream to over seven feet at RM 7.1, down to four feet at RM 7.0, and average about that much downstream to RM 6.2.

Robles Diversion is located at the head of Reach 4. It crosses the channel and is situated within the 100-year floodplain. The Robles Diversion Dam would be impacted by sediment-laden flood flows, but is not expected to would suffer severe damage by simple inundation.

There are at least fifty residences located at Live Oak Acres on the north bank of the river between RM 10.4 and 9.4. They are currently protected by a small levee approximately three to four feet high at the upstream end and a newer five-foot levee and floodwall extending down to Santa Ana Bridge at RM 9.4. Alternative 4b includes a levee in the upstream portion of this reach, but due to the close proximity of houses to the channel, only a floodwall could adequately protect the downstream portion of this site. A levee/floodwall approximately 6,512 feet long and approximately 13 feet high at its maximum (about eight feet higher than the existing levee) is included in Alternative 4b. The construction of these levees and floodwalls would ensure that impacts would be less than significant **(Class III)**.

Alternative 4b includes replacement of the Santa Ana Bridge to reduce impacts to many properties on the north side of the channel. The current bridge is only capable of passing a 100-year discharge under baseline conditions. Backwater effects, under heavy bed load conditions caused by Alternative 4b, would occur in a 25-year or larger flood event. Replacement of the bridge would ensure that these impacts would be less than significant **(Class III)**.

Plotted increased water surface elevations of slightly less than five feet in Reach 3 at RM 7.8 extend downstream to over seven feet at RM 7.1, down to four feet at RM 7.0, and average approximately seven feet downstream to RM 6.2.

At least fifty homes are located at Casitas Springs in close proximity to the channel at RM 7.85. A levee at the upper end, with a floodwall adjacent to the mobile home park, and a levee extending downstream from this point, is included to mitigate the protect impacts to this site. The levee/floodwall would be approximately 5,260 feet long, and approximately 15 feet high at its maximum. The increase in levee height would ensure impacts in this reach are reduced to less-than-significant levels **(Class III)**.

Plotted increases indicate deposition that would impact development in Reach 2 occurs from RM 5.2 to 3.8. Flood elevations would increase about three feet and would impact development during major storms. The Cañada Larga area includes residences, a school, the City of Ventura Water Filtration Plant, and a gasoline refinery located on the south side of the channel. Alternative 4b includes raising the existing 10,102-foot long levee. The levee would be raised about three feet to prevent breakout under unusually large event conditions. With the increase in levee height, flooding impacts in Reach 2 would be less than significant **(Class III)**.

Aggradation resulting from Alternative 4b would not increase flood hazards in Reach 1. No flood hazard impacts are anticipated in this reach.

Groundwater and Surface Water Supplies

The removal of Matilija Dam could potentially deplete groundwater or surface water supplies or interfere with groundwater flow or recharge due to increases in turbidity and sedimentation. It is estimated that project-related turbidity increases would cause surface diversions from existing facilities at Foster Park to be reduced by approximately 470 acre feet the first year after construction of the dam, diminishing to no reduction in diversions after six years. The first year reduction amounts to approximately seven percent of total yearly diversion. Total reduction in diversions over the six-year period is estimated at 1,600 acre-feet, which represents approximately four percent of the six-year diversion total. The alternative includes the construction of two groundwater wells at Foster Park to offset the possible reduction. With the inclusion of these wells, impacts to City of Ventura water supply facilities are considered adverse, but less than significant **(Class III)** at Foster Park.

Potential impacts to diversion operations at Lake Casitas are addressed above, and are prevented by the proposed sediment bypass structure. Impacts would be adverse, but less than significant **(Class III)**.

Casitas MWD has a lease with Ventura County to use stored water at Matilija Dam until 2009, when the current lease expires. Matilija Dam provides an average of 590 acre-feet/yearyear of water for Robles diversions under current operating criteria. The safe yield water supply that is estimated to be lost when the Dam is removed in year 2007 is 1,180 acre-feet. Obtaining a similar amount of water from alternative source would offset this loss. At this time, Alternative 4b assumes this would involve purchasing water from the California State Water Project. During Pre-construction Engineering and Design other alternatives, such as obtaining water from groundwater or other less costly sources, would be considered for mitigation. Because the water could be obtained from other sources, the loss of Matilija Dam storage water is considered adverse, but less than significant **(Class III)**.

If large sediment concentrations exist at low flows, it is possible that the riverbed may become clogged with sediment. This could only occur until the next high flows mobilize the sediment, but during this period the yield from subsurface wells may be reduced. For this to occur, the infiltration throughout the entire Ventura River would have to be reduced. Because such an occurrence would be temporary until sediment discharges stabilize, and intermittent as a result of sediments being transported by high flows, this impact is considered adverse, but less than significant **(Class III)**.

Herbicide Use and Giant Reed Removal

Short-term affects to water quality may occur during the removal of giant reed. The Proposed Action would include the use of mechanical and glyphosate-based herbicide for giant reed removal. It is currently anticipated that either Rodeo® or Aquamaster® would be used, both of which are labeled for use within water and have the same formulations: glyphosate (53.8 percent) and water (46.2 percent). Rodeo® and Aquamaster® are currently approved, and in use by the CDFG and USFS for the removal of giant reed in riparian habitats throughout southern California. Glyphosate could enter surface water through three routes: (1) direct application to aquatic vegetation; (2) binding to soil that washes off treated terrestrial sites; or, (3) through drift from treated areas near water. In addition, potential impacts to surface water could occur due to the accidental spill or leaking of herbicides. To minimize possible affects to surface and ground water the use of herbicides would take place over short periods of time, and would be applied either by or under the supervision of a licensed professional to ensure that specific safety measures are followed. In addition, glyphosate remains attached to soil and sediment particles after application, where it is degraded over time by microorganisms. Due to its quick adsorption by soil and the fast action of soil microorganisms, the potential for leaching into surface or groundwater is low and would be considered a less than significant impact (**Class III**).

With the implementation of Mitigation Measures B-11 (Section 5-3), the effects of the Proposed Action with respect to surface and ground water would be considered less than significant (**Class III**).

The removal of the giant reed in the project area may result in a temporary increase in the temperature of surface water. This would result from the removal of vegetation that shades surface water. However, this impact would be considered temporary and less than significant because the Proposed Action involves revegetation with native species, which would ultimately re-shade the area and provide an overall beneficial affect to the watershed (**Class IV**).

5.2.4 Alternative 1 - Full Dam Removal/Mechanical Sediment Transport - Dispose of Fines, Sell Aggregate

Alternative 1 would remove all the sediment stored behind Matilija Dam from the river system. There would be a natural re-supply of Matilija Creek sediment to the downstream reaches. This natural re-supply of sediment would have noticeable impact on reaches located between Matilija Dam and Baldwin Road with the greatest impact near the dam, where approximately three feet of deposition is expected. Because of the re-supply of Matilija Creek sediment, the deposition at Robles Diversion may increase by approximately a factor of two. This would increase maintenance costs and perhaps necessitate a design that reduces the amount of deposition at the site. Silt and clay concentrations in the Ventura River would not be drastically different from the No Action Alternative.

Alternative 1 includes features to minimize the effect of increased turbidity through the mechanical removal of all accumulated sediments behind the dam.

The fine sediment concentrations after the first flood events would not be substantially different from the present condition, but demolition of the dam before the first flood and the mechanical removal of sediment would introduce fine sediment into the river system. In addition, it would be impossible to remove all the fine sediment from the system. The residual sediment would be easily mobilized by the first flows that pass through the reservoir area. These river flows would likely carry high concentrations of sediment until the first flood flow scours the reservoir area.

Because turbidity impacts are temporary, impacts to water quality standards are considered adverse, but less than significant **(Class III)**. No mitigation is required.

Under Alternative 1, the fine sediment concentrations at Foster Park after the first flood events would not be substantially different from the present condition. Therefore, it is expected that the period of disrupted surface diversion would remain similar to existing conditions at approximately 17 days per year. The impact due to the increase in turbidity during this first flow is considered adverse, but less than significant **(Class III)**.

This alternative would have a similar effect with regard to lateral erosion, streambed scour, or long-term channel aggradation/degradation as Alternative 4b. The increase in sediment loads due to the re-supply of sediment may impact the diversion at Robles Diversion through two mechanisms:

- **Deposition at the Robles Canal intake structure.** Deposition at the entrance to the canal may prevent some of the water from entering the diversion canal. Alternative 1 allows the natural sediment loads from Matilija Creek to pass down Ventura River and the coarser fractions of the sediment (coarse sand, gravel and cobbles) to deposit behind Robles Diversion. The sediment deposition is expected to increase by a factor of two to three over current conditions. Under equilibrium conditions, it is estimated that any flood with a return period larger than three to four years would deposit 40,000 cubic yards or more of material behind Robles Diversion. When 40,000 cubic yards or more of sediment deposit behind Robles Diversion, Casitas MWD has problems continuing diversion. A high flow bypass would limit the amount of deposition at the Robles Diversion and would limit the possibility of the diversions at Robles being affected.

- **Deposition in Robles Canal and/or at Fish Screen.** The excessive quantities of sand may not be transported through the fish screen area. Sand generally travels as suspended load in the river and it is possible that large quantities of sand are transported into the canal. Once they reach the fish screen, it is possible that they would deposit due to the reduced velocities there. Under equilibrium conditions, approximately three times as much sand would enter the canal than under current conditions. The increase in sand loads would cause increased maintenance. Because the fish screen facility is new, its ability to function under high sediment load is difficult to determine.

With the implementation of the sediment bypass, this alternative's impact to surface water supplies at Robles Diversion would be adverse, but less than significant **(Class III)**.

Within the reservoir and delta area, under Alternative 1, the sediment trapped behind Matilija Dam would be removed and/or stabilized. No adverse impacts would occur in Reach 7.

Within Reach 6b, there would be a gradual return to pre-dam conditions and it is estimated that approximately three feet of aggradation would occur in this reach. This is slightly less than the four feet of erosion that has occurred since 1971. As such, aggradation here would aid in returning the canyon to natural hydrologic conditions and would be a beneficial **(Class IV)** impact.

Aggradation in Reach 5 would begin after dam removal and continue for up to 50 years when near equilibrium conditions would be attained. Approximately two feet of deposition would occur in the upper portion of Reach 5 with nearly no deposition occurring in the lower portion of Reach 5. This aggradation would help return the reach to a more natural condition and would be a beneficial **(Class IV)** impact.

Within Reach 4, because of the re-supply of sediment to the river channel, the sediment excavation at the Santa Ana Boulevard Bridge would need to be increased. There is no long-term record of sediment excavation at this site so it is difficult to estimate the increase in excavation required. If the Santa Ana Bridge were replaced, as is proposed under this alternative, no sediment excavation would be required thereby providing a beneficial **(Class IV)** impact.

In Reach 3, the impacts are expected to be similar to the No Action Alternative and would be less than significant **(Class III)**.

Within Reach 2, there would be up to three more feet of additional erosion in this reach over the next 50 years. As erosion would continue without the implementation of this alternative, however, impacts would be considered adverse, but less than significant **(Class III)**.

Within Reach 1, deposition is insensitive to the alternative chosen. On average, it is expected that approximately one foot of sand would deposit in the estuary over a 50 year-period. Any impacts would be less than significant **(Class III)**.

Flood hazard impacts under Alternative 1 would be similar to, but less than, those described for Alternative 4b. Under Alternative 1, the aggradation described above would be less than that described for Alternative 4b and so flood protection would be accordingly reduced. All impacts associated with the purchase and removal of property and structures, including the Camino Cielo bridge, and the replacement of the Santa Ana Road Bridge would be the same as described for Alternative 4b. Flooding hazards for areas with levees and floodwalls would be less, but levees and floodwalls would still be modified under this alternative to protect against increased flood flows. Flood impacts to water supply facilities would also be the same as described for Alternative 4b.

In general, the flood water surface elevations are expected to increase substantially as a result of sediment deposition, but Alternative 1 includes a variety of measures, including purchasing and vacating property, constructing or raising levees, and removing and replacing a bridge, to prevent flooding impacts. Since flood impacts would be prevented, impacts would be adverse, but less than significant **(Class III)**.

The groundwater and surface water impacts would be similar to those described for the No Action Alternative except they would occur when the project activities have been completed, approximately two years after completion of construction. Impacts to groundwater or surface water supplies would be adverse, but less than significant **(Class III)**. Affects to groundwater or surface water from giant reed removal would be similar to Alternative 4b.

5.2.5 Alternative 2a - Full Dam Removal/Natural Sediment Transport - Slurry "Reservoir Area" Fines Off Site

Alternative 2a uses the natural flows to erode the delta and the upstream channel. The delta is composed of approximately 13 percent gravel, 54 percent sand, 28 percent silt, and five percent clay and the upstream channel is composed of approximately 39 percent cobbles, 39 percent gravel, 16 percent sand and six percent silt. When flow starts to erode this material, first a narrow deep channel would be created through the material, followed by gradually widening of the channel through the delta deposits. The rate of widening would be dependent upon the flow rate: the larger the flood, the more material removed and the wider the channel through the delta. Because the concentration of silt and clay is small, the turbidity impact would be of relatively short duration. There is approximately 3.9 million cubic yards of material available for transport in this alternative and some of this material would deposit in the upper reaches of the Ventura River. Because the dam is removed in a single phase in this alternative, all the sediment is immediately available for transport. There is considerable uncertainty regarding the deposition downstream of the dam and therefore the levee and floodwall design is necessarily conservative. Large amounts of sediment would deposit in the area impounded by Robles Diversion Dam. During the first few floods sediment eroded from the reservoir would fill the diversion until it starts to spill over the diversion dam crest. Re-designing the diversion dam by including a high-flow bypass or similar structure would reduce the deposition at the site to acceptable levels.

An increase in turbidity may cause water quality problems in Lake Casitas and may increase water treatment costs. Based on the average detention time of water in the reservoir (approximately eight years) it is expected that most of the silt and sand-sized sediment would deposit near the outlet of

Robles Canal into Casitas Reservoir and would not reach the intakes for the treatment plant. However, some small amounts of clay and organic matter may stay in suspension indefinitely in the reservoir. Clays account for approximately five percent of the material in the delta of Matilija Reservoir. For Alternative 2a, the duration of excessive turbidity is expected to be a matter of days as soon as flow is returned to the reservoir area.

The proposed desilting basin at Robles Diversion would decrease turbidity in the flows to Lake Casitas and, thus, impacts to water quality standards or waste would be less-than-significant **(Level III)**.

It would be conservatively assumed that concentrations and turbidity would increase by a factor of ten at Foster Park until the first storm passes. If the concentrations are increased by a factor of ten, the fraction of time that ten NTU is exceeded at the surface intake is increased to 14 percent of the time (or 51 days per year) until the first storm passes. After the first storm, it is estimated that the concentrations would be increased by a factor of two and therefore the surface diversion would be shut down approximately six percent of the time (22 days per year).

Without installation of the two ground water wells proposed for the alternative at Foster Park, impacts to water quality would be significant. However, their installation ensures less-than-significant **(Class III)** impacts to water quality.

Alternative 2a would cause an initial oversupply of sediment that would quickly return the channel to pre-dam elevations. However, the channel may actually aggrade above pre-dam elevations at select locations if sediment is supplied to the river too quickly. The possibility of this excessive aggradation in some reaches would require that levees be constructed higher than the other alternatives.

In Reach 6b, there is over ten feet of aggradation predicted for this entire reach. The large amount of deposition is due to its proximity to the dam and the sudden increase in sediment loads. The ten feet of aggradation may be temporary and the river channel would likely return to elevations similar to Alternatives 1. Rather build a substantial floodwall or levee around the Matilija Hot Springs facility to provide protection, the facility would instead be purchased and removed as a part of project activities. With the removal of the Matilija Hot Springs structures, impacts would be less than significant **(Class III)**.

The sudden re-supply of sediment to Reach 6a would cause large amounts of deposition at Robles. The exact of amount of deposition would be dependent on the storm magnitudes following dam removal. Based on the simulations run using the 1991-2001 hydrology, the full dam removal under Alternative 2a would deposit approximately 90,000 cubic yards the first year following dam removal. This amount of deposition could effectively shut down the diversion operations at Robles for that first year. As described for Alternative 4b and 1, the implementation of the sediment bypass would reduce impacts to less-than-significant levels **(Class III)**.

There is substantial deposition expected from RM 15 to RM 13 (Robles Diversion is at RM 14.15) in Reach 5. The amount of deposition would decrease in the downstream direction. Significant erosion has occurred in the reach downstream of Robles Diversion and it is expected that Alternative 2a would supply enough sediment to this reach to bring the cross sections back to the pre-dam conditions. The initial oversupply of sediment would cause rapid aggradation. Approximately four feet of deposition would occur in the upper portion of Reach 5 with nearly no deposition occurring in the lower portion of Reach 5. As described above, the installation of radial gate sediment bypass structures at the Robles Diversion Dam would reduce impacts to less-than-significant levels **(Class III)**.

At Live Oaks Levee in Reach 4, it is expected that Alternative 2a may deposit an additional 2.5 feet of sediment. Because of the additional sediment being deposited in this reach, it is possible that the County may not have an opportunity to remove sediment before a large flow occurs. The 100-year water surface elevation would then force pressure flow at the bridge and cause water to overtop the levee. Under this alternative, however, the bridge would be re-designed and replaced. Replacement of the bridge would reduce aggradation impacts in Reach 4 to less than significant levels **(Class III)**.

While the GSTARS-1D model described in Appendix E of the Feasibility Study does not predict substantial aggradation in Reach 3 due to dam removal, the analytical model does. In the Casitas Springs area, it is expected that there would be approximately four feet of additional sediment deposition. This aggradation would be a benefit **(Class IV)** to the heavily scoured riverbed in this reach.

There would be up to two more feet of additional erosion in Reach 2 over the next 50 years, but as erosion would continue without the alternative at a similar pace, impacts would be less than significant **(Class III)**.

Impacts to Reach 1 would be the same as described for Alternatives 4b and 1.

With the exception of induced flooding, evaluated below, sediment related impacts are generally beneficial for the reason that the river channel downstream of the dam would return to sediment equilibrium after approximately ten years. Deposition would occur, which should inhibit the channel erosion that has occurred over the years since the construction of the dam. Sediment delivery to the ocean would be increased. Construction of a sediment bypass would prevent potentially adverse impacts at the Robles Diversion and Robles Canal. Impacts would be adverse, but less than significant **(Class III)**.

Flood hazard impacts are the same as described for Alternative 1, and groundwater impacts are the same as described for Alternative 4b. Affects to groundwater or surface water from giant reed removal would be similar to Alternative 4b.

5.2.6 Alternative 2b - Full Dam Removal/Natural Sediment Transport – Natural Transport of "Reservoir Fines"

Alternative 2b removes the dam all at once and allows natural flows to erode all the sediment stored behind Matilija Dam. The initial erosion would take place vertically and cut a deep channel through the reservoir sediments. The concentration of fine sediment downstream of the dam would be exceedingly large, greater than 100,000 mg/l, for a period of days to weeks. After this initial formation of a channel through the reservoir deposits, the flow would begin to cut a deep narrow channel through the delta deposits. When the flow rate increases during a flood, the channel through the delta would become much wider and a considerable amount of sands, gravels and cobbles material would also be removed from the delta. The first two to three storms would carry very high sediment loads downstream. The concentration of fine material would decrease after each storm and is expected to reach near natural levels after two to three storms that are equal or greater than an average annual flood. The deposition impacts in the upper reaches of the Ventura River would be large and the deposition elevations are uncertain. Therefore, large levees and floodwalls are required to provide adequate flood protection.

Large amounts of sediment would deposit in the area impounded by Robles Diversion Dam. In addition to the deposition impacts at Robles, the turbidity impacts would last much longer than in Alternative 2a. However, the desiltation basin proposed for Alternative 2a is considered infeasible for Alternative 2b. Even with implementation of the desilting basin, water diversions could not be assured due to the accumulation of excessive finer sediments. An entire diversion season could essentially be missed or severely impaired if opportunities had to be forgone as a result of having to interrupt operations for potentially extended periods of time to allow for cleanout maintenance.

Thus, it would be necessary to reimburse Casitas MWD for the cost of water from an outside source to mitigate the reduction in safe annual yield. Chapter 3 of the Main Report provides an assessment of the potential water supply losses to Casitas MWD and the cost to import replacement water from an outside water purveyor. The assessment determined that a total of $31 million dollars would be needed to purchase water to provide restitution to Casitas MWD.

H-1 Provide Restitution to Casitas Municipal Water District. Project costs shall be provided for restitution to Casitas MWD totaling $31 million dollars for the cost to purchase water from an outside water purveyor.

The impacts of Alternative 2b are greater than those of Alternative 2a, but with the mitigation described above, these impacts are less than significant **(Class II)**.

Impacts resulting from lateral erosion, streambed scour, or long-term channel aggradation/degradation are the same as described for Alternative 2a. The impacts of Alternative 2b are greater than those of Alternative 2a, but with the project features in Alternative 2b designed to reduce the effects of erosion and aggradation, impacts would be less than significant. Impacts related to flood hazards would be the same as described for Alternative 1. Impacts to groundwater would be the same as described for Alternative 4b. Affects to groundwater or surface water from giant reed removal would be similar to Alternative 4b.

5.2.7 Alternative 3a - Incremental Dam Removal/Natural Sediment Transport - Slurry "Reservoir Area" Fines Off Site

Alternative 3a removes only a portion of the dam at first. A flood is allowed to erode the sediment stored behind the dam and then the remainder of the dam is removed. This alternative has similar impacts to Alternative 2a, but there would be a greater measure of control of the deposition impacts. If, for example, more deposition than expected occurred at a particular location after the first stage of removal, it would be possible to mechanically remove that sediment from the stream channel or raise levees in that area before the next stage of dam removal is started. Therefore, this alternative has a much reduced risk over Alternative 2a. The levees constructed for this alternative would not have to be as high as for Alternatives 2a and 2b because the sediment is released more slowly and would cause less downstream aggradation. However, if the region is experiencing severe drought conditions, it is possible that up to seven years may pass between the first stage and the second.

Impacts to water quality and erosion would be the same as described for Alternative 2a. Impacts to flood hazards would be the same as described for Alternative 1. Impacts to groundwater would be the same as described for Alternative 4b. Affects to groundwater or surface water from giant reed removal would be similar to Alternative 4b.

5.2.8 Alternative 3b - Incremental Dam Removal//Natural Sediment Transport – Natural Transport of "Reservoir Fines"

Alternative 3b has similar impacts to Alternative 2b, but has reduced risks associated with it. The levees may not have to be constructed as high because the sediment is eroded from the reservoir more slowly. The turbidity impacts would also be extended over a longer period because new fines are exposed after each stage of removal. If the region is experiencing severe drought conditions, it is possible that up to seven years may pass between the first stage and the second.

Impacts to water quality would be the same as described for Alternative 2b. The impacts of Alternative 3b are greater than those described for Alternative 2a, but with the mitigation described in 2ab, impacts would be less than significant. Impacts from erosion would be the same as described for Alternative 2b. Impacts from flood hazards would be the same as described for Alternative 1. Impacts to groundwater would be the same as described for Alternative 4b. Affects to groundwater or surface water from giant reed removal would be similar to Alternative 4b.

5.2.9 Alternative 4a - Full Dam Removal/Long-Term Sediment Transport – Long-Term Transport Period

Alternative 4a removes all the sediment storage behind Matilija Dam from the Ventura River System. The sediment is either mechanically removed or permanently stabilized. Therefore, the downstream impacts associated with this alternative are practically identical to the Alternative 1.

Impacts to water quality would be the same as described for Alternative 1. Impacts from erosion, increased flood hazard, or to groundwater would be the same as described for Alternative 1. Affects to groundwater or surface water from giant reed removal would be similar to Alternative 4b.

5.3 BIOLOGICAL RESOURCES

5.3.1 Impact Significance Criteria

In accordance with NEPA and CEQA, the project is evaluated to determine if implementation of the Proposed Action and/or alternatives would have significant adverse impacts to existing biological resources. This section focuses on the potential effects of the Proposed Action and other alternatives based upon the following significance criteria. The project would have a significant adverse impact on biological resources if it would result in the following:

- Substantial loss of individuals of a federal- or State-listed endangered or threatened species such that breeding success or sustainability of the population would be adversely affected
- Substantial loss of populations or habitat of Federal Species of Concern (FSOC) and California Species of Special Concern (CSC) that would jeopardize the continued existence of the species within the region
- Substantial loss of habitat for sensitive species
- Loss or long-term disruption of a major wildlife movement corridor
- Substantial loss of natural vegetation, especially vegetation that is slow to recover
- Substantial loss of species or community diversity in natural vegetation and wildlife habitat, including loss or substantial degradation of wetlands
- Loss of critical habitat designated by the U.S. Fish and Wildlife Service or sensitive plant communities designated by the State Department of Fish and Game.

Impact Analysis

Notwithstanding the significance criteria defined in 5.3.1 above, the evaluation of impacts to biological resources is driven by potential direct and indirect impacts as well as potential ecological benefits that may occur to habitats and species identified as potentially occurring within the proposed project area. These include eleven federally or State listed threatened or endangered species and twenty-four federally or State listed species of special concern (see Table 4.3-4 and 4.3-5 for summary of species' status and occurrence in the proposed project area). The analysis of impacts focuses on direct and indirect effects of project implementation, the temporary and potential permanent losses of habitat, and possible beneficial impacts to sensitive plant and animals that may result from the removal of Matilija Dam. The impact analysis described in this section is based on the preliminary design of the proposed project alternatives and may be revised as a result of design changes.

- **Direct Impacts** result from the physical removal of habitat, diversion of water, the physical loss of individual species, or the immediate loss of nesting or breeding areas.
- **Indirect Impacts** result from construction-generated noise, reduction in air and water quality, increases in invasive species populations, disruption of wildlife corridors, and temporary loss of potential breeding or nesting areas.
- **Permanent Impacts** result in the irreversible loss of biological resources including habitat, sensitive species, breeding areas, or wildlife corridors.
- **Temporary Impacts** result in short term losses to vegetation, nesting and breeding habitat, or disruption of wildlife corridors. Temporary impacts may occur from construction-generated noise, water diversion, sediment transfer, or vegetation clearing.

With the exception to the No Action Alternative, each of the alternatives would require the removal of all vegetation from Matilija Lake. These actions would result in direct but temporary impacts to habitat and sensitive wildlife in this area. In addition, removal of Matilija Dam would result in the direct and permanent loss of lacustrine habitat. However, this habitat would gradually disappear over time as the lake continues to fill with sediment. The goal of the Proposed Action is to remove Matilija Dam, restore passage for steelhead, remove invasive giant cane, and return natural stream dynamics to this section of the Ventura watershed. Specific impacts associated with dam and sediment removal for each alternative are fully described below. See Table 5.3-1 for a comparison of impacts associated with each project component and alternative.

5.3.2 No Action Alternative (Future Without-Project)

Under the No Action Alternative, Matilija Dam would remain in place and the reservoir would continue to fill with sediment. Over the next 40 years, approximately three million cubic yards of sands, gravel, cobbles, and boulders would deposit behind the dam (BOR, 2003). Presently, the majority of the silt and clay suspended in the water column passes over the top of the dam. The combination of silts and clays in the water column and the exclusion of sands and other course material creates an adverse effect on downstream aquatic species and habitats. Adverse effects on habitat are created as sediment starved water removes fine particulate material from the stream course resulting in stream narrowing, erosion of the streambed and banks, and development of a course, boulder dominated, streambed (Mount, 1995). Conversely, uninhibited stream flows carry a natural mixture of boulder, cobble, gravel, sand, clay, and silt materials that are deposited at different intervals within the floodplain reflective of the strength of the most recent flood event. The diversity and episodic nature of streams and streambed materials creates habitat niches within the floodplain for varying wildlife. As a result of sediment deposition occurring behind Matilija Dam, course boulder material currently dominates many areas of the Ventura River. These boulder-dominated areas do not provide the suitable substrate of sand and gravel required by steelhead for spawning.

Under the No Action Alternative, the reservoir capacity is expected to continue to decrease, to approximately 150 ac-ft in 2010 and less than 50 ac-ft by 2020 (BOR, 2003). Over this time period, slow aggradations of Reaches 5 and 6 would occur, as well as increases in deposition at the Robles Diversion Area. In approximately 40 years, sand and gravel would start to pass over the dam, mimicking a more natural distribution of sediment in the water column and streambed downstream. In 100 years, the Ventura River would be in approximate equilibrium, meaning that sediment load entering the river system is in approximate balance with the sediment load exiting the system (BOR, 2003 and Mount, 1995). However, at that time, approximately 4.2 million cubic yards of sand would be permanently sequestered behind the dam and unavailable for beach replenishment, steelhead spawning, or the creation of other habitat types such as riffle and pool formations and sandbars which support a variety of sensitive species including the southwestern pond turtle, western spadefoot toad, and arroyo toad, respectively. Therefore, habitat diversity downstream from the dam is expected to slowly degrade until which time sand and gravel-size sediment is able to pass over the dam crest in approximately 40 years. Most importantly, it is unknown what the effect of another 40 years

Table 5.3-1: Estimated Temporary and Permanent Habitat Impacts (acres)

Restoration Alternative Action Feature	Acreage of Impact	Alt 1	Alt 2a	Alt 2b	Alt 3a	Alt 3b	Alt 4a	Alt 4b	No Project Alternative
RESERVOIR CLEARING		√	√	√	√	√	√	√	
Palustrine Forest Habitat	T: 75.0	T: 75.0	T: 75.0	T: 75.0	T: 75.0	T: 75.0	T: 75.0	T: 75.0	
Wetland Lacustrine Habitat	P: 45.0	P: 45.0	P: 45.0	P: 45.0	P: 45.0	P: 45.0	P: 45.0	P: 45.0	
LEVEES - CAÑADA LARGA			√	√	√	√		√	
Palustrine Forest Habitat (Willow Riparian)	T: 5.5 P: 1.5		T: 5.5 P: 1.5	T: 5.5 P: 1.5	T: 5.5 P: 1.5	T: 5.5 P: 1.5		T: 5.5 P: 1.5	
Palustrine Scrub Habitat (Sage Scrub & Chaparral)	T: 2.5 P: 0.5		T: 2.5 P: 0.5	T: 2.5 P: 0.5	T: 2.5 P: 0.5	T: 2.5 P: 0.5		T: 2.5 P: 0.5	
Barren Earth/Disturbed	T: 1.1		T: 1.1	T: 1.1	T: 1.1	T: 1.1		T: 1.1	
Developed/Paved	T: 2.5		T: 2.5	T: 2.5	T: 2.5	T: 2.5		T: 2.5	
LEVEES - CASITAS SPRINGS		√	√	√	√	√	√	√	
Palustrine Forest Habitat (Willow Riparian)	T: 1.0	T: 1.0	T: 1.0	T: 1.0	T: 1.0	T: 1.0	T: 1.0	T: 1.0	
Palustrine Scrub Habitat (Sage Scrub & Chaparral)	T: 2.8 P: 0.06	T: 2.8 P: 0.06	T: 2.8 P: 0.06	T: 2.8 P: 0.06	T: 2.8 P: 0.06	T: 2.8 P: 0.06	T: 2.8 P: 0.06	T: 2.8 P: 0.06	
Non-native Annual Grassland	T: 5.8 P: 0.34	T: 5.8 P: 0.34	T: 5.8 P: 0.34	T: 5.8 P: 0.34	T: 5.8 P: 0.34	T: 5.8 P: 0.34	T: 5.8 P: 0.34	T: 5.8 P: 0.34	
Developed/Paved	T: 2.1	T: 2.1	T: 2.1	T: 2.1	T: 2.1	T: 2.1	T: 2.1	T: 2.1	
LEVEES - LIVE OAK		√	√	√	√	√	√	√	
Palustrine Forest Habitat (Willow Riparian)	T: 5.1	T: 5.1	T: 5.1	T: 5.1	T: 5.1	T: 5.1	T: 5.1	T: 5.1	
Palustrine Scrub Habitat (Sage Scrub & Chaparral)	T: 1.3	T: 1.3	T: 1.3	T: 1.3	T: 1.3	T: 1.3	T: 1.3	T: 1.3	
Non-native Annual Grassland	T: 5.0	T: 5.0	T: 5.0	T: 5.0	T: 5.0	T: 5.0	T: 5.0	T: 5.0	
Developed/Paved	T: 4.6	T: 4.6	T: 4.6	T: 4.6	T: 4.6	T: 4.6	T: 4.6	T: 4.6	
LEVEES – MEINERS OAKS		√	√	√	√	√	√	√	
Palustrine Forest Habitat (Willow Riparian)	T: 2.9	T: 2.9	T: 2.9	T: 2.9	T: 2.9	T: 2.9	T: 2.9	T: 2.9	
Palustrine Scrub Habitat (Sage Scrub &Chaparral)	T: 2.3 P: 1.2	T: 2.3 P: 1.2	T: 2.3 P: 1.2	T: 2.3 P: 1.2	T: 2.3 P: 1.2	T: 2.3 P: 1.2	T: 2.3 P: 1.2	T: 2.3 P: 1.2	
Oak Woodland Habitat	T: 3.0	T: 3.0	T: 3.0	T: 3.0	T: 3.0	T: 3.0	T: 3.0	T: 3.0	
Barren Earth/Disturbed	T: 2.3	T: 2.3	T: 2.3	T: 2.3	T: 2.3	T: 2.3	T: 2.3	T: 2.3	

Restoration Alternative Action Feature	Acreage of Impact	Alt 1	Alt 2a	Alt 2b	Alt 3a	Alt 3b	Alt 4a	Alt 4b	No Project Alternative
LEVEES – CAMINO CIELO		√	√	√	√	√	√	√	
Palustrine Forest Habitat (Willow Riparian)	T: 1.2 P: 0.23	T: 1.2 P: 0.23	T: 1.2 P: 0.23	T: 1.2 P: 0.23	T: 1.2 P: 0.23	T: 1.2 P: 0.23	T: 1.2 P: 0.23	T: 1.2 P: 0.23	
Palustrine Scrub Habitat (Sage Scrub & Chaparral)	T: 2.8	T: 2.8	T: 2.8	T: 2.8	T: 2.8	T: 2.8	T: 2.8	T: 2.8	
Developed/Paved	T: 1.2	T: 1.2	T: 1.2	T: 1.2	T: 1.2	T: 1.2	T: 1.2	T: 1.2	
WATER PIPELINE									
SLURRY PIPELINE		√	√		√		√	√	
Riverine and Palustrine Habitat (River Water & Willow Riparian)	T: 0.23	T: 0.23	T: 0.23		T: 0.23		T: 0.23	T: 0.23	
Palustrine Scrub Habitat (Sage Scrub & Chaparral)	T: 1.1	T: 1.1	T: 1.1		T: 1.1		T: 1.1	T: 1.1	
SLURRY DISPOSAL SITE		√	√		√		√	√	
Palustrine Forest Habitat (Willow Riparian)	T: 5.0	T: 5.0	T: 5.0		T: 5.0		T: 5.0	T: 5.0	
Palustrine Scrub Habitat (Sage Scrub & Chaparral)	T: 29.0	T: 29.0	T: 29.0		T: 29.0		T: 29.0	T: 29.0	
Oak Woodland Habitat	T: 2.0	T: 2.0	T: 2.0		T: 2.0		T: 2.0	T: 2.0	
Walnut Woodland Habitat	T: 27.0	T: 27.0	T: 27.0		T: 27.0		T: 27.0	T: 27.0	
Non-native Annual Grassland	T: 31.0	T: 31.0	T: 31.0		T: 31.0		T: 31.0	T: 31.0	
DESILTATION BASIN				√		√			
Palustrine Scrub Habitat (Sage Scrub & Chaparral)	T: 3.0 P: 3			T: 3.0 P: 3		T: 3.0 P: 3			
Non-native Annual Grassland	T: 20.0 P: 12			T: 20.0 P: 12		T: 20.0 P: 12			
ACCESS ROADS	N/A								
VCWPD MAINTENANCE	N/A								
TOTAL POTENTIAL IMPACTS	T: 248.33 P: 63.83	T: 213.73 P: 46.83	T: 225.33 P: 48.83	T: 173.00 P: 63.83	T: 225.33 P: 48.83	T: 173.00 P: 63.83	T: 213.73 P: 46.83	T: 225.33 P: 48.83	N/A

T = Temporary Impacts; P = Permanent Impacts; N/A = No Impacts are Expected of sediment starvation would have on the steelhead. In addition, under the no project alternative, 16 miles of prime steelhead spawning habitat would remain unavailable upstream from Matilija Dam.

As part of the No Action Alternative, flood control measures would not occur, including the purchase of the Matilija Hot Springs facility, the purchase and removal of structures and the bridge at Camino Cielo, raising the Santa Ana bridge, construction of new or raising existing levees and floodwalls at Meiner's Oaks, Live Oaks, Casitas Springs, and Cañada Larga. In addition, no sediment transport activities would be undertaken and use of the 94-acre sediment storage site or the proposed desiltation basin would not be required. Therefore, habitats and wildlife within the vicinity of these proposed measures would not be impacted as part of this project. However, with or without the project, the Matilija Dam and reservoir would have negligible effects on controlling peak flows in flood events at the 10-year interval. Furthermore, several locations throughout the study area, including the residential communities and river crossings mentioned above and both the Robles Diversion Dam and the levee at Casitas Springs do not currently have protection against a 100-year flood event (BOR, 2003). Therefore, the structures and communities that are in jeopardy as a result of the Proposed Action would also be in jeopardy as a result of the No Action Alternative. This would likely result in the eventual implementation of flood control measures without the added benefits of dam removal and habitat restoration.

As stated previously, if the dam remains in place, the reservoir would continue to shrink in size as it gradually fills with sediment. Lacustrine habitat would disappear and wildlife that utilizes this habitat type would be required to disperse to other areas containing suitable habitat or perish. Some species that may be affected by the loss of lacustrine habitat include the California red-legged frog and tri-colored blackbird. More common species such as waterfowl and raptors may also reduce in numbers. As lacustrine habitat diminishes, emergent freshwater wetland acreage would initially increase, but would later decrease as the filled land behind the reservoir begins to dry. These benefits; however, may diminish as giant reed continues to spread throughout the area behind the dam and expand further downstream, competing with native riparian species for space, light, and nutrients. Giant reed has been proven to out compete and exclude established plant species and prevent the establishment of native trees and shrubs that are important for wildlife, as well as have adverse effect on water quality, bank stabilization, flood control, and fire regime. Thus, without an intensive removal program, exotic plant species, particularly giant reed, is expected to continue to increase in distribution throughout areas upstream and downstream of the Dam and diminish the ability of the Ventura River to support sensitive species that rely on native willow, cottonwood, and other native riparian species.

Due to the eventual filling of the reservoir with sediment, some benefits to wildlife may result under the No Action Alternative. These include the loss of lacustrine habitat that eliminates suitable habitat for many exotic predators such as bullfrogs and largemouth bass. A second benefit may include the expansion of riparian habitat suitable for the least Bell's vireo, southwestern willow flycatcher, and other riparian dependent species. However, these benefits would also occur under the Proposed Action alternatives as studies have shown that dam removal projects also lower the populations of opportunistic species that are adapted to still-water conditions (Mount, 1995). In addition, native fish and wildlife diversity in formerly impounded reaches has been shown to dramatically increase because they prefer clean, flowing water (Kanehl et al., 1997).

5.3.3 Alternative 4b (Recommended Plan): Full Dam Removal/Long-Term Sediment Transport - Short-Term Transport Period

The following section is an impact analysis of Alternative 4b. The section begins with a discussion of potential impacts addressing the overall ecological effects to the river system, followed by discussion of impacts to individual habitat communities and to sensitive flora and fauna. Each discussion of impacts to sensitive flora and fauna has been subdivided first into federally listed species, followed by State-listed species, and finally sensitive species, including U.S. Forest Service and State Species of Special Concern.

Overall Ecological Effects

Stream and river ecosystems are highly dynamic, changing in response to climatic, geologic, and tectonic conditions of their watersheds (Mount, 1995). Geology, in the form of tectonic plates colliding, results in the uprising of mountain ranges. In turn, the hydrologic cycle of precipitation, runoff, and evaporation work to erode this progress. Streams form a steady state condition or “dynamic equilibrium” in between dramatic, short-lived bursts of change. Floodplains are the buffer that allows streams the flexibility for these bursts. By definition, floodplains are active depositional and erosional environments, prone to floods and shifting materials, storing excess sediments at times of low water, and providing sediments in floods. In addition to the physical processes of rivers, there are biological and biogeochemical processes that work to shape the ecosystem as a whole. In alluvial rivers, such as the Ventura River, riparian vegetation can be the most important factor in controlling channel cross-sections by stabilizing bank sediments with extensive deep root systems (Mount, 1995). In addition, the riparian habitat is the primary source of nesting, breeding, and/or foraging sources supporting wildlife that utilizes the river.

The Matilija Dam and Reservoir has substantially altered the ecology and dynamics of the Ventura River by creating a sediment trap at the dam and controlling peak flows. The dam ensures that virtually no deposition takes place immediately downstream of the dam with the exception of silts and clays suspended in the water column during large rain events. In turn, the Ventura River has narrowed downstream of the dam and the riverbed sediments are made up of primarily coarse boulder material. The reduction in width of the riverbed, as well as the loss of sand, gravel, and cobble-sized sediments has reduced the River’s ability to effectively support many sensitive wildlife species such as the steelhead and possibly the arroyo toad and California red-legged frog. The removal of the Matilija Dam is expected to reverse many of the negative effects of the dam on stream ecology and wildlife over the last 50 years. By removing the dam, there would be a reestablishment of natural sediment and hydrologic flows, and subsequent increase in wildlife use of the Ventura River due to the removal of barriers to up and downstream passage for steelhead and other aquatic species. However, there are short-term impacts associated with restoring these processes and long-term impacts due to permanently removing habitats created as a result of the dam. The impacts, as well as the benefits, to sensitive habitats, flora and fauna are discussed in detail below, but these effects are considered beneficial (**Class IV)** to the overall ecology of Ventura River.

Short-term effects to the ecology of Ventura River system associated with Alternative 4b would occur as a result of temporary and permanent removal of sensitive habitats including lacustrine, riverine, palustrine, and upland habitat types. Impacts associated with downstream sediment transport have been controlled to the greatest extent practicable without permanently removing beneficial sediments from the River. Alternative 4b temporarily stabilizes sediment upstream from the dam in Reach 7 and is designed to allow limited downstream sediment transport during 2- and 5-year flood events and more substantial sediment transport during 10-year storm events or greater. Sediments are expected to erode in the upper and lower portions of Reach 7 over an estimated 20-year period. However, in this same 20-year period, sediment loads would be stabilized after two or three storm events to approximately twice the current levels. This is not considerably higher than what would be expected in a normal, unaltered stream; therefore, the impact to wildlife due to the deposition of sediment is considered adverse, but less than significant (**Class III**). In addition, because the fraction of silt and clay remaining in the delta area would be relatively small, the turbidity impact would be relatively short duration, lasting for the first three storm events (BOR, 2003).

Slurrying reservoir fines and clays downstream to the 94-acre slurry disposal site would also impact annual grasslands and oak woodlands within the historic floodplain of the River. Storing the remaining sediments upstream from the dam would temporarily bury wetland plants, including cattails and sedges, as well as sage scrub and chaparral communities. Although vegetation and wildlife would be displaced during these activities, these areas would be restored at the completion of project construction. Impacts resulting from these activities would be considered adverse, but less than significant after restoration.

Mortality of sensitive wildlife such as small mammals, reptiles, birds, and other less mobile species may result from construction activities associated with Alternative 4b. Short-term construction-related impacts would occur as a direct result of demolition activities associated with dam removal, vegetation clearing, and excavation of sediments. Other potential sources of direct mortality to wildlife may include ground disturbance activities and access by construction vehicles during pipeline construction. Clearing, grading, excavating, and/or burying habitats could also lead to mortality of small mammals, reptiles, and nesting birds with eggs or young. Impacts to wildlife and water quality may also occur as a result of accidental fuel spills.

Potential wildlife mortality related to construction activities would be a potentially significant impact without mitigation (**Class II)**. However, by implementation of Mitigation Measures B-1, B-2, B-3, B-4, B-5, B-6, B-7, B-8, B-9, and B-10 (listed at the end of this section), impacts would be reduced to less-than-significant levels. In addition, by limiting initial brush clearing to periods when wildlife is less abundant, this impact would be reduced to a less-than-significant level (B-5).

Indirect impacts resulting from human disturbance during implementation of alternative 4b would also occur. Harassment of wildlife due to heavy vehicle vibrations or noise could cause displacement of some wildlife to other habitats, which may or may not be able to support additional individuals. Some wildlife may be impacted from noise related to the slurry line operation. These impacts would be considered significant without mitigation (**Class II**). Impacts as a result of increased human disturbance may also include avoidance of preferred habitat areas and reduced reproductive success in local wildlife populations, including special status species such as red-legged frogs. Indirect effects to terrestrial fauna using habitats adjacent to the area may result from reduced food sources, increased predation, increased noise, and decreased cover. These impacts would be considered significant (**Class I**); however, these impacts are expected to be short term and revegetation of the area would ultimately restore quality upland and riparian habitat and eventually lead to recruitment of native wildlife species along this section of Matilija Creek. Therefore, the benefits that would occur over time in this area, including the removal of non-native plant and animal species and a return to natural stream dynamics, would likely offset any initial adverse impacts that would occur during dam removal.

Long-term effects include the loss of lacustrine habitat and the subsequent reduction in the diversity of organisms that prefer this habitat type. These activities would directly impact one federally endangered species, the California red-legged frog, which is known to utilize lacustrine and emergent wetland habitat types in Reach 7. However, even without the implementation of the Proposed Action, the lake and wetland habitats are expected to gradually disappear as the reservoir fills with sediment over the next ten years. Deposition of material in the reservoir, large numbers of aquatic predators currently present in the lake, and the continued infestation of giant reed during the next ten years would likely exclude many aquatic inhabitants including the California red-legged frog. Furthermore, riverine, palustrine, and upland habitats would be restored after construction, but the quantities of each habitat type would change compared to existing conditions. These restored systems would function naturally over the long term and have the potential to create natural habitat niches that are not currently represented in Reach 7, such as riffles and pools, floodplains and sandbars, and secondary channels, all of which provide critical riverine habitat for the endangered steelhead populations. Most importantly, the restored stream would provide improved riparian habitat for resident and migratory birds including the least Bell's vireo and southwestern willow flycatcher, and provide access to an additional 16 miles of prime steelhead spawning habitat. The restored riparian habitat would further be improved through the removal of giant reed and aquatic predators from the headwaters of Matilija Creek to the mouth of the Ventura River Estuary. Aquatic habitats downstream of the dam would be improved through the eradication of exotic predators such as bullfrogs, crayfish, and largemouth bass. Mitigation Measure B-12 would require the development of an aquatic predator removal plan to be implemented during construction of the project. The plan would address the removal of aquatic predators including bullfrogs, crawfish, and non-native fish and would be developed in coordination with the CDFG and the USFWS. Implementation of the aquatic predator removal plan would result in beneficial impacts to native aquatic species in Matilija Creek and the Ventura River (**Class IV**).

Another important ecological benefit of Alternative 4b would be the permanent eradication of giant reed from the Matilija Reservoir, Matilija Creek, and the Ventura River. Giant reed is present throughout the project area and composes a substantial portion of the existing vegetation within the Matilija Reservoir. Populations of giant reed are expected to increase in this area and would likely become the dominant vegetation type as the reservoir continues to fill with sediment over the next ten years. In addition, the reservoir acts as a source of giant reed propagules for the lower watershed as material is washed downstream during large storm events. After the removal of this invasive weed and others such as tamarisk, impacted areas outside of the temporary sediment storage sites protected by soil cement would be revegetated with native vegetation. Removal of giant reed as a component of the project would provide beneficial impacts (**Class IV**) to Matilija Creek and the downstream watershed, as the maintained areas would no longer be a source of propagules for future giant reed infestations. This action would increase the habitat value and function of existing and restored habitats within the Ventura River.

The use of herbicides for giant reed removal may unintentionally affect sensitive plant and animal species that occur within the Ventura River system. The foliar application of herbicides would create a possibility that aerial overspray would drift and come into contact with wetland plant and animal species, thereby, causing damage or removal of native, non-target vegetation or wildlife. In addition, foliar herbicide application would leave vegetation to die and remain in place allowing for an increased risk of fire damage. Impacts to the native wetland vegetation and wildlife would be considered potentially significant without mitigation (**Class II**).

For those methods of giant reed removal that would involve the use of herbicide treatments, a glyphosate-based herbicide would be used. It is currently anticipated that either Rodeo® or Aquamaster® would be used, both of which are labeled for use within water and are considered safe for wildlife when properly applied. CDFG has proven that cut and daub (painting) with Rodeo® or Aquamaster® has been effective in controlling giant reed while not posing a substantial toxicity hazard to non-target species (CDFG, 2001). Due to the disturbances associated with mechanical removal and other activities (flagging, establishing pathways, etc.) prior to herbicide application, terrestrial wildlife would not likely be exposed to direct spray. Similarly, fish and other aquatic organisms would not be expected to be directly exposed to herbicides as mitigation would require that herbicide treatment dose not occur during the wet season or when surface water is within or near the project area. In addition, much of the reservoir water would be drained and a sensitive species relocation effort would be undertaken prior to removal of giant reed further reducing potential impacts to non-target or sensitive species.

Implementation of Mitigation Measure B-11, requiring development of the Giant Reed Removal Plan that requires: (1) the use of approved and water-safe herbicides at concentrations safe for fish and wildlife species; (2) the application of herbicides be conducted by a licensed contractor and trained personnel; (3) restricting herbicide spraying when wind velocities exceed six mph; and, (4) minimizing herbicide spraying when surface water is within or near the site, the proposed herbicide applications would result in less than significant impacts to fish and wildlife species **(Class III)**.

Mitigation Measures

B-1 **Pre-Construction biological surveys.** The Corps of Engineers shall conduct pre-construction protocol-level surveys for least Bell's vireo and southwestern willow flycatcher. In addition, pre-construction surveys shall be conducted for sensitive birds, active nests or roosts in riparian areas that would be subject to project disturbance. If active nests are located, birds shall be flushed prior to construction activities or nests shall be avoided until the young have fledged.

Qualified biologists familiar with species known to inhabit the Ventura River shall be utilized to conduct the surveys.

B-2 **Pre-Construction plant surveys.** The Corps of Engineers shall conduct pre-construction surveys for special-status plant species within all areas subject to project disturbance.

B-3 **Capture and relocate.** The Corps of Engineers shall design and implement a capture and relocation program for California red-legged frog, southwestern pond turtle, and two-striped garter snake prior to construction activities in Matilija Lake, Matilija Creek, and the Ventura River.

B-4 **Agency coordination.** The Corps of Engineers shall immediately contact the appropriate regulatory agencies (Corps, VCWPD, CDFG, and USFWS) if federally- or State-listed or otherwise sensitive flora and fauna are identified during pre-construction surveys. The Corps shall coordinate with the appropriate agencies to develop and institute avoidance, minimization, and mitigation measures prior to proceeding with project construction.

B-5 **Restricted initial clearing.** The Corps of Engineers shall conduct initial clearing of open water, freshwater marsh, and riparian habitats in Reach 7 outside of the breeding season (September 15 through March 15). Clearing of riparian vegetation for levee construction shall be conducted between September 15 and March 15.

B-6 **Fueling.** The construction contractor shall conduct all fueling and maintenance activities a minimum of 100 feet from riparian and wetland habitats or in areas where accidental fuel spills may flow into waters of the state.

B-7 **Construction monitoring.** The Corps of Engineers shall have a qualified biologist present when conducting clearing and grading operations at Matilija Lake, slurry disposal sites, levee locations, and during the removal of giant reed in riparian habitat. The monitor shall move or flush non-sensitive wildlife away from project construction to the extent practicable.

B-8 **Downstream monitoring.** The Corps of Engineers shall conduct monitoring of downstream reaches of Matilija Creek and the Ventura River on a quarterly basis during the first two years of construction activity and twice annually for the duration of construction. Monitoring shall be conducted to document riparian and wetland habitat, and shall note the presence of benthic invertebrates, amphibians, reptiles, fishes, birds, and mammals.

B-9 **Worker training and Best Management Practices.** The Corps of Engineers shall conduct a Worker Environmental Awareness Plan (WEAP) prior to construction and implement related best management practices (BMPs) to reduce downstream impacts from sediment-laden water. The WEAP shall identify any sensitive biological or cultural resources known to occur in the project area, the appropriate BMPs required to reduce water quality impacts, and appropriate trash disposal and maintenance locations.

B-10 **Trash removal.** The construction contractor shall ensure that food and trash are stored in sealed containers and removed from the job site on a weekly basis.

Wildlife Corridors

Wildlife movement in Matilija Canyon and along Matilija Creek would be temporarily disrupted by dam and sediment removal activities for a period of up to ten years. Vegetation, including giant reed, would be removed during the early stages of the alternative, thereafter disrupting wildlife habitat and movement corridors for the duration of the construction. These impacts, particularly for the duration proposed would be considered significant impacts (**Class I**). Mitigation Measures B-3 and B-5 could be implemented to reduce the severity of impacts, but they would likely remain significant. However, due to the proximity of the river to many naturally vegetated areas, wildlife corridors may not be disrupted in all areas. Moreover, left in place, Matilija Dam would remain a substantial barrier to wildlife movement for a number of sensitive species. In addition, following dam removal and restoration activities, the canyon and creek in the vicinity of the Matilija Dam and reservoir would eventually be restored to a natural condition and wildlife movement through the area would resume resulting in a net benefit to wildlife movement (**Class IV**). As such there would be no long-term loss or disruption of wildlife movement corridors. In fact, wildlife movement through the canyon would increase due to the removal of the barrier represented by Matilija Dam, especially for fish and other aquatic species that cannot currently move past the dam. Steelhead would be able to migrate upstream into the upper reaches of Matilija Creek and into historical habitat. As a result of dam removal and stream restoration, approximately 9,500 linear feet of streambed and bank would be restored following the alignment of the 1947 "pre-dam" condition. The stream would be 100 feet wide and provide 22 acres of stream, in addition to 83 acres of restored riparian habitat on the banks (VCWPD, 2004a). Steelhead habitat would include the 22 acres of riverine plus 6.5 acres of lower bank on one side of the new channel between the years 0 and 5 following the deconstruction of the dam. By year 20, natural processes would remove the temporary soil revetment and steelhead habitat would increase to approximately 38 acres. The removal of Matilija Dam would also provide steelhead populations that have been landlocked since the construction of the dam access to the Pacific Ocean and allow a potential return to anadromy. These beneficial impacts (**Class IV**) would be substantial and more than outweigh the temporary impacts resulting from construction.

The removal of Matilija Dam, which is a barrier to wildlife dispersal, would ultimately enhance species diversity by allowing separate populations to more readily move upstream and downstream, especially fish and other aquatic species, including southwestern pond turtle and California red-legged frog, providing beneficial impacts (**Class IV**). Although lacustrine and palustrine habitats along Matilija Creek (at Lake Matilija) would be reduced with the implementation of these alternatives, the reduction in these habitat types is not considered noteworthy since they were created artificially and, although they currently provide habitat for a number of sensitive species, the habitat would eventually be lost without the implementation of an action alternative. These impacts would be considered adverse, but less than significant (**Class III**).

Wildlife movement may also be temporarily disturbed by construction of the desiltation basins and slurry disposal sites. The slurry disposal sites that have been proposed for use during project construction are fully described in Section 4.3 and are located within or adjacent to the floodplain of the Ventura River. Although wildlife may avoid these sites during construction and upstream passage could be temporarily hindered, long-term impacts to wildlife movement are not expected to be significant. In addition, at the completion of construction these sites would be revegetated with native plant species. As only one of the slurry sites would be utilized for storage, wildlife would still have access to large areas of the floodplain for movement and dispersal. In addition, wildlife in this area are currently subject to a variety of human disturbance including, agricultural processes, levee maintenance, and equestrian and pedestrian usage. Short-term impacts may be adverse, but are not expected to be significant (**Class III**). The construction of the proposed desiltation basins is also not likely to substantially affect wildlife passage. The proposed desiltation basins would be constructed adjacent to the Robles canal and would be approximately 15 acres in size. As proposed the basins would occupy habitat consisting of disturbed non-native grasslands. Access to the desiltation basins sites would occur on existing roadways located along the Las Robles canal. Vehicle traffic along these roadways may result in short term impacts to wildlife movement but due to the large open areas adjacent to the canal these impacts would not be considered significant (**Class III**). In addition, construction activities would occur during daylight hours and wildlife would have access past these areas during the night when many species are commonly active.

Construction of the levees and floodwalls may also temporarily affect wildlife movement along both Matilija Creek and the Ventura River but is not likely to substantially limit or disrupt wildlife movement within the watershed. The levee and floodwall located at Camino Cielo Bridge would be approximately 1,000 feet in length and would be located in the area where existing structures currently exist and may already minimize wildlife movement in this area. In addition, dense riparian woodland occurs on either side of the proposed floodwall that would provide cover and refuge for wildlife movement. Removal of the Camino Cielo Bridge would also minimize vehicle traffic in this area providing potential beneficial effects to wildlife movement (**Class IV**).

The proposed Meiners Oaks levee and floodwall would be constructed between the Ventura River channel and a rural residential community consisting or large open properties, orchards, and horse stables. Wildlife may currently utilize this area for passage between the river and adjacent upland habitat. Construction of the proposed levee and floodwall may affect movement to a limited degree but is not likely to adversely affect wildlife passage along this section of the river. Access for wildlife would still remain both up and downstream of the levee, and the proposed structure would border a currently developed area. As the floodplain in this area contains large sections of densely vegetated upland habitat wildlife would still be provided cover and refuge, and impacts would not be considered significant (**Class III**).

The proposed expansion of the Live Oak levee and floodwall would for the most part, occur on an existing levee system. A roadway runs along the top of the existing levee and fenced residential, business, and vacant properties border the area. As this location is currently fenced the majority of wildlife movement for large mammals is likely limited to up and downstream movement along this section of the river. Development of the levee would not substantially alter the existing conditions to wildlife movement and impacts no additional impacts are expected from the new levee.

The proposed Casitas Springs levee and floodwall would be constructed on the existing levee and access road located adjacent to the river channel. Expansion of the levee in this location would result in a substantially higher barrier with the new floodwall. This would prevent the movement of wildlife along this section of the river. However, in many locations the existing levee occurs along disturbed non-native grassland, residential poetries and a mobile home park. In addition, SR 33 runs parallel to the levee and would be substantial barrier to wildlife movement. Impacts to wildlife movement in this area are expected to be adverse, but not significant (**Class III**). In addition, wildlife would still have access in more heavily vegetated areas upstream of the levee and along San Antonio Creek. Similarly, few barriers exist to the west of the levee and no impacts to movement within the river channel would be expected to occur as a result of the levee expansion.

The proposed levee and floodwall at Cañada Larga would be approximately 10,000 feet in length and would be a barrier to wildlife along this section of the river. However, SR 33, the Ojai Valley Bicycle trail, and urban development currently restrict wildlife movement in this area. Although several areas adjacent to the river contain disturbed ruderal habitat the majority of these sites are fenced and would limit movement of most mammals throughout this area. As such while the proposed levee would further restrict wildlife movement to the east wildlife would still be able to disperse into upland areas upstream of the levee. Due to existing barriers in place the proposed levee would not result in significant impacts to wildlife movement in this area (**Class III**).

Operation and Maintenance

Routine maintenance of the existing and proposed levees would occur on an ongoing basis. Maintenance activities would include but not be limited too: (1) Vegetation removal within 15 feet of the levee toe by herbicide application, approximately once every six weeks during rainy years and less frequently in dry years; (2) Repair of damaged levees and structures after major storm events; (3) Cleaning and maintaining culverts after each storm event and inspection of facilities prior to the rainy season; and (4) Maintenance of access roads through regrading or recovering as needed. Routine maintenance activities associated with the proposed project are unlikely to adversely impact wildlife movement within the river valley. These activities would be limited to short-term projects and would occur on or adjacent to the levees. As many of these areas are adjacent to developed properties and are currently subject to existing maintenance operations, pedestrian and equestrian usage, no additional impacts to wildlife movement would be expected. Impacts of routine maintenance would not be substantially different from construction of the levee and would be considered adverse, but not significant (**Class III**).

Sensitive Habitats

Sensitive plant communities within lacustrine and palustrine systems would be impacted as a result of the Proposed Action. These include riparian scrub and woodlands, open water and wetlands, areas of the flood plain including alluvial scrub, and sage scrub habitat. Components of these plant communities are sensitive vegetation types because they provide preferred habitat for a diversity of wildlife species, serve as habitat for both State and federally listed species, provide breeding and nesting habitat for several species of special concern, are of limited distribution within the region, and provide wildlife corridors along both Matilija Creek and the Ventura River. The Corps administrates wetlands, while riparian habitat found throughout the area is an important resource regulated by the CDFG.

Construction activities that would cause direct impacts to habitat include the removal of all native and invasive vegetation from the Matilija Reservoir, the 94-acre slurry disposal site and the proposed desiltation basin prior to excavation; ground disturbance (trenching new stream channel, digging to remove sediments, removal of dam structures); compaction of the new channel bed and sediment storage sites from machinery; and preparation of access routes that disturb surface and subsurface soils. In addition, loss of habitat may occur during levee construction and the raising Santa Ana Bridge along the Ventura River. Habitat and sediment removal would occur primarily during construction and would occur for approximately two years.

Riparian Habitat. Implementation of Alternative 4b would result in the temporary removal of approximately 90 acres of willow riparian woodland associated with removal of all existing vegetation and sediment from the reservoir, construction of sediment storage areas, construction of the levees, and desiltation basin. Restoration of riparian habitat would not occur in the reservoir for approximately ten years after the initiation of the project. However, giant reed removal in Reaches 7, 8, and 9 would occur prior to project initiation and continue in downstream reaches immediately afterwards. Giant reed removal would increase the habitat value and function of the existing riparian habitat; including its ability to support sensitive wildlife during the time frame that riparian habitat is absent in Reach 7. Under Alternative 4b, restored riparian habitat is expected to total approximately 88 acres by the year 20 (VCWPD, 2004a). After which time it is expected that soil revetment within Reach 7 would be removed and riparian habitat would increase by approximately 38 acres (VCWPD, 2004a). Therefore, the temporary loss of 90 acres of riparian habitat would be considered significant without mitigation (**Class II**). With the implementation of Mitigation Measures B-11 and B-12, impacts would be reduced to less-than-significant levels as restoration and giant reed eradication would eventually enhance the existing conditions and improve riparian habitat throughout the Ventura River. Temporary disturbances to riparian habitat impacted during expansion of the levees would be restored at the completion of levee construction. Vegetation disturbed as a result of the proposed slurry and water pipelines would be restored after the transfer of sediment is complete. However, VCWPD removes or limits the recruitment of vegetation within 15 feet of the levee toe by the routine application of herbicides. This activity occurs approximately once every six weeks during rainy years and is less frequently applied during periods of drought. Replanting of riparian vegetation after the installation of the levees would occur outside of the 15-foot buffer area and no vegetation would be allowed to occur in the buffer area maintained by the VCWPD (VCWPD2004b). Because of the regularity of the proposed maintenance activities, it is unlikely that native riparian vegetation would be adversely affected during routine maintenance activities.

Wetland and Open Water. Implementation of Alternative 4b would result in the removal of approximately 46 acres of open water and emergent wetland habitat artificially created by development of the Matilija Reservoir. This estimation is based on vegetation cover and does not address the parameters of hydrology and hydric soils. The majority of the impacts to wetlands and open water would be similar to vegetation clearing described above and would result in long-term permanent significant impacts (**Class I**). Sediment and vegetation removal would impact the existing vegetation, seed bank and eliminate any remaining propagules that contribute to the re-establishment of wetland vegetation. Soils would be impacted during vegetation removal by the direct removal of litter and organic matter along with vegetation, and a reduction in biomass available as new input to the soil. Soils in wetlands would be removed and relocated to adjacent upland storage areas. Removal of sediments would also eliminate soil microbes essential to the reestablishment of wetland plants. Wetland habitat of these types would not likely reestablish in Reach 7 due to the overall goal of restoring riparian and stream processes which typically does not allow water to remain in areas for long enough duration to support emergent wetland vegetation or create hydric soil conditions. However, it is currently expected that open water and marsh habitat would eventually be substantially reduced or eliminated as sediment continues to fill the existing reservoir. This would ultimately lead to the permanent loss of this habitat. Nonetheless, it has been shown that following dam removal fish and wildlife diversity dramatically increase in formerly impounded streams. Therefore, the overall benefits to wildlife by removing Matilija Dam outweigh the loss of these two artificial habitats (**Class IV**).

California Black Walnut Communities. Impacts to California black walnut communities may occur as a result of clearing and grading, sediment removal and storage, or levee raising activities. California black walnut communities occur in scattered populations throughout the Ventura River and along the paved roadway north of Matilija Reservoir. A small community occurs within the proposed 94-acre sediment storage area adjacent to the community of Meiner's Oaks. Removal of California black walnuts may occur, but impacts to this species would be minor and would not pose a significant loss to this native community. Impacts to this community would be considered less than significant (**Class II**) with implementation of Mitigation Measure B-13.

Sage Scrub. Construction activities associated with dam removal, vegetation clearing, levee-expansion, construction of the desiltation basins, slurry disposal sites, and bridge modification may result in temporary impacts to approximately 33 acres of sage scrub and chaparral habitat. Impacts to these communities would be temporary and would not result in the significant impacts to this community. In addition, at the conclusion of dam and sediment removal activities, areas disturbed by project construction would be revegetated with native species. Removal of the existing Matilija Dam would ultimately result in the removal of exotic species and a restoration of existing sage scrub and chaparral habitats in and adjacent to the Matilija reservoir. This action would provide for an overall beneficial impact to sage scrub habitats and impacts to these communities would not be considered significant (**Class III**).

Oak Woodland. Oak woodlands are known to occur within the proposed 94-acre sediment storage area adjacent to the community of Meiners Oaks. Direct impacts to this species would occur through vegetation clearing, levee construction and sediment deposition and storage. Significant impacts to this species would occur without mitigation. By implementation of Mitigation Measure B-14 (Oak and Walnut Replanting) requiring replanting of native oaks at the conclusion of construction, impacts to oak woodlands would be reduced to less-than-significant levels (**Class II**).

Mitigation Measures

B-11 Giant Reed Eradication. The Corps of Engineers shall develop and execute a giant reed eradication program that includes monitoring during post deconstruction restoration activities. Eradication efforts shall begin prior to the dam removal in Reach 7, 8, and 9, continuing throughout the downstream reaches immediately afterwards. The Giant Reed Eradication Plan shall be submitted to the CDFG and USFWS for review and comment prior to implementation. The plan shall include measures to prevent permanent or temporary impacts to wetlands and associated sensitive vegetation and wildlife during herbicide treatments of giant reed. The plan shall ensure that all activities requiring herbicide treatment would:

- Ensure that herbicides are not applied during the wet season (November 1st to April 15th) to avoid potential impacts to downstream vegetation where feasible, and to avoid impacts to fish and wildlife species.
- Ensure that only water-safe and surfactant-free herbicides are used. Treatments shall use a glyphosate-based herbicide including Rodeo® and/or Aquamaster®, both of which are labeled for use within water.
- Ensure that herbicides are applied at concentrations that are considered safe for biological resources within and adjacent to the project area.
- Ensure that herbicides are mixed with a non-toxic, water soluble dye of low toxicity that highlights treated areas.
- Minimize overspray of herbicides onto non-target species by restricting herbicide spraying when wind velocities exceed six mph.
- Minimize trampling of native vegetation by establishing marked trails prior to project implementation.
- Remove dead giant reed material that was foliar treated and left in place to avoid fire hazard potential prior to the beginning of the fire season. Material shall be removed when spring access is permitted and before the ensuing fire season begins (between April 15 and the beginning of the fire season).
- Have a licensed professional conduct or oversee herbicides applications.

B-12 Predator removal plan. The Corps of Engineers shall develop and implement a predator eradication plan in consultation with the CDFG and USFWS. The plan shall include specific measures to reduce the number of aquatic predators in Matilija Reservoir and minimize the potential for release of these species downstream during dam removal.

B-13 Restoration plan. The Corps of Engineers shall develop and implement a Habitat Restoration Program for all areas disturbed by project construction including giant reed removal.

B-14 Oak and walnut replanting. The construction contractor shall replace any native oaks or California black walnut trees removed during project construction.

Sensitive Flora

Federally Listed as Endangered or Threatened. No federally-listed, endangered, or threatened plant species have been identified as occurring within the proposed project area, and none are expected to occur. Impacts to federally listed species would be considered less than significant (**Class III**).

State-Listed as Endangered or Threatened. No State-listed, endangered, or threatened plant species have been identified as occurring within the proposed project area, and none are expected to occur. Impacts to State listed species would be considered less than significant (**Class III**).

Sensitive Plant Species. Eleven plant species listed as sensitive by the CNPS and USFS were identified with the potential to occur within or adjacent to the proposed study area. With the exception of California black walnut, which was identified near Matilija Dam, these species were not observed during vegetation surveys conducted in 2002. Species identified as having the potential to occur within the proposed project area are listed in Table 4.3-4 and include:

- **Aphanisma** (*Aphanisma blitoides*) a List 1B species,
- **Mile's milk vetch** (*Astragtalus didymocarpus* var. *davidsonii*) a List 1B species,
- **Davidson's saltscale** (*Atriplex serenana* var. *davidsonii*) a List 1B species,
- **Late-flowered mariposa lily** (*Calochortus weedii* var. *vestus*) a List 1B species,
- **Southern tarplant** (*Centromadia parryi* ssp. *australis*), a List 1B species,
- **Island Mountain Mahogany** (Cercocarpus betuloides var. blancheae) a List 4 species,
- **Ojai fritillary** (*Fritillaria ojaiensis*), a List 1B species
- **California Black Walnut** (*Juglans californica var. californica*) a List 4 species,
- **Coulter's goldfields** (*Lasthenia glabrata* ssp. *coulteri*), a List 1B species,
- **Sanford's arrowhead** (*Saggittaria sanfordii*), a List 1B species, and
- **Salt spring checkerbloom** (*Sidalcea neomexicana*), a List 2 species.

No federal- or State-listed plants are expected to be impacted by project activities including vegetation clearing, dam removal, levee raising, or at any of the desiltation and slurry disposal sites. In addition, there is no indication that any sensitive or rare plants occur in the study area. Extensive botanical surveys and vegetation mapping conducted by Magney (DMEC, 2002) did not identify any sensitive plant species within the study area. However, rainfall from July 2001 through June 2002 was well below normal across most of southern California, including most of Ventura County. Ojai received approximately 8.03 inches of rain (37 percent of normal) while Ventura received approximately 6.91 inches of rain (45 percent of normal) (National Weather Service, 2002). It is possible that sensitive annual species such as southern tarplant and Coulter's goldfields may have failed to germinate or flower. Furthermore, bulb-forming species such as the Ojai fritillary and late-flowered mariposa lily may have failed to grow or flower and would not have been observed during the previous surveys. This phenomenon was noted throughout southern California during 2002.

Adjacent habitats also have the potential to support sensitive species, particularly upland slopes of sage scrub and chaparral. With the exceptions of Sanford's arrowhead, southern California black walnut, and salt spring checkerbloom, all of the species listed above are residents of upland communities. In addition, many of the species listed above have the potential to be extant in the study area even though they were not observed during surveys (USFWS, 2003). Therefore, the following is a discussion regarding potential areas of impact and precautionary mitigation measures.

Potential direct impacts to sensitive plants could occur if present as the result of the removal of the dam and subsequent temporary and permanent loss of approximately 130 acres of riparian and wetland habitat in Reach 7, and the loss of 33 acres of upland habitat. Impacts could also occur at the proposed slurry sites, levee expansion areas, or along the proposed pipeline routes. The slurry storage sites within Reach 7 are dominated by giant reed and sensitive species are not expected to occur in this area. Construction at the Cañada Larga and Camino Cielo levee sites would likely result in temporary impacts to sage scrub, chaparral, and oak woodland plant communities. Impacts to sensitive plants could occur if present during the removal of giant reed. Mechanical removal and herbicide use has the potential to affect habitat adjacent to giant reed populations. Implementation of Mitigation Measure B-11 (safe application of herbicide, pre-construction surveys for sensitive plants) would reduce impacts to sensitive plants to less than significant levels (**Class III**).

The 94-acre slurry disposal site in Reach 5 is vegetated with grasslands, scrub, chaparral, oak, and walnut woodlands, with approximately ten percent palustrine scrub/shrub forest. The proposed slurry pipeline has the potential to impact approximately two acres of palustrine forest, 1.1 acres of upland scrub, and 0.23 acres of wetland habitat. The pipeline would be constructed above ground and the primary pipeline routes are along exiting dirt access roads, agricultural land and are not expected to impact vegetated areas. Construction of the water pipeline would occur adjacent to the Lake Casitas water canal, existing access roads, and agricultural land. The water pipeline would meet the slurry pipeline near the Camino Cielo Bridge and no additional impacts to vegetated areas are expected to occur.

Although sensitive plants are not expected to occur, and have not been observed within the project impact areas, the low rainfall during the botanical survey period may have prevented detection of some sensitive plant species. To minimize potential impacts to special-status plants, pre-construction focused surveys would be performed within areas subject to direct impacts prior to project implementation (Mitigation Measure B-2, Pre-Construction Plant Surveys). If special-status plant species are found within areas to be impacted by the project, avoidance and minimization measures would be developed in consultation with the Corps, VCWPD, CDFG, and USFWS (Mitigation Measure B-4, Agency Coordination).

Indirect effects to sensitive plant species, if present, could include a short-and long-term reduction in water availability resulting from water diversion, soil compaction, or disruption of existing native seed banks. These actions may result in reduced habitat quality for aquatic and riparian plants in general, but would be temporary in nature and not considered significant (**Class III**).

Implementation of Alternative 4b may ultimately lead to beneficial effects (**Class IV**) to sensitive plant species as a result of eradication of invasive plants including giant reed, restoration of uplands, and a return to natural stream dynamics.

Sensitive Fauna

This section addresses wildlife species that may inhabit the study area and are protected under the Federal Endangered Species Act, California Endangered Species Act, and Migratory Bird Act or listed by the CDFG as California species of concern, or are Fully Protected species. There are approximately 35 species of threatened, endangered, rare, or species of special concern that are known to occur within or adjacent to the study area or have the potential to occur within the study area. These species include: 3 fish, 2 amphibians, 4 reptiles, 24 birds, and 2 mammals (Table 4.3-5 of Section 4.3.3.2). Some of these species such as the California red-legged frog, southwestern pond turtle, southern steelhead, arroyo chub, osprey, and peregrine falcon, have been observed within the study area.

Of the 35 sensitive wildlife species, which either occur or have the potential to occur within the Ventura River and Matilija Creek, only the eight federal- or State-listed threatened or endangered species and six federal or State species of species concern listed in Table 4.3-5 have a high likelihood of occurring in the proposed project area.

As mentioned in section 4.3.3.2, Biological Assessments are prepared to comply with section 7 of the Federal Endangered Species Act, and appear in Appendix C1 for the endangered steelhead (which is under the jurisdiction of the National Marine Fisheries Service) and in Appendix C2 for species under the jurisdiction of the US Fish & Wildlife Service. They are: the southwestern willow flycatcher, least Bell's vireo, yellow-billed cuckoo, California red-legged frog, arroyo toad, western snowy plover, brown pelican, California least tern, tidewater goby, and California condor.

The "may affect", "no effect", and/or "likely to adversely affect" determinations by the action agency (i.e., the Corps) per federal regulations on interagency cooperation regarding compliance with the Endangered Species Act (50 CFR 402) are contained in those appendices. The reader is directed to those two appendices for specifics on compliance with the Federal Endangered Species Act.

Fish

Federally Listed as Endangered or Threatened

Steelhead (*Oncorhynchus mykiss*) is a form of rainbow trout that are native to the Pacific coast streams from Alaska south to northwestern Mexico. The population in this area is considered a federally endangered evolutionary significant unit (ESU).

Direct impacts to the steelhead may result from the dispersion of sediments into the water column during dam removal and sediment stabilization activities. Sediments could damage spawning grounds, and negatively impact water, habitat, and food quality. Large sediment pulses may partially or completely fill channels, resulting in temporary or permanent changes to the channel course. Sediment and fine particulate matter can fill interstitial spaces between gravel and result in lower oxygen content or smothering and subsequent mortality to egg masses. Increases of sediment may also fill in pools and spawning habitat, clog gill structures, reduce visibility, and result in abrasions to migrating fish. In order to control these events from occurring and/or limit their effects, the majority of fine sediments of silt and clay would be transported to the downstream 94-acre slurry site and stabilized to a 50-year event. These types of fine sediments are the most detrimental to aquatic life and especially to steelhead as they can reduce the permeability of the gravel and impair inter-gravel water flow needed to provide oxygen and remove metabolic wastes from embryos (Kondolf, 2003). By stabilizing these sediments downstream, it is expected that after two or three storms, the turbidity levels would be no more than twice the natural levels. The short-term effects of aggradation during the first two storm events may result in significant impacts to steelhead **(Class I)**. After the third storm passes, the concentrations should return to near natural levels. In addition, aquatic organisms have evolved under natural disturbances such as sediment pulses and have been documented as recovering rapidly (USACOE, 2004), often within 2 or 3 years (CDPHE, 2000 and NMFS, 2001). Therefore, potential short-term impacts to steelhead as a result of increased sediment load and turbidity are considered adverse and significant (**Class II**). Potential long-term impacts resulting from fine sediment transport associated with implementation of Alternative 4b may be adverse, but not significant (**Class III**).

Course material that is less damaging to water quality would be temporary stabilized at three locations within Reach 7. Three levels of protection incorporating soil cement revetments would be used such that areas with higher proportions of fines are more protected. The lower soil cement revetments would be allowed to erode during 2- and 5-year events, estimated at between 3,000 to 7,500 cubic feet per second. The higher revetment would overtop and erode in 10-year storm events or greater, estimated at 12,500 cubic feet per second. Soil revetments would not protect other smaller areas that would erode under the low flow events. This approach allows for sediment to erode in the upper and lower portions of the reach over an estimated 20-year period while at the same time the amount of sediment suspended in a storm event, up to a 10-year event, is not expected to be substantially higher than normal. In addition, because the fraction of silt and clay remaining in the delta area would be relatively small, the turbidity impact would be relatively short duration, lasting for the first three storm events as stated above (BOR, 2003). Furthermore, sediment movement in streams contributes to habitat complexity and diversity by redistributing spawning gravels, formation of riffles, channel widening, increase channel braiding, and contribution to channel movement (USACE, 2004). Therefore, the diversity of habitats created by dynamic sediment transport contributes to the biotic productivity of the riparian ecosystems, including that of the steelhead.

The removal of Matilija Dam would clearly benefit steelhead populations in the Ventura watershed (**Class IV**). However, it is difficult to quantify the exact benefits to steelhead, as it is difficult to predict how the existing population would rebound and in what timeframe. The removal of the dam would open 16 miles of prime steelhead spawning habitat to the species. The accessibility of this additional habitat would result in the net gain of spawning habitat even with the temporary loss or degradation of spawning habitat in the lower river. Eventually, a natural free-flowing river would result in normal sediment deposition downstream that would assuredly lead to better habitat for steelhead where only course boulder streambeds currently exist. This is expected to occur within ten years following the beginning of deconstruction activities. Therefore, the deposition of sediment is expected to be gradual and not expected to cause any blockages or barriers to fish passage or migration (USACOE, 2004). With respect to hydrology, the Matilija Dam does not currently restrict low flows and has a negligible impact on the peak flows of floods over a 10-year interval (BOR, 2003). By restricting peak flows, natural fluctuations in hydrology (hydrodynamics) downstream are altered. In the absence of the dam, not only is natural sediment transport restored, but also the fluctuations of hydrologic peaks which are likely beneficial to steelhead migration to natal spawning habitat.

Alternative 4b allows for restoration of natural stream transport, dispersion of sands and gravels necessary to create improved steelhead spawning habitat, migration to upstream habitat areas currently cut off by the Dam. Overall aquatic wildlife movement through the canyon would be enhanced due to the removal of the barrier represented by Matilija Dam, especially for fish. Steelhead would be able to migrate upstream into the upper reaches of Matilija Creek and into historical habitat. As a result, available spawning habitat for migrating steelhead would be substantially expanded in the Ventura River watershed. The removal of Matilija Dam would also provide steelhead populations that have been landlocked since the construction of the dam access to the Pacific Ocean and allow a potential return to anadromy. These beneficial impacts (**Class IV**) would more than outweigh the temporary impacts resulting from construction.

Tidewater goby is a small federally endangered fish known to occupy habitat in the Ventura River Estuary and have been observed upstream approximately two miles north of the Main Street Bridge (Hunt and Lehman, 1992). The decline of the species likely occurs by similar events as with the steelhead including water diversions, pollution, siltation, and urban development.

Potential impacts to this species are not likely to occur as a result of dam removal, sediment storage or vegetation removal as these actions would occur in areas not currently inhabited by this species. Direct and indirect impacts to the estuary and the tidewater goby due to sediment transport are not expected as sediment would be stored in upland sections of the river and upstream reaches are currently sediment starved and would accumulate any downstream transport of sediment (BOR, 2003). In fact, benefits to the Estuary by increased sediment transport are not expected to occur for approximately 20 years (VCWPD, 2004b). It is estimated that it would require 50 years for Reaches 1, 3, and 5 to fill in the nutrient and sediment deficits caused by Matilija Dam.

State Listed as Endangered or Threatened

There are no known State-listed fish that inhabit Ventura River or Matilija Creek.

Sensitive Species

Arroyo chub, a California-State species of special concern and USFS sensitive species have been observed within one mile of the Main Street Bridge, located near the intersection of 101 Freeway and Highway 33 (Hunt and Lehman, 1992).

Direct impacts to arroyo chub are not expected to occur during Dam removal or vegetation clearing. This species has only been observed near the mouth of the river and estuary as described above. However, direct impacts to the species could occur levee construction, giant reed removal, or raising of the Santa Ana Bridge. These impacts may be adverse if the species is present but would not be significant (**Class III**). Indirect impacts could occur from decreases in water quality through sediment transport and the reduction of aquatic vegetation buried by increased sediment loads. In addition, herbicide associated with giant reed removal could affect water quality without mitigation. These impacts may adverse but not significant (**Class II**). Indirect impacts could also result from an increase or concentration of predator populations by releasing exotic species such as crayfish, bullfrogs or large mouth bass from Matilija Lake. Implementation of Mitigation Measures B-11, B-12 (Giant Reed and

Predator Eradication), B-8 (Downstream Monitoring), and B-9 (Worker Training and Best Management Practices) would further reduce any adverse impacts to this species. In addition, the arroyo chub has been successful in transplanted streams outside of its range; therefore, the likelihood of impacts from the Proposed Action threatening the regional populations of the arroyo chub are considered less than significant (**Class III**).

Benefits to the species as a result of the Proposed Action include access to habitat upstream of the existing Matilija Dam, removal of exotic species including giant reed and aquatic predators, re-establishment of suitable substrate, and a return to natural stream processes. Over time, it is expected that the stream would naturally create pools and aquatic vegetation in locations downstream from the Dam that are currently sediment starved thereby providing beneficial habitat to the species (**Class IV**).

Amphibians

Federally Listed as Endangered or Threatened

California red-legged frog (*Rana aurora draytonii*). A federally threatened and California state species of special concern, one individual was identified approximately 0.75 mile upstream of the dam. In addition, the species is known to occur in San Antonio Creek, approximately four miles southeast of Matilija Creek (USFWS, 2000; URS, 2000) Direct impacts to the California red-legged frog could occur in Reach 7 due to the permanent loss of lacustrine and emergent wetland habitat types utilized for breeding or through direct mortality as a result of construction activity. Examples of potential impacts include crushing from mechanized equipment, loss of breeding pools, sediment aggradation, and disruption of egg masses. Breeding behavior could also be disrupted due to construction noise, lighting, and the timing of construction activities. Potential indirect impacts may also occur from other construction related activity including fuel, lubricant, or spills of construction waste. These impacts could be considered adverse and potentially significant without mitigation (**Class II**). However, with implementation of Mitigation Measures B-3 (Capture and Relocate) and B-7 (Construction Monitoring), as well as proper implementation of required water quality and construction best management practices, direct impacts could be minimized or completely avoided (USFWS, 2003). Even without project-related disturbance, suitable breeding and rearing habitat would diminish over time as sediment and giant reed continue to fill in the reservoir and adjacent riparian habitat.

Indirect effects may result from a variety of mechanisms, including an increase in the density of predator species as water is released from Matilija Reservoir and impacts to water quality from downstream sediment transport, or herbicide use during giant reed removal. Additionally, if diversion of water is required during construction, changes in flow may strand egg masses of juvenile meta-morphs. Premature drying of natal pools, would likely affect the survival to metamorphosis. Survival to and immediately after metamorphosis is generally acknowledged to be a crucial phase in the life cycle of amphibian species; factors that affect recruitment at this stage may have significant short and long-term impacts to a population. By implementation of Mitigation Measures B-11, B-12 (Giant Reed/ Predator Eradication) and B-3 (Capture and Relocate), indirect affects to this species would be reduced to less-than-significant levels with mitigation (**Class II**).

Beneficial effects to this species are likely to occur over time from restored stream processes including the development of natural pools, the recruitment and establishment of native riparian vegetation, and the removal of exotic predatory species such as crayfish and bullfrogs by the implementation of Mitigation Measures B-11, B-12 (Giant Reed/Predator Eradication), and B-8 (Downstream Monitoring). In addition, the restoration of stream and riparian areas in Reach 7 would also include permanent and temporary ponds that would likely provide suitable pools for breeding resulting in a beneficial impact to this species (**Class IV**).

State Listed as Endangered or Threatened

There are no known State-listed amphibians that inhabit Ventura River or Matilija Creek.

Sensitive Species

Western spadefoot toad. This species is a federal and State species of special concern with populations that range throughout the Central Valley and adjacent foothills. Potential habitat within the study area occurs in the Ventura River floodplain near Oak View in Reach 3, but no toads have been observed in the area. In addition, there are no known records of toads existing in the Ventura River or Matilija Creek (USFWS, 2003). Predators including bullfrog and crayfish may limit the distribution of this species within the study area.

Because of predator populations, the western spadefoot toad is not expected to occur within the study area; therefore, direct and indirect impacts to this species are not expected to occur as a result of the proposed activities.

Reptiles

Federally Listed as Endangered or Threatened

There are no known federally listed reptiles that inhabit Ventura River or Matilija Creek.

State Listed as Endangered or Threatened

There are no known State-listed reptiles that inhabit Ventura River or Matilija Creek.

Sensitive Species

Southwestern pond turtle. Southwestern pond turtle, a federal and California-State species of special concern were identified at Matilija Lake and at several locations along the Ventura River and Matilija Creek.

Direct impacts to this species may occur as a result of the Proposed Action via the loss of lacustrine habitat and upland breeding sites in Reach 7 in addition to impacts at two bridge crossings, Camino Cielo and Santa Ana. These impacts would be associated with the removal of vegetation, excavation or blasting of the Dam face or bridge crossings, mechanical crushing, diversion of water, placement of soil cement, and human trampling. Impacts to this species would be considered significant without mitigation (**Class II**). Impacts to this species can be minimized to a less-than-significant level by implementing Mitigation Measures B-1 (Pre-construction Biological Surveys) and B-3 (Capture and Relocate).

Indirect impacts to southwestern pond turtle could result from temporary impacts to water quality, temporary loss of upland nesting sites, foraging habitat, disruption of breeding activity, the disturbance of basking sites or basking activity, and the increase or concentration of terrestrial and aquatic predators during the construction phase. Indirect impacts could also occur by the over application of foliar herbicides during giant reed removal. Juvenile southwestern pond turtles typically move from nesting sites in adjacent upland or riparian areas to the stream in the spring (Buskirk, 1992). Hatchlings are very small, often less than one inch, and may be inadvertently trampled during project construction. In addition, access to zooplankton, an important hatchling food source, may be disrupted if water quality were to be severely degraded by project construction or is lost as a result of the draining of lake water. Similar to the direct impacts above (**Class II**), these impacts can likely be minimized by implementation of Mitigation Measure B-1 (Pre-construction Biological Surveys), as well as Mitigation Measures B-7 (Construction Monitoring) and B-9 (Worker Training and Best Management Practices) and B-11 (Giant Reed Removal).

Because this species utilizes adjacent upland areas to bask, there is also a low likelihood that maintenance of levee structures may affect this species. Impacts could occur during routine herbicide application and culvert maintenance if temporary ponds or sandy bars utilized by this species exist near the toe of the levee slope. Maintenance activities are long-term impacts as they occur on an annual or more frequent basis, but are individually of short duration. Herbicide application for routine maintenance would be limited to Rodeo® or Aquamaster®, both of which are labeled for use within water and are considered safe for wildlife when properly applied. Nonetheless, these activities have the potential of being adverse and significant without mitigation, yet they are difficult to measure because of the regular nature of the activities and the unknown future locations of turtles. Implementation of Mitigation Measure B-16 (Development of a Maintenance Program) would reduce impacts to sensitive wildlife to less-than-significant levels.

Beneficial effects to this species include the development of natural stream channels, the deposition of large logs, boulders, and other areas utilized for basking sites, the establishment of native riparian and upland vegetation, the development of friable terrace soils suitable for oviposition, and over-wintering habitat. In addition, although southwestern pond turtles prefer calm standing water found within lacustrine habitat and deep pools in riverine habitat, the detrimental effects of predation to juvenile turtles by the large numbers of aquatic predators identified in Matilija Lake may outweigh any benefit received by adult turtles. Most pond turtle populations in southern California appear to be dominated by mature adults suggesting a lack of successful recruitment by juveniles. This has been linked to large numbers of aquatic predators specifically, bull frogs and crayfish (Hunt, 2003). Therefore, the removal of aquatic predators including crayfish, bullfrogs, and large mouth bass would likely improve the reproductive success of existing pond turtle populations over time and crayfish reduce the numbers of aquatic predators which prefer slow moving water found in Matilija Lake. In addition, existing lacustrine habitat in the reservoir is expected to decline from continued sediment deposition. The restoration of coarse sediment transport would provide suitable upland habitat for egg sites and over-wintering. Therefore, alternative 4b would likely result in an overall net benefit to southwestern pond turtles (**Class IV**).

Silvery legless lizard's (*Anniella pulchra pulchra*) is a small, secretive species currently listed as a federal and State species of special concern. The species is known to occur at the mouth of the Ventura River within coastal dune habitat (Hunt and Lehman, 1992).

The silvery legless lizard is not expected to utilize habitat in Reach 7 and impacts to this species are not expected to occur. Suitable habitat for this species does occur within coastal dune areas west of the Ventura River (USFWS, 2003). However, beach erosion, recreation, and commercial and residential development of the beaches and dunes has eliminated this species form this area (USFWS, 2003). Therefore, direct impacts to this species as a result of the construction related activities are not expected to occur.

Coastal western whiptail is a California species of special concern. The species were observed in the upland areas in the northern portion of the study area (USFWS, 2000); however, the location of the observation was not mapped. It is assumed that the observation occurred in Reach 7b or further north due to the habitat requirements of the species.

Direct impacts to this species may occur as a result of vegetation and sediment removal at Matilija Dam, the 94-acre sediment disposal site and the desiltation basin areas. This species may also be impacted by giant reed removal from the headwaters of Matilija Creek. Depending on giant reed infestation, methods used for removal would include mowing large patches or aerial spraying of individual patches using herbicides. Impacts to this specie would be significant without mitigation (**Class II**). With the implementation of Mitigation Measure B-3 (Capture and Release), B-7 (Construction Monitoring), and B-11 (Giant Reed Removal) impacts to this species would be reduced to less-than-significant levels.

Long-term benefits of Alternative 4b to the coastal western whiptail include the restoration of additional dry wash and upland areas in the northern study area.

Two-striped garter snake is a California-State Species of Special Concern that is known to occur in the proposed project area.

Direct effects to the two-striped garter snake, if present, could occur from construction activity as a result of mechanical crushing, loss of nesting, breeding or thermoregulation sites, and human trampling in both aquatic and upland areas. Disturbance would be associated with the removal of vegetation, excavation of bridge footings, diversion of water flow, and placement of riprap on levees or soil cement at temporary stabilization sites. Direct losses to this species could occur as a result of the Proposed Action and would be significant without mitigation (**Class II**). By implementing Mitigation Measures B-1 (Pre-construction Biological Surveys), B-3 (Capture and Relocate), B-7 (Construction Monitoring), B-8 (Worker Training and Best Management Practices), and B-11 (Giant Reed removal) impacts to this species would be reduced to less-than-significant levels.

Potential losses of suitable habitat for this species could occur as a result of construction would be adverse but temporary, and would not be considered significant (**Class III**). Suitable habitat for the species occurs elsewhere in the region including nearby Lake Casitas and in ponds and riverine habitat both up and downstream of Matilija Lake. Indirect effects to two-striped garter snake, if present, could result from temporary impacts to water quality, temporary loss of upland nesting sites, foraging habitat, or disruption of breeding activity.

Potential impacts to two-striped garter snake would be temporary and occur for the duration of the project, while beneficial effects on the species would be long-term, similar to that described previously for other amphibians and retiles. These benefits include the removal of aquatic predators known to prey on juvenile garter snakes, development of natural stream channels and seasonal pools within the floodplain for summering, and upland mounds and native riparian vegetation for wintering. In addition, population numbers for the two-striped garter snake have reduced in part due to loss of native upland habitats. In Reach 7, following the deconstruction of the dam and restoration of the creek bed and banks, the slurry disposal site would be temporary stabilized and other areas would be converted to native upland habitat. These upland areas would allow for a native buffer adjacent to the perennial Matilija Creek for the snake to winter and result in overall net benefits from Alternative 4b (**Class IV**).

Birds

Federally Listed as Endangered or Threatened

California brown pelican is federally listed as endangered and has been observed roosting on occasion at the Ventura River Estuary during the summer months. Direct impacts to the pelican as a result of the deconstruction of the dam and removal of existing habitats in Reach 7, raising levees, or modifying bridges are unexpected due to the low likelihood that this species use these areas. No indirect, long-term impacts, nor benefits, to the species are expected as a result of the Proposed Action.

California condor is a federally listed endangered species, as well as a State-endangered and fully protected species. California condors have been reintroduced to the Los Padres National Forest and have been observed flying over the Ojai Valley which is located southeast of the project area. The species may utilize the study area for foraging and roosting although no activity in the area has been recorded (USFWS, 2003). Therefore, direct impacts are unlikely and would not be considered significant (**Class III**). Indirect impacts could include temporary loss of foraging and roosting habitat in Reach 7 that would require the birds, if utilizing the area, to disperse to habitat within Ojai Valley, the Los Padres National Forest, or other riparian areas in Ventura River. However, the likelihood that condors would be displaced by project construction is low as no nesting has been recorded within the proposed project area and the species prefers to nest on steep cliffs and rocky slopes. Subsequently, impacts to condor would be considered less than significant (**Class III**).

Western snowy plover is a federally listed threatened species that known to use, but not breed at the sand dunes around the Ventura estuary and neighboring San Buenaventura State Beach.

No direct impacts would occur to western snowy plover by implementation of from Alternative 4b. This species has been observed near the estuary of the Ventura River and does not occur within any areas that would be disturbed by project construction. Impacts to this species would be considered less than significant (**Class III**). However, indirect impacts could occur as a result of increased noise from the haul routes along Highway 101, approximately one mile from the Estuary, and potential sediment aggradation within the Estuary, or giant reed removal. However, impacts associated with noise are considered negligible due to the currently elevated traffic and noise levels associated with Highway 101. Impacts due to possible sediment aggradation are considered less than significant because the trapped fines behind the Reservoir would be transported and deposited to the slurry disposal site and stabilized up to a 50-year event. The remaining sediment would be made up of primarily sand, gravel, cobble, and boulders and is eventually expected to replenish the Estuary and beach, beginning in approximately 50 years. Impacts associated with giant reed removal including potential impacts from herbicide overspray would be reduced to less-than-significant levels through implementation of Mitigation Measure B-11 (Giant Reed Removal) (**Class II**). Long-term benefits to the species may occur from future beach replenishment (**Class IV**).

California least tern is a federally threatened and State species of special concern. The species has been recorded foraging at the Ventura River Estuary before their migration south, but breeding in the study area has not been recorded, likely due to the extensive historic beach use in this area.

Direct impacts to California least terns as a result of project construction are not expected, as this species has not been observed in areas subject to project disturbance. Impacts could occur if the species utilizes lacustrine habitat at Matilija Reservoir, however this use is unexpected, as the Reservoir does not contain large sandy areas preferred by this species. Impacts to this species would be considered less than significant (**Class III**). Pre-construction bird surveys Mitigation Measure B-1 (Pre-construction Biological Surveys), would further ensure that impacts to this species are avoided. As with other species that utilize sandy beach habitat surrounding the Ventura River Estuary, long-term benefits to the species associated with dam removal may result from beach replenishment in approximately 50 years.

Southwestern willow flycatcher is a federally listed endangered species that is obligate to riparian habitats along rivers, streams, or other wetlands vegetated by dense growths of willows, cottonwoods, coyote brush, mule fat, and other riparian scrub species. Suitable habitat occurs within the study area between the Ventura estuary and Foster Park; however, there are no historic records of nesting southwestern flycatchers in this area. In addition, no southwestern willow flycatchers were detected during five surveys conducted by the USFWS in 2000. The presence of the brown-headed cowbirds, a nest parasite, and limited suitable habitat areas are likely the reason the species is not observed in the study area.

As this species has not been detected in the proposed project areas, direct and indirect impacts to the southwestern willow flycatcher are not expected to occur as a result of dam removal or other related activities. However, as with many other sensitive species in the project area, benefits to the species could occur with the restoration of stream processes. Implementation of Alternative 4b would result in several factors that ultimately provide beneficial impacts to this species. Eradication of giant reed and a return to natural stream processes would result in an increase in native riparian habitat. This action may create suitable nesting habitat for this species and provide for future use of the river by the southwestern willow flycatcher.

Least Bell's vireo is a federally and State endangered migratory bird that nests in riparian habitat with a dense understory of sandbar willow, mule fat, willow saplings, and other low vegetation. This species is currently restricted in distribution to southern California and northwestern Baja California (USFWS, 2003); however, three pairs have been recorded in the Ventura River in the lower reaches. No least Bell's vireos have been identified in the Matilija Reservoir.

Direct impacts to this species could occur from removal of riparian habitat, disruption of nesting habitat, and increased noise and dust generation. Potential direct losses, although temporary, would be significant without mitigation (**Class II**). By implementation of protocol surveys and scheduling brush-clearing activities to avoid the breeding season, impacts to this species while adverse could be reduced to less-than-significant levels (Mitigation Measures B-1 and B-5). Removal of vegetation would be temporary, lasting approximately 24 months during the deconstruction of the dam plus several subsequent years for the restoration of the creek. In addition, habitat in Reach 7 is currently dominated by giant reed that would continue to expand and compete with native riparian vegetation providing for less least Bells Vireo habitat. Impacts to this species may occur during levee expansion, particularly in the lower reaches, however my implementation of the mitigation measures described above impacts could be avoided or minimized.

Because the Proposed Action includes an intensive giant reed removal program (B-11) and subsequent restoration and creation of approximately 38 acres of willow and cottonwood riparian habitat in Reach 7 (VCWPD, 2004a), habitat would likely be more suitable to the species under post-project conditions than under the no project alternative. In addition, willow and cottonwood forests have rapid growth rates with adequate water sources; therefore, the development of acceptable habitat would likely occur within 5 years following restoration.

<u>State Listed as Endangered or Threatened</u>

The **American peregrine falcon** is a rare uncommon migratory bird of California. The species has been observed foraging at the Ventura River Estuary and has potential to use the Matilija Reservoir for foraging. Potential impacts to this species include the removal of open water and wetland habitats in Reach 7, and potential sediment aggradation within the Estuary. Adverse impacts due to the loss of habitat are considered negligible (**Class III**) because of the unlikely occurrence of the species at Matilija Lake and the close proximity of Casitas Reservoir and the Estuary as alternative sites for the migratory species. No impacts associated with noise are expected due to the currently elevated traffic and noise levels associated with Highway 101 at the Ventura River Estuary. Impacts due to possible sediment aggradation are considered less than significant (**Class III**) because the trapped fines behind the Reservoir would be transported and deposited to the downstream 94-acre site and stabilized as described above.

The **western yellow-billed cuckoo** is a rare fall and summer migrant of riparian areas in California. This species has not been observed in the study area and are only known to occur from the Central Valley, Amargosa River, Feather River, Kern River, Lower Colorado River, and occasionally at Prado Basin in Orange and Riverside Counties. Due to the rarity of this species and lack of recent observations in Ventura County, it is unlikely that the species would occur at Matilija Reservoir. Potential impacts to this species would not be considered significant (**Class III**).

The **Belding's savannah sparrow** is a resident of southern California salt marshes from Goleta Slough in Santa Barbara County south to northwestern Baja California Norte, Mexico (USFWS, 2003; CDFG, 2003). A small group consisting of three pairs of adults and a few juveniles were observed approximately 0.80 mile east of the Ventura Estuary (USFWS, 2003). This species would not be expected to utilize the Matilija Dam Reservoir due to the absence of suitable habitat and distance from the Pacific Ocean. In addition, there is a low likelihood of the species being permanent users of the Ventura River Estuary because the habitat type is rather small. Therefore, no impacts to the Belding's savannah sparrow are expected as a result of the Proposed Action.

Sensitive Species

Black swift, Vaux's swift, and olive-sided flycatcher are not expected to occur in the study area except for brief periods during migration. Each of these three species prefers forested areas dominated by redwood and Douglas-fir habitats with nest-sites in large hollow trees and snags. The species are known to occur in northern California as far south as Santa Cruz and San Luis Obispo Counties. Therefore, no direct or indirect impacts would likely occur to these species.

Double-crested cormorant, great blue heron, and great egret were all observed within the study area. Impacts to these species would include the removal of freshwater marsh and open water habitats in the Matilija reservoir and potential indirect impacts during deconstruction related activities. Impacts to these species may be adverse but would not be considered significant (**Class III**). Although construction may disrupt habitat utilized by these species, Lake Casitas and the Ventura River Estuary would also provide freshwater marsh and open water habitats in the region of the study area. In addition, these impacts would be temporary, and while lake habitat in this area would be permanently removed, this habitat would eventually be eliminated naturally through continued sediment aggradation behind the face of the dam. While these species are considered species of special concern, they are relatively common to the area and project related disturbance is not expected to threaten their regional populations. Nonetheless, with implementation of Mitigation Measures B-1 (Pre-Construction Biological Surveys) and B-5 (Restricted Initial Clearing), impacts to these species would remain at less-than-significant levels.

Tricolored blackbirds have recently been proposed for upgrading to a Priority 1 species on the draft list of the California species of special concern and are considered especially scarce in coastal southern California. A colony of tricolored blackbirds was observed in Reach 2 in 1993 (CDFG, 2002); however, no colonies have been observed within Reach 7. Impacts to these species may occur from the removal of freshwater marsh and open water habitats in Reach 7 if the species was present in this area during construction activities or by possible levee construction in the lower reaches of the river. However, nearby Lake Casitas and the Ventura River Estuary also provide freshwater marsh and open water habitats such that displacement of the species would likely be short term. Impacts to this species if present would be considered significant without mitigation (**Class II**). By implementation of Mitigation Measures B-1 (Pre-Construction Biological Surveys) and B-5 (Restricted Initial Clearing), impacts to this species may be avoided or reduced to less-than-significant levels.

Yellow-breasted chat, yellow warbler, and Lawrence's goldfinch are migratory birds that nest in willow and cottonwood riparian habitats. These species are rare nesters in southern California; however, they have been observed within the project area. Loss of breeding habitat would be considered a substantial impact without mitigation (**Class II**) and could effect these species regional populations. Therefore, implementation of Mitigation Measures B-1 (Pre-Construction Biological Surveys) and B-5 (Restricted Initial Clearing) would be required to mitigate impacts to a level of less than significant.

Southern California rufous-crowned sparrow inhabits rocky slopes and nests in upland habitats including coastal sage scrub and chaparral communities. Suitable upland habitat occurs throughout the entire study area and dominates much of the surrounding habitat. This species has been observed in the project area (USFWS, 2000), but exact locations are unknown. There is a potential for direct impact to this species, albeit temporary, by the removal of habitat at the slurry disposal sites. Impacts to this species would be short term and at the completion of dam removal and restoration activities are completed, the slurry sites, as well as the restored stream banks, would be restored with native upland vegetation, increasing the acreage of upland habitat. Finally, this species is relatively common in southern California; therefore potential temporary impacts to this species may be adverse but are not expected to threaten their regional populations and are thereby considered less than significant (**Class III**).

White-faced ibis and osprey have the potential to utilize fresh emergent wetlands and lacustrine habitats at the Ventura River Estuary and the Matilija Reservoir. The white-faced ibis is an uncommon summer resident and a rare migratory bird to sections of southern California. One sighting in the Ventura River Estuary was recorded in 1989 (Hunt and Lehman, 1992) and the species has been observed at the Salton Sea and the Buena Vista Lagoon, both in San Diego County. Ospreys are associated strictly with large, fish-bearing waters, primarily in ponderosa pine through mixed conifer habitats (CDFG, 2003). The Osprey has vanished as a nesting species almost completely from southern California, including the Channel Islands (CDFG 2004). Potential impacts to these species include the direct removal of foraging habitat and potential indirect impacts during deconstruction related activities in Reach 7; however, suitable nesting and foraging habitat for the species occurs at Lake Casitas and the Ventura River Estuary. In addition, the loss of lacustrine habitat at Matilija Reservoir is expected to occur naturally over time as a result in increased sediment aggradation behind the Dam. Because of the low potential for occurrence, the close proximity of alternative habitat areas, potential impacts if these species are present may be adverse, but are considered less than significant (**Class III**). Nonetheless, in order to minimize potential impacts to these species, Mitigation Measures B-1 (Pre-Construction Biological Surveys) and B-5 (Restricted Initial Clearing) would be implemented.

Mammals

Sensitive Species

Pallid bat. This species breeds and roosts in caves, rock crevices, mines, hollow trees, buildings, and bridges and other cool temperature areas found around the study area. The species has been observed by USFWS during past surveys; however, the pallid bat is not federally or State listed as endangered or threatened and locations of roosts have not been precisely mapped. Direct impacts are unexpected to occur as a result of deconstruction activities in Reach 7 because activities would not take place on steep canyon walls and potential cave dwellings of Matilija Creek. However, significant impacts without mitigation (**Class II**) may occur to this species as a result the raising of the Santa Ana Bridge. These impacts can be minimized or completely avoided by implementing Mitigation Measure B-15 (Pre-construction Bat Surveys). Potential indirect and temporary impacts to this species include noise, dust, and removal of foraging habitat during the 24-month deconstruction activities. However, due to the temporary nature of these activities the impacts would not constitute a substantial loss that would jeopardize the continued existence of the species within the region.

B-15 **Pre-Construction bat surveys.** The Corps of Engineers shall conduct pre-construction surveys for sensitive bats at the Santa Ana Bridge and any other structures that may house suitable roosting habitat for this species. If bats are located in the structure, construction would be scheduled to occur outside of the breeding season.

B-16 **Development of an Operations and Maintenance Program.** The Corps of Engineers shall develop and execute an Operation and Maintenance Program limiting the potential of long-term and short-term impacts to sensitive flora and fauna. The Maintenance Program would be submitted to the CDFG and USFWS for review and comment prior to implementation. At a minimum, the following items shall be included in the maintenance program:

- Utilize existing access roads and ramps for all maintenance activities unless by foot or authorized by the appropriate regulatory agencies.
- Ensure that only water-safe and surfactant-free herbicides are used. Treatments would use a glyphosate-based herbicide including Rodeo® and/or Aquamaster®, both of which are labeled for use within water.
- Ensure that herbicides are applied at concentrations that are considered safe for biological resources within and adjacent to the project area.
- Ensure that herbicides are mixed with a non-toxic water soluble dye of low toxicity that highlights treated areas.
- Minimize overspray of herbicides onto non-target species by restricting herbicide spraying when wind velocities exceed six mph.
- Have a licensed professional conduct or oversee herbicides applications.
- Ensure that herbicides are not applied to ponded features within the 15-feet width to avoid potential impacts to fish and wildlife species.

- Remove trash and debris cleared from culverts from the streambed to avoid potential direct impacts from debris being dislodged and carried downstream or by creating water quality impacts for aquatic species.
- Maintain access roads outside of breeding season when repair areas are within 300-feet of known breeding pairs of least Bell's vireo, southwestern flycatcher, California gnatcatcher or other sensitive nesting species.
- Use proper BMPs when maintaining access roads and ramps including regrading and repaving.
- Inspect levees, roads, and ramps on a regular basis and repair small problems to limit the possibly of a large failure that would require extensive repair and potential damage to sensitive habitat.

5.3.4 Alternative 1: Full Dam Removal/Mechanical Sediment Transport – Dispose Fines, Sell Aggregate

Alternative 1 would result in similar impacts to those identified in Alternative 4b except that sand and gravel would be sold as aggregate over an approximate ten-year period. Sediment behind the dam would be removed mechanically with the majority of fines being transported to a slurry disposal area offsite. Sand and gravel remaining at the project area would be stockpiled upstream of the reservoir area on the east side of the channel and sold from the site for use as aggregate. Residual fine sediment would be trucked to the slurry disposal area.

Overall Ecological Effects

Overall long-term effects to the ecology of Ventura River associated with Alternative 1 would be similar to Alternative 4b except for the permanent removal of course sand and gravels from the River system and the restoration of the creek in a non-pre dam configuration. Following Dam removal there would be a natural re-supply of sediment from Matilija Creek to downstream reaches. It is estimated that sand replenishment to the beach would increase by 20% in 50-years (BOR, 2004). Dam and sediment removal activities in addition to aggregate sales would disrupt wildlife movement in Matilija Canyon and along Matilija Creek for a period of up to ten years, approximately seven years longer than Alternative 4b. Short-term effects of Alternative 1 are similar to Alternative 4b except for the reduced impacts on water quality and aquatic organisms due to reduced sediment aggradation downstream over the long-term. Therefore, short-term impacts to steelhead remain adverse and significant (**Class II**); however, long-term impacts are improved. Vegetation, including giant reed, would be removed during the early stages of the alternative, thereafter disrupting wildlife habitat and movement corridors for the duration of Alternative 4b aggregate sales. These impacts, particularly for the duration proposed would be considered significant impacts (**Class I**).

Mitigation measures could be implemented to reduce the severity of impacts, but impacts would likely remain significant due to the extended period of disturbance required for continued aggregate sales. Although wildlife may acclimate to some level of disturbance, impacts would likely remain significant. Following dam removal and restoration activities, the canyon and creek in the vicinity of the Matilija Dam and reservoir would eventually be restored; albeit not in the pre-dam configuration, to a natural condition and wildlife movement through the area would resume. Therefore, there would be no long-term loss or disruption of wildlife movement corridors similar to Alternative 4b. Wildlife movement through the canyon would be enhanced due to the removal of the barrier represented by Matilija Dam, especially for fish and other aquatic species that cannot currently move past the dam. Steelhead would be able to migrate upstream into the upper reaches of Matilija Creek and into historical habitat. As a result, available spawning habitat for migrating steelhead would be substantially expanded in the Ventura River watershed. The removal of Matilija Dam would also provide steelhead populations that have been landlocked since the construction of the dam access to the Pacific Ocean and allow a potential return to anadromy. These beneficial impacts (**Class IV**) would more than outweigh the temporary impacts resulting from construction.

Mitigation Measures for Alternative 1 are the same as Alternative 4b.

Wildlife Corridors

The removal of Matilija Dam, which is a barrier to wildlife dispersal, would enhance species diversity by allowing separate populations to more readily move upstream and downstream, especially fish and other aquatic species, including southwestern pond turtle and California red-legged frog. Removal of the Dam would be considered a beneficial impact to wildlife corridors (**Class IV**). In addition, as a result of Dam removal and stream restoration, approximately 9,100 linear feet of streambed and bank would be restored. The stream would be 60 feet wide and provide 12.5 acres of stream, in addition to 83 acres of restored riparian habitat on the one bank and upstream floodplain areas (VCWPD, 2004a). Steelhead habitat would total 12.5 acres of riverine plus 6.5 acres of lower bank on one side of the new channel between the years 0 and 5 following the deconstruction of the dam. By year 20, the soil cement would be removed and there would be an increase of riparian areas to 28 acres and an increase of steelhead habitat to 25.5 acres (VCWPD, 2004a). These acreages are less than Alternative 4b by approximately 5 acres in years 0 through 5 and approximately 10 acres by year 20, and as stated previously the stream would not be in a natural, pre-dam alignment.

Potential impacts to wildlife movement related to expansion and maintenance of the levees, construction of the desiltation basins, access roads or slurry disposal sites would be similar to Alternative 4b.

Sensitive Habitat

Impacts to sensitive plant communities within Lacustrine and Palustrine systems would be similar to those identified in Alternative 4b. After the dam has been removed and the sediment has been cleared from the reservoir area and aggregate sales are completed, there would be a permanent loss of the lacustrine and wetland habitat associated with loss of Lake Matilija. However, the lake and associated wetland habitats would gradually disappear without implementation of an action alternative as the reservoir fills with sediment and invasive species such as giant reed continue to expand and exclude native vegetation, to the detriment of any native aquatic inhabitants. Although lacustrine and palustrine habitats along Matilija Creek (at Lake Matilija) would be reduced, the reduction in these habitat types is not considered significant since they were created artificially and, although they currently provide habitat for a number of sensitive species, the habitat would eventually be lost without the implementation of an action alternative. These impacts would be considered adverse, but less than significant (**Class III**). In addition, riverine, palustrine, and upland habitats would be restored after construction, but the quantities of each habitat type would change compared to existing conditions. However, due to the extended period of time required for the sale and removal of aggregate, temporary impacts to riparian and wetland communities would occur over a much greater time period, possibly for up to 12 years. Mitigation measures could be implemented to reduce the severity of impacts, but they would likely remain significant due to the extended period of disturbance required for continued aggregate sales.

Construction and operation of the slurry disposal site would have the potential to disturb habitat and along a 94-acre upland parcel adjacent to the Ventura River. Sediment from behind the dam would be transported to the slurry disposal site and allowed to drain. The site would be revegetated following completion of the slurry operation. The vegetation communities at the slurry site would be displaced to a higher elevation, but as discussed in Alternative 4b, would rapidly recover. It is unlikely that any sensitive or listed species would be impacted as a result of the disturbance of this site. Impacts would be adverse, but less than significant (**Class III**).

Low-level downstream flood control protection would be required under Alternative 1 and would be similar to impacts described in Alternative 4b. While some new levees and floodwalls would be constructed under this alternative, most of the flood control measures would be improvements to existing facilities. New facilities may permanently remove some areas of upland habitat along the Ventura River and would possibly temporarily disrupt wildlife movement corridors. Although these impacts would be long-term in nature, the relatively small increase in habitat disruption would be considered an adverse, but less-than-significant impact (**Class III**).

Mitigation Measures for Alternative 1 are the same as Alternative 4b.

Sensitive Flora

Impacts to sensitive plant species are similar to those described in Alternative 4b.

Sensitive Fauna

Alternative 1 would result in the temporary loss of habitat for sensitive species during demolition and construction, including lacustrine, riverine, palustrine, and upland habitat types. The demolition and construction activities associated with dam removal, sediment slurrying, and aggregate sale activities would result in the potential loss of individuals of protected and sensitive wildlife species inhabiting the Matilija Dam reservoir area, including southern steelhead, arroyo chub, California red-legged frog, southwestern pond turtle, coastal western whiptail, and two-striped garter snake similar to impacts described in Alternative 4b. However, impacts associated with Alternative 1 would occur for a period of up to 12 years and would be considered significant at the Matilija Reservoir (**Class I**). In addition, the permanent loss of sands and gravels as part of Alternative 1 would likely slow the rehabilitation of stream habitats downstream, such as riffles and pools, in comparison to Alternative 4b.

Mitigation Measures for Alternative 1 are the same as Alternative 4b.

5.3.4 Alternative 2a: Full Dam Removal/Natural Sediment Transport – Slurry "Reservoir Area" Fines Off Site

Alternative 2a is designed to fully remove the dam in one continuous process and allow removal of sediment using natural river hydraulic forces to move trapped sediment to locations downstream of Matilija Dam. Fine sediments would be deposited at the 94-acre disposal site similar to Alternatives 4b and 1. Construction impacts related to this action could possibly be accomplished within one year.

Overall Ecological Effects

Short-term effects to the ecology of the Matilija Creek and the Ventura River would likely occur as a result in increased sediment loads and regional deposition of material. Impacts would be severe following the first few major storm flows from the dam, but would be fairly short term in nature. Sediment flow would be considered adverse, but less than significant (**Class III**). Removal of the dam and construction and maintenance of downstream levees under this alternative would limit the time wildlife movement in Matilija Canyon and along Matilija Creek is disrupted and provide for a beneficial impact to the area. Similar to Alternative 4b and 1, all vegetation would be removed during the early stages of the alternative, thereafter disrupting wildlife habitat and movement corridors only during dam removal and vegetation clearing. These impacts, although temporary would still be considered significant (**Class I**). Similar to Alternative 4b, following dam removal and restoration activities, the canyon and creek in the vicinity of the Matilija Dam and reservoir would eventually be restored to a natural condition and wildlife movement through the area would resume. Wildlife movement through the canyon would ultimately be enhanced as described in Alternative 4b and would provide a beneficial impact (**Class IV**).

Potential impacts to wildlife movement related to expansion of the levees, construction of the desiltation basins, access roads or slurry disposal sites would be similar to Alternative 4b.

Mitigation measures are the same for all alternatives.

Sensitive Habitat

Impacts to sensitive plant communities within Lacustrine and Palustrine systems, the 94 acres slurry disposal site, desiltation basins, levee expansion areas, and levee maintenance would be similar to those identified in Alternative 4b.

Sensitive Flora

Impacts to sensitive plant species are similar to those described in Alternative 1 and 4b.

Sensitive Fauna

Alternatives 2a would result in the temporary loss of habitat for sensitive species during demolition and construction, including lacustrine, riverine, palustrine, and upland habitat types. The demolition and construction activities associated with dam removal and sediment slurrying would result in the potential loss of individuals of protected and sensitive wildlife species inhabiting the Matilija Dam reservoir area, including, arroyo chub, California red-legged frog, southwestern pond turtle, coastal western whiptail, and two-striped garter snake similar to impacts described in Alternative 4b.

Short-term impacts to steelhead may increase with implementation of Alternative 2a as a result of downstream sediment transport. Alternative 2a has a greater potential to affect downstream habitat conditions than Alternative 4b or 1. When initial storm flows start to erode the material behind the dam, a narrow deep channel would first be created, followed by stream widening. Large quantities of sediment suspended in the water column would accumulate in downstream reaches of Matilija Creek and the Ventura River. There is considerable uncertainty regarding the rates of aggradation downstream of the dam (BOR, 2004). However, sediment could substantially change streambed conditions and raise bed elevations, especially in areas immediately downstream of the dam. The river reaches immediately downstream could receive between five and 15 feet of sediment over the course of 50 years, with the channel immediately downstream of the dam receiving between 20 and 40 feet of sediment. These sediments would collect along incised river channels, raising the level of stream bottom and has the potential to fill in available steelhead breeding areas immediately below the Matilija Dam. Increased sediment loads can impact aquatic organisms in a variety of ways including, mechanical suffocation, abrasion, reduced oxygen loads, and suffocation or smothering of egg masses. These impacts would be considered significant (**Class I**) and may pose substantial concerns to the remaining steelhead populations. However, it is expected that after the first three storm events, turbidity levels would stabilize at approximately twice current levels (BOR, 2004) and within 2 to 5 years, concentrations should return to natural levels (USFWS, 2003). Therefore, the effects would be short-lived, adverse and significant, but eventually, spawning habitat for migrating steelhead would be substantially expanded in the Ventura River watershed and steelhead populations that have been landlocked since the construction of the dam would have access to the Ventura River and Pacific Ocean providing a beneficial impact to this species (**Class IV**).

Sedimentation and scouring may also substantially alter vegetation communities; however, vegetation communities are expected to re-establish along the Ventura in the timeframe and quantities similar to Alternative 4b (VCWPD, 2004a). Therefore, the disruption in vegetation by flood flows and this type of sedimentation would not result in significant impacts and would be similar to impacts described in alternative 4b. The total sand replenishment to the beach is expected to be 32% higher over a 50-year period, exactly the same as with Alternative 4b.

Mitigation measures are the same for all alternatives.

5.3.5 Alternative 2b: Full Dam Removal/Natural Sediment Transport – Natural Transport of "Reservoir Fines"

Overall Ecological Effects

Impacts resulting from Alternative 2b would be largely the same as those described for Alternative 2a. With natural transport of fine sediments from the reservoir area, impacts due to downstream sediment aggradation would be greater than described for Alternative 2a, but would still be less than significant (**Class III**) due to the rapid rate of recovery exhibited by Ventura River vegetation communities and the expectation that turbidity would stabilize to twice normal levels following the first three storm events (BOR, 2004). Because sediment would be transported downstream during storm events instead of slurried, Alternative 2b would not have the impacts associated with the 94-acre disposal site as described for Alternatives 1, 2a or 4b. Impacts associated with downstream flood control structures, operation and maintenance would be similar to Alternatives 1, 2a, and 4b.

Sensitive Habitat

Impacts to sensitive plant communities within lacustrine and palustrine systems and levee expansion areas would be similar to those identified in Alternative 4b with the exception that the 94-acres slurry disposal site and desiltation basin would not be utilized.

Sensitive Flora

Impacts to sensitive plant species are similar to those described in Alternative 4b.

Sensitive Fauna

Alternatives 2b would result in the temporary loss of habitat for sensitive species similar to 2a, 1, and 4b. However, Alternative 2b has an even greater potential to result in significant short-term impacts to steelhead and other aquatic organisms as a result of downstream sediment transport (**Class I**). As reservoir fines would not be transported to off-site slurry storage areas this material would be transported downstream during normal storm events. As identified in Alternative 2a, this could result in substantial deposition of sediment in prime steelhead habitat located just below Matilija Dam.

Mitigation measures are the same for all Alternatives.

5.3.6 Alternative 3a: Incremental Dam Removal/Natural Sediment Transport - Slurry "Reservoir Area" Fines Off Site

Alternative 3a is designed to fully remove the dam in two stages. Sediments would be transported to the 94-acre slurry disposal site as discussed in Alternatives 1 and 2a. A portion of the dam would then be removed and flows would be allowed to erode the sediment trapped behind the dam. After a considerable amount of sediment has been naturally transported downstream, another section of the dam would be removed. Construction impacts related to this action are estimated to be approximately 18 months in duration for Phase I. Phase II would be determined by the flood events and could result in delays up to seven years under drought conditions (BOR, 2004).

Overall Ecological Effects

The impacts of Alternative 3a would be very similar to those of Alternative 2a discussed above, except that changes to downstream conditions would be moderated by the more gradual release of sediment downstream under this alternative. The majority of impacts under Alternative 3a would be the same as those described for Alternative 2a, although due to the extended duration of work above the dam, temporary impacts in Matilija Canyon would be more severe, and downstream impacts resulting from sediment aggradation would be less severe. Dam removal activities in Phase I would be completed in 18 months and Phase II would begin approximately two years after the completion of Phase I. Phase II would be completed in an indeterminate amount of time based on hydrology of the river system. As in Alternative 2a, long-term downstream sediment aggradation impacts on habitats would be less than significant (**Class III**), as smaller quantities of sediment would be released downstream. However, short-term impacts of potentially equal proportions would re-occur with Phase II. All other impacts and benefits would be the same as described for Alternative 2a.

Wildlife Corridors

Due to the extended length of time required to complete this alternative, habitat and wildlife corridors in Matilija Canyon would be disrupted for a longer period than described for Alternative 2a, though not as long as Alternative 1. These impacts would be significant and unavoidable (**Class I**).

Sensitive Habitat

Impacts to sensitive plant communities within Lacustrine and Palustrine systems and levee expansion areas would be similar to those identified in Alternative 4b.

Sensitive Flora

Impacts to sensitive plant species are similar to those described in Alternative 4b.

Sensitive Fauna

Alternatives 3a would result in the temporary loss of habitat for sensitive species during demolition and construction, including lacustrine, riverine, palustrine, and upland habitat types. The demolition and construction activities associated with dam removal and sediment slurrying would result in the potential loss of individuals of protected and sensitive wildlife species inhabiting the Matilija Dam reservoir area, including, arroyo chub, California red-legged frog, southwestern pond turtle, coastal western whiptail, and two-striped garter snake similar to impacts described in Alternative 4b and Alternative 2a.

Short-term impacts to steelhead may increase with implementation of Alternative 3a versus with Alternatives 1, 2a, or 4b due to the re-occurrence of sedimentation and turbidity in storm flows. Aggradation of material in the channel under this alternative could result in short-term significant impacts to steelhead populations (**Class I**). As with Alternatives 2a and 4b, the total sand replenishment to the beach is expected to be 32% higher over a 50-year period.

Mitigation Measures for Alternative 3a are the same for all Alternatives.

5.3.7 Alternative 3b: Incremental Dam Removal/Natural Sediment Transport – Natural Transport of "Reservoir Fines"

Alternative 3b is designed to fully remove the dam in two stages. A portion of the dam would be removed and stream flows would naturally erode the sediment trapped behind the dam, including fines (silts and clays). Construction impacts related to this action are estimated to be 18 months for Phase I and timing of Phase II would be determined by the flood events and could be up to seven years under drought conditions (BOR, 2004).

Overall Ecological Effects

The majority of impacts of Alternative 3b would be very similar to those of Alternative 2a and 3a discussed above; however, short-term impacts to turbidity would be more severe due to natural transport of reservoir fines. Turbidity would be extended over a longer period because fines would not be transported to the 94-acre slurry disposal site. In addition, with each phase of dam removal another surge of sediments would occur. As in Alternative 2a, long-term downstream sediment aggradation impacts on habitats would be adverse but less than significant (**Class III**). All other impacts and benefits would be the same as described for Alternative 2a.

Wildlife Corridors

Impacts of Alternative 3b would be similar to Alternative 3a. These impacts would be significant and unavoidable (**Class I**).

Sensitive Habitat

Impacts to sensitive plant communities within Lacustrine and Palustrine systems and levee expansion areas would be similar to those identified in Alternative 2b.

Sensitive Flora

Impacts to sensitive plant species are similar to those described in Alternative 4b.

Sensitive Fauna

Alternative 3b impacts to sensitive fauna are similar those described for Alternative 3a due to the approximate project duration (up to seven years) and similar to Alternative 2a with respect to loss of habitat and sedimentation (natural transport of reservoir fines). Short-term impacts to steelhead may increase with implementation of Alternative 3b versus with Alternative 2a due to the re-occurrence of sedimentation and turbidity in storm flows. These short-term impacts would be considered significant (**Class I**).

5.3.8 Alternative 4a: Full Dam Removal/Long-Term Sediment Transport – Long-Term Transport Period

Alternative 4a Biological resource impacts resulting from Alternative 4a would be similar to those described for Alternative 1, with three primary differences:

- Alternative 4a would not include the 94-acre slurry disposal site;
- The duration of Alternative 4a would be approximately three years as opposed to the estimated ten years for Alternative 1; and
- Matilija Canyon would be returned to a semi-natural topography upon completion of the project, but would not return to pre-dam conditions.

Overall Ecological Effects

Under Alternative 4a, the impacts associated with the 94-acre slurry disposal site utilized in Alternatives 1, 2a, 3a, and 4b and the desiltation basin utilized in Alternative 4b would be completely eliminated. Temporary impacts to species, habitat, and wildlife corridors in Matilija Canyon would be considerably less than described for Alternatives 1, 3a, and 3b, due to the shorter duration of disturbance, but would be greater than the impacts in Alternatives 2a and 2b with each phase of deconstruction. Impacts would remain significant (**Class I**) even with the implementation of mitigation measures. Riverine, palustrine, and upland habitats would be restored after construction, but the quantities of each habitat type would change compared to existing conditions. Approximately 9,500 linear feet of streambed and bank would eventually be restored under this alternative. The stream channel in the Matilija Reservoir area would be 100 feet wide and provide 22 acres of stream, exactly the same as with Alternative 4b. Alternative 4a would also restore 83 acres of riparian habitat on the banks and upstream floodplain areas (VCWPD, 2004a), approximately 5 acres less than Alternative 4b. Steelhead habitat would total 22 acres of riverine plus 6.5 acres of lower bank on one side of the new channel over the life of the project, up to 50 years (VCWPD, 2004a). Restoration of these habitats would be considered a beneficial impact (**Class IV**), but as the topography is unlikely to return to a natural state, the magnitude of this benefit is less than as described for the previous alternatives.

Wildlife Corridors

Impacts to wildlife corridors would be similar to Alternative 4b and eventually result in beneficial effects to steelhead and other wildlife. Impacts from levee and floodwall construction and levee and culvert maintenance activities would be similar to Alternative 4b.

Sensitive Habitat

Impacts to sensitive plant communities within Lacustrine and Palustrine systems and levee expansion areas would be similar to those identified in Alternatives 1, 4b, 2a, 2b, 3a, and 3b.

Sensitive Flora

Impacts to sensitive plant species are similar to those described in Alternative 4b.

Sensitive Fauna

Alternative 4a impacts to sensitive fauna due to sedimentation are similar those described for Alternative 1.

Mitigation Measures for Alternative 4a are the same for all Alternatives.

5.4 CULTURAL RESOURCES

5.4.1 Impact Significance Criteria

Section 15126.4(b) of the California Environmental Quality Act (CEQA) Guidelines, Consideration and Discussion of Mitigation Measures Proposed to Minimize Significant Effects, provides guidance for compliance with federal standards for the treatment of historic properties to generally avoid a significant effect on the resource. Specifically, the section states "Where maintenance, repair, stabilization, rehabilitation, restoration, preservation, conservation or reconstruction of the historical resource will be conducted in a manner consistent with the Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings (Weeks and Grimmer 1995), the project's impact on the historical resource shall generally be considered mitigated below a level of significance and thus is not significant."

Section 106 of the National Historic Preservation Act states that any federal agency engaging in an undertaking is required to take into account the effects of the undertaking on properties that are included in or eligible for inclusion in the National Register of Historic Places (NRHP). The guidelines for this procedure are found in 36 CFR 800: Protection of Historic Properties, and 36 CFR 60: The National Register of Historic Places. If a cultural resource is included in or is eligible for inclusion in the NRHP, it is then considered to be a historic property.

The procedure for taking into account the effect of an undertaking on a cultural resource is a two-part process. First, the cultural resource needs to be evaluated for its potential for inclusion in the NRHP, by applying the four criteria found in 36 CFR 60.4 and determining which of the criteria match the type of cultural resource being evaluated. Second, the criteria of adverse effects found in 36 CFR 800.5 must be applied. An undertaking is considered to have an advert effect on a historic property when the undertaking may alter the characteristics that may qualify the property for inclusion in the NRHP. An adverse effect occurs when an undertaking may diminish the integrity of the property's location, setting, materials, workmanship, feeling, or association.

In accordance with the National Historic Preservation Act and 36 CFR Part 800.5(a)(1), impacts to cultural resources are considered significant if one or more of the following conditions would result from implementation of the Proposed Action:

- Physical destruction, damage, or alteration of all or part of the property
- Alteration of a property including restoration rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 CFR Part 68) and applicable guidelines
- Removal of the property from its historic location
- Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance
- Introduction of visual, atmospheric, or audible elements that diminish the integrity the property's significant historic features

- Neglect of a property that causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian Tribe or Native Hawaiian organization
- Transfer, lease, or sale of property out of federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

5.4.2 No Action Alternative (Future Without-Project)

Under the No Action Alternative, the Corps or VCWPD would initiate no actions to remove Matilija Dam. With the lack of project-related disturbance, cultural resources along Matilija Creek and the Ventura River would not be adversely affected by project construction activities. However, land disturbance associated with continuing urban development in the study area could affect cultural resources in the future as new development projects are initiated.

5.4.3 Alternative 4b (Recommended Plan): Full Dam Removal/Long-Term Sediment Transport - Short-Term Transport Period

As Matilija Dam itself is not considered to be eligible for the NRHP, there would not be an adverse effect from its removal and demolition. The NRHP eligibility of the dam is subject to concurrence by the California State Historic Preservation Officer.

The downstream disposal site and slurry line have yet to be surveyed for the presence of historic or prehistoric cultural resources. These additional surveys would occur after a selected alternative is proposed. If any resources are found, and determined to be eligible for the NRHP, the first step would be to try to redesign the alternative to avoid these sites. For both the slurry line and disposal sites, this would be relatively easy. If redesign were not feasible, these sites would likely be adversely affected by these activities. However, subsurface archeological sites might possibly be protected and preserved by burial under sediment placed at the disposal site. This would require a detailed and comprehensive plan to ensure that it is implemented in a manner that minimizes damage. Mitigation Measure CR-1 requires pre-construction surveys of these locations and NHRP evaluations, if necessary. With implementation of CR-1, impacts to potential NRHP sites would be less than significant (**Class II**).

Historic/prehistoric sites COE#1 and COE#2 are located at the margin of sediment removal activities. These sites have not formally been evaluated and determined to be NRHP eligible. However, based on survey information, they could contain information important in history and prehistory, and hence are NRHP eligible. Erosion after removal of sediment at the margin may undermine the stability of the sites, and damage any cultural deposits present. Also, portions of them may be buried under sediment behind the dam. Additional studies would be necessary to evaluate these sites for the NRHP and determine their horizontal and vertical extent. If they are determined to be NRHP eligible, and would be affected by sediment removal, mitigation measures would be necessary. Implementation of Mitigation Measure CR-2 would ensure that sites COE#1 and COE#2 are evaluated and that proper procedures are followed if the these sites are determined to be potentially NRHP eligible, thereby reducing this impact to a less-than-significant level (**Class II**).

Undiscovered buried historic and prehistoric resources may be present beneath sediment behind Matilija Dam. Removal of sediment by natural and mechanical means would have an adverse effect on any buried resource eligible for listing on the National Register of Historic Places. It would be very difficult to stabilize buried cultural deposits as sediment is removed without disturbing their integrity. Mitigation Measure CR-3 requires development of a discovery plan to treat previously unknown resources found during implementation of the project. It would include procedures to monitor and treat cultural resources discovered during mechanical and natural removal of sediment behind Matilija Dam. It would also include procedures for discoveries made during grading and earth-moving activities. Mitigation Measure CR-4 requires consultation with potentially affected Native American Tribes or other groups or individuals with a cultural interest in areas construction could affect. Implementation of Mitigation Measures CR-3 and CR-4 would reduce any potentially significant impacts associated with the discovery of buried resources to a less-than-significant level (**Class II**).

Potentially NRHP-eligible Matilija Hot Springs, which is located just downstream of Matilija Dam, would be acquired and removed. Additional investigation of the significance of Matilija Hot Springs would need to be performed. If this site is determined to be NRHP eligible there would be an adverse effect from its removal and demolition, or damage from flooding and neglect. The NRHP eligibility of the site is subject to concurrence by the California State Historic Preservation Officer.

Mitigation Measures

CR-1 A field survey of the slurry line, disposal site, levee sites, bridge removal locations, and other previously unsurveyed features will be conducted. If any historic or prehistoric resources are found, additional National Register of Historic Places evaluations will be made.

CR-2 A test excavation and National Register of Historic Places evaluation shall be conducted of historic/prehistoric site COE#1, COE#2, and others that may be identified by additional survey. If any are evaluated, and determined to be eligible for the National Register of Historic Places, mitigation measures shall be developed and agreed to in a memorandum of agreement. This document would be developed between the California State Historic Preservation Officer, the Corps and local sponsors. Federally Recognized Tribes and interested Native American groups would be invited to participate as concurring parties to the agreement. These procedures shall follow the requirements of Section 106 of the National Historic preservation Act, as implemented by 36 CFR 800.

CR-3 A discovery plan shall be developed in consultation with the State Historic Preservation Officer pursuant to 36 CFR 800.13(b) to treat previously unknown resources found during implementation of the project. It shall include procedures to monitor and treat cultural resources discovered during mechanical and natural removal of sediment behind Matilija Dam. It would also include procedures for discoveries made during grading and earth moving activities.

CR-4 Consultation shall be conducted with Native American Tribes and other groups and individuals to obtain their concerns with the potential to impact Traditional Cultural Places, and other resources of importance to them.

5.4.4 Alternative 1: Full Dam Removal/Mechanical Sediment Transport – Dispose of Fines, Sell Aggregate

From a cultural resource perspective, the impacts resulting from many of the components of Alternative 1 would result in the same impacts as described for Alternative 4b. As with Alternative 4b, Alternative 1 would include a slurry disposal site and so if cultural resources were identified for the site, impacts would be adverse (**Class II**), but less than significant with the implementation of Mitigation Measure CR-1, which would survey for historic or pre-historic features. Known historic/prehistoric sites COE#1 and COE#2 are located at the margin of sediment removal activities for Alternative 1. If the sites were determined to be NRHP eligible, this would be considered an adverse (**Class II**), but less than significant impact with the implementation of Mitigation Measure CR-2. Alternative 1 would not include the locally preferred desilting basin included in Alternative 4b and so would have a lower risk of impacting buried cultural resources. Mitigation Measures CR-3 and CR-4 would reduce any potentially significant impacts associated with the discovery of buried resources to a less-than-significant level (**Class II**).

5.4.5 Alternative 2a: Full Dam Removal/Natural Sediment Transport – Slurry "Reservoir Area" Fines Off Site

Because of the similarities in the area of affect between Alternative 2a and Alternatives 4b and 1, the impacts would be largely the same for Alternative 2a as for the previously described alternatives. As Alternative 2a would not include a desilting basin, impacts for this alternative would be the same as those described for Alternative 1.

5.4.6 Alternative 2b: Full Dam Removal/Natural Sediment Transport – Natural Transport of "Reservoir Fines"

The impacts resulting from Alternative 2b would be largely the same as Alternative 2a, but would have a lower risk to buried resources as Alternative 2b would not require the slurry disposal site included in Alternative 2a. All other impacts would be identical to those in Alternative 2a.

5.4.7 Alternative 3a: Incremental Dam Removal/Natural Sediment Transport - Slurry "Reservoir Area" Fines Off Site

Cultural resource impacts for Alternative 3a would be identical to those described for Alternative 2a. While project activities would be spread over a longer time period, activities that would result in impacts to cultural resources would occur at the same time as Alternative 2a.

5.4.8 Alternative 3b: Incremental Dam Removal/Natural Sediment Transport - Natural Transport of "Reservoir Fines"

Cultural resource impacts for Alternative 3b would be identical to those described for Alternative 2b. While project activities would be spread over a longer time period, activities that would result in impacts to cultural resources would occur at the same time as Alternative 2b.

5.4.9 Alternative 4a: Full Dam Removal/Long-Term Sediment Transport – Long Term Transport Period

Alternative 4a requires the same low-level of flood control protection as described for Alternative 1, and like Alternative 1 also lacks the locally preferred desilting basin required in Alternative 4b. As the area of impact for Alternative 4a would be generally the same as for Alternative 1, cultural resource impacts would also be the same as described for Alternative 1.

5.5 AESTHETICS

5.5.1 Impact Significance Criteria

Significance criteria have been established to identify the Proposed Action's potential impacts on aesthetic qualities and scenic resources in the study area. The level of impact is determined based on the project's contribution to the following significance criteria:

- Substantially degrade or obstruct views of important scenic resources within Lake Matilija, a designated scenic resource area depicted on the County of Ventura's Resource Protection Map
- Substantially degrade or obstruct views of important scenic resources from a designated or eligible scenic highway (as shown on the County's Resource Protection Map and as described in State Highway Code § 263.3)
- Substantially degrade or obstruct views of a ridgeline visible from a designated scenic resource area, hiking/riding trails, or designated/eligible scenic highway
- Substantially degrade or obstruct views of shorelines along beaches or rivers
- Permanently degrade a scenic feature that is rare or unique in the region, or is highly valued for its cultural or historical significance
- Substantially degrade the natural environmental character of local cities, communities, or the region as a whole
- Temporarily disturb or obstruct views of important scenic resources, from scenic resource areas depicted on the Resource Protection Map, hiking/riding trails, designated/eligible scenic highways, or shorelines along beaches, rivers, or streams.

5.5.2 No Action Alternative (Future Without-Project)

Without the Proposed Action, Matilija Dam would remain in place and the reservoir behind the dam would continue to shrink in size as it gradually fills with sediment. The capacity of the reservoir behind Matilija Dam continues to decrease as the current capacity is less than 500 acre-feet and is anticipated to reach zero capacity by 2017.

Scenic resources at the Lake Matilija area include the slopes, ridgelines, and vegetation that make up the natural setting of the area, as well as man-made reservoir of Lake Matilija, which contribute to the scenic qualities of the area. Without the Proposed Action, scenic resources within the reservoir area would continue to exist, but the reservoir would gradually diminish in size and disappear. Other scenic resources observed from designated or eligible scenic highways, and hiking/riding trails would remain. Without the Proposed Action, the substantial changes to the visual character of Matilija Canyon in the vicinity of the dam and reservoir resulting from the removal of the dam would not occur.

Beaches within Ventura County continue to experience erosion. Without the Proposed Action, sediment trapped behind the dam would not be transported to replenish eroding beaches. Erosion processes would continue while sediment sources behind Matilija Dam would continue to replenish the beaches at least until the time that the reservoir behind the dam fills with sediment. At that time, sediments from the upper Matilija Creek watershed would once again begin to migrate to the Ventura River estuary and local beaches.

Matilija Dam may be considered a unique feature within the region. The top of the dam can be viewed from State Route 33 and hiking/riding trails, and the face of the dam can be viewed from the access road for those with key access. Without the Proposed Action, the dam would remain at least until an unspecified future date when dam removal may be necessitated due to structural deterioration.

Without the Proposed Action, the current natural environmental character of the region, including local cities and communities, is anticipated to remain largely intact. Based on goals and policies outlined in the General Plans for Ventura County and local cities, it is unlikely that views of or the natural environmental setting itself would be obstructed or disturbed by major future development.

Lastly, without implementation of the Proposed Action, project-related temporary obstructions or disturbances to scenic resources due to demolition and construction activities would not occur. The potential would still exist for possible future removal of the dam or other future projects, which may result in temporary obstructions or disturbances to views of scenic resources in the area.

5.5.3 Alternative 4b (Recommended Plan): Full Dam Removal/Long-Term Sediment Transport - Short-Term Transport Period

Alternative 4b, as well as all of the other action alternatives, would result in the elimination of Lake Matilija, which is an area designated as a scenic resource on the Resource Protection Map of the County of Ventura's General Plan. Although the lake is designated as a scenic resource, which would be eliminated by this alternative, the proposed activity behind the dam in the reservoir area would serve to enhance the aesthetic qualities of the Matilija Canyon. The excavation of material from behind the reservoir, removal of Matilija Dam, re-vegetation of the reservoir area, and creation of a naturally flowing stream channel would return the lake to a more natural, canyon-like landscape than the wide floodplain currently emptying into the reservoir. Additionally, the removal of giant reed, which has established on the growing banks of Lake Matilija, as part of the alternative and the re-vegetation of the area with native species, would improve views of the Matilija Canyon by creating a more natural landscape for viewers. Although Lake Matilija would be eliminated, the improvement to the scenic value of Matilija Canyon would be a considerable aesthetic benefit (**Class IV**) to the area, especially considering that the lake will continue to decrease in size under current conditions.

No views of scenic resources from eligible or designated scenic highways, such as portions of SR 33, would be affected by this alternative. The top of Matilija Dam is visible from this SR 33, but Lake Matilija is not. The removal of the dam would result in unobstructed views of the natural environment behind the dam. Although the dam could be considered a unique feature of the area, views of the dam from SR 33 are relatively limited and the replacement of views of the dam with views of Matilija Canyon would be an improvement to the natural scenery. Improvement of views from SR 33 would be considered an aesthetic benefit (**Class IV**) resulting from the project. Portions of the Ventura River are also visible from SR 33, but views of the river are largely restricted by intervening vegetation, terrain, or existing structures. Downstream flood control improvements would not affect views of the Ventura River from SR 33.

The majority of activities associated with this project would not obstruct or degrade views of ridgelines from scenic resource areas, recreation trails, or scenic highways. Activities at Matilija Dam and in Matilija Canyon would occur within the bottom of the canyon and so would not interfere with views of ridgelines. Activities downstream, such as the improvements to flood control protection measures, would not interfere with views of ridgelines from SR 33, in large part due to the activities taking place along the banks of the Ventura River, which are generally lower in elevation than SR 33, and thus not blocking views of higher ridgelines. Similarly, project activities above Matilija Dam would not interfere with views of shorelines along beaches or rivers. Any impacts would be adverse, but less than significant (**Class III**).

Downstream flood protection measures would result in the following impacts to visual resources along the Ventura River and its banks:

- **Camino Cielo/SR 33:** The 968-foot floodwall on the west side of SR 33 would range in height from 4.1 feet to 10.6 feet. The floodwall would be constructed just downslope of SR 33 to the west. Views along this stretch of SR 33 are constrained by steep canyon walls to the east and heavy vegetation to the west between SR 33 and the Ventura River. Construction of the floodwall just west of SR 33 would introduce a large, man-made feature into a dominantly natural area. This would be considered a significant impact (**Class II**), but could be reduced to a less-than-significant level through implementation of Mitigation Measures AE-1 and AE-2.
- **Meiners Oaks:** Although a large portion of the levees and floodwall near Meiners Oaks and Robles Diversion would be obstructed from views by intervening terrain and vegetation, a portion of the levees and floodwall would be constructed along the western property line of a number of Meiners Oaks residences. This alignment would also cross portions of the Ojai Valley Land Conservancy (OVLC) Ventura River-Rancho El Nido Preserve, Rice Canyon and East/West River Bottom Loop Trails. Currently, the proposed alignment is heavily vegetated with oaks and other oak woodland species. Views from the residences and trails of dense oak woodland vegetation would be replaced and dominated by views of the levees and floodwall, which could reach up to 17 feet in height. Although this impact would be significant (**Class II**), implementation of Mitigation Measure AE-1, which would shift the final alignment of the levees and floodwalls to the other side of the vegetated area, would reduce the visual impacts to the residences to less-than-significant levels. Implementation of Mitigation Measure AE-2, which would require the planting of native vegetation appropriate to the location to screen the views of the levees and floodwall from the Rice Canyon and East/West River Bottom Loop Trails would reduce the aesthetic impact to recreational trail users to less–than-significant levels.
- **Live Oaks:** The levees and floodwall along this portion of the river would be raised between 4 and 13 feet. Many rural residential properties along Riverside Road back up to the existing levee along the river, but most have intervening fields or are at a lower elevation than the top of the levee. Views from most of these properties are of the existing levee and the opposite walls of the valley. Increasing the height of the levee at these locations would increase views of introduced, man-made structures, but would only marginally alter the views of the opposite valley wall. A small number of properties, however, particularly along the southern portion of Riverside Road, are at the same elevation as the existing levee. Increasing the height of the levee to nearly 13 feet would result in a substantial blockage of views for a small number of property owners. For these properties at the same level as the existing levee, there is little flexibility in shifting the location of the proposed levee and floodwall further from their property lines. For this reason, the levee and floodwall at this location would result in significant, unmitigable impacts (**Class I**).

- **Casitas Springs:** The flood control improvements along Casitas Springs would pass behind a number of residences at its southern end, traverse north adjacent to the west of open space fields and the Ojai Valley Trail, cross through the west end of a mobile home park, then continuing north along more fields. Intervening vegetation largely screens the existing levee from residential views at the southern end of the proposed levee, and would continue to screen the levee even with an increase in height. Impacts at this location could be adverse, but would be less than significant (**Class III**).

  Users of the Ojai Valley Trail along the east side of the open space fields can view the existing levee across the fields, although the levee is largely screened by grasses and other field vegetation and is set against the background of heavy vegetation along the river and the opposite wall of the valley. Because of this, the river cannot be viewed from the trail at this location. An increase in the height of the levee would increase the man-made features as part of the viewed landscape, but set against the backdrop of the opposing valley wall, increased levee height would not result in a substantial change to views from the trail. Impacts would be adverse, but less than significant (**Class III**).

  The mobile home park, however, would be directly adjacent to the proposed levee. Viewers at the west end of the mobile home park have views of the Ventura River, though these are partially obscured by intervening vegetation. An increase in the levee height to over 13 feet would substantially impact views of the residents of the mobile home park. Due to the proximity of the residences to the river channel, it is unlikely that the alignment of the levee and floodwall could be moved to avoid substantially damaging views from the back of the park. Impacts would be significant and unmitigable (**Class I**).

- **Cañada Larga:** As the levee at this location would pass through an area largely consisting of open space and industrial areas, there are few opportunities to view the Ventura River along this area. Views of the river from SR 33 at this location are heavily screened by vegetation and the intervening petroleum facilities. Similarly, views of a levee built along this location would also be screened by heavy vegetation and intervening terrain and structures. Impacts are considered less than significant (**Class III**).

AE-1 Adjust alignment of levees and floodwalls to allow vegetative screening of flood control improvements. Final levee and floodwall alignments along residential properties at Meiners Oaks and along SR 33 at Camino Cielo shall be designed to be set back from the properties and road right-of-way (ROW) to allow vegetation to screen views of the flood control improvements. The distance of the setback would be determined at each location based on site feasibility, but shall be such that views of the levees and floodwalls are partially to completely obscured by intervening vegetation.

AE-2 Screen levees and floodwalls with vegetation planting. Levees and floodwalls adjacent to SR 33 at Camino Cielo and the Rice Canyon Trail in Meiners Oaks shall be screened from view by the planting of native vegetation. Vegetation selected for screening shall consist native species appropriate to the location and approved by a qualified biologist familiar with species known to inhabit the Ventura River. Species selected must be chosen and maintained to achieve a height as tall or taller than the levee/floodwall height at maturity. Planting of screening vegetation shall be initiated as soon as possible during levee/floodwall construction and shall achieve a minimum of 50 percent screening of the levee/floodwall within 10 years of project initiation. The goal of the screening should be to maintain the natural character of the remaining area and to screen the levees and floodwalls to the maximum feasible extent. An aesthetic screening plan would be submitted to the Corps by the construction contractor at least 90 days prior to construction and would include, but not be limited to:

- A list of proposed tree and shrub species and sizes and a discussion of the suitability of the plants for the site conditions and mitigation objectives;

- Maintenance procedures, including any needed irrigation; and
- A procedure for replacing unsuccessful plantings.

Three different locations have been proposed as possible slurry disposal sites. Only one site would ultimately be chosen as the final slurry disposal site for the alternative, but all three potential sites must be evaluated for their potential aesthetic impacts.

- **Rice Road:** As shown in Figures 5.5-1 and 5.5-2 (figures are at the end of Section 5.5), this 94-acre slurry disposal site would be visible from Rice Road on the east side of the Ventura River and would be visible from OVLC trails to the north and west of the site. Disposal of fine sediments at this location would raise terrain in this area by up to 15 feet. As views of this area would largely be from above, raising the terrain at this location would not necessarily obstruct views from above. Slurry activities would convert a dominantly natural area into a large, human-disturbed parcel, but as the slurry disposal site would be re-vegetated following completion of project activities, the area would soon return to a more-natural state.

  Placement of the slurry disposal site in this location, however, would also cause the displacement of portions of the East/West River Bottom Loop Trails and block access from the Riverview Trailhead. This displacement would destroy views of the surrounding valley walls and river channel landscape from the trails and would be considered a significant, but mitigable impact (**Class II**). Although the slurry disposal activities at this location would disturb a large area and a sizable length of trails, Mitigation Measure AE-3 would require the re-establishment of trails on top of the slurry disposal site after material on the site has settled, dewatered, and been re-vegetated. Implementation of Mitigation Measure AE-3 would reduce impacts to a less-than-significant level.

- **Highway 150 Non-Contiguous Sites:** As shown in Figures 5.5-3, 5.5-4, and 5.5-5 (at the end of this section), portions of the three northernmost slurry disposal sub-sites at this location would be visible from Highway 150 and the southernmost sub-site would be visible from scattered residences on the west side of the Ventura River. The three northernmost sub-sites within the Ventura River floodplain would be viewed from a greater elevation looking down, so the slurry sites would not result in the obstruction of any views. Views of these areas may be deteriorated by the introduction of the large, man-made slurry retention features into the natural landscape. As the slurry disposal sites would consist of earthen berms filled during the slurrying operations with silt and sediments, its appearance would not be greatly incompatible with the appearance of the sparsely vegetated floodplain terraces nearby. With re-vegetation of these areas following completion of slurry activities, the area would soon return to a more-naturally appearing state. Any impacts resulting from the slurry disposal sub-sites in these locations would be adverse, but less than significant (**Class III**).

  As Figures 5.5-6 and 5.5-7 show, the southernmost disposal site would be at a similar elevation or lower than viewers at surrounding residences, but due to its distance from these viewpoints, the site would not substantially obstruct any views. Re-vegetation following completion of slurry activities would restore the site to a more natural state than it had previously been. The site would be viewed against a backdrop of the valley walls and would not substantially change views of the valley. Any impacts would be adverse (**Class III**), but less than significant.

- **North of Baldwin Road:** A slurry disposal site at this location would be largely out of the line of sight of residences and would be heavily screened from Highway 150 (Baldwin Road), Ranch Road, and De La Garrigue Road by intervening trees and terrain. Any impacts that a slurry disposal site at this location would cause to views would be adverse, but less than significant (**Class III**).

AE-3 Create trails over the Rice Road slurry disposal site following re-vegetation of site. Prior to completion of slurry disposal activities and re-vegetation of the site, the Corps shall design a system of trails over the completed, re-vegetated site along with a re-vegetation plan for the site. The Ojai Valley Land Conservancy shall be consulted on appropriate trail routes to replace the trails covered by the slurry. Final trail designs and re-vegetation plans shall be submitted to the Ojai Valley Land Conservancy for approval at least 60 days prior to commencement of revegetation activities. Trail route construction shall commence in tandem with revegetation activities and shall be completed to the same level of quality as currently exist on the site or better.

Views of beach shorelines would not be adversely affected by project activities. In the long term, increased sand and sediment would be transported downstream from above the Matilija Dam, which could increase beach nourishment. According to Appendices D and E of the Feasibility Study, however, it is unclear how this would affect beach conditions and, therefore, beach aesthetics.

Other than Matilija Dam, the project would not degrade any rare or unique scenic features in the region, and the removal of the dam would improve the aesthetic qualities of the Matilija Canyon and allow for the enhancement of previously valued aesthetic features in the area, such as Hanging Rock, which has been the subject of many historic postcards and images of Matilija Creek. Enhancement of unique and historically significant landmarks such as this would be a beneficial (**Class IV**) impact resulting from the project.

Alternative 4b, as a whole, would improve the natural environmental character of the region by returning Matilija Canyon to a more natural state as well as allowing for increased future beach nourishment. This type of improvement would be considered a beneficial (**Class IV**) impact resulting from the project.

Activities associated with the project, including giant reed removal, reservoir material excavation, dam demolition, bridge replacement, installation and improvement of downstream flood protection measures, installation of the locally preferred desilting basin, and modifications to water supply facilities at Robles Diversion and Foster Park, would result in temporarily obstructed views to the Ventura River and temporary deteriorations in the aesthetic value of the project area. These impacts would result from the presence of equipment, materials, and work force at project construction, excavation, or demolition sites, as well as staging areas. Temporary impacts would also result from the temporary alteration of landforms and vegetation during project activities. Construction and excavation equipment would be seen by various viewers in close proximity to the sites, including nearby residences, recreationists on trails and roads, motorists, and pedestrians. View durations would generally be brief, between one and four months, although for residents in the Matilija Canyon, the duration of these impacts would be up to 18 months. Although these impacts would be significant (**Class II**), the implementation of Mitigation Measure AE-4 would ensure that impacts to these viewers are reduced to a less-than-significant level.

AE-4 **Reduce visibility of project activities and equipment.** If visible from nearby residences, roadways, or recreation facilities, project construction sites, as well as all staging, material, and equipment storage areas shall be visually screened with temporary screening fencing. Fencing shall be of an appropriate design and color for each specific location. All evidence of project activities, including ground disturbance due to staging or storage areas, shall be removed and all disturbed areas shall be returned to an original or improved condition upon completion of project activities including the replacement of any vegetation or paving removed during construction.

5.5.4 Alternative 1: Full Dam Removal/Mechanical Sediment Transport – Dispose of Fines, Sell Aggregate

The effects on visual resources associated with this alternative would be similar to those described for Alternative 4b. The primary differences from an aesthetic perspective between Alternative 1 and Alternative 4b are the sale and trucking of aggregate from the reservoir area for the duration of the project and the implementation of lower-level downstream flood control measures.

Alternative 1, like Alternative 4b, would result in the elimination of the County of Ventura designated scenic resource, Lake Matilija. The aesthetic impact of the elimination of Lake Matilija would be the same for Alternative 1 as for Alternative 4b. The excavation and removal of the material filling the reservoir, removal of the dam, and eradication of giant reed would return Matilija Canyon to a more natural state, and improve the aesthetic value of Matilija Creek and Canyon for viewers. Although Lake Matilija would be eliminated, the enhancement to the natural landscape would be considered a beneficial aesthetic impact (**Class IV**) resulting from the project.

As in Alternative 4b, no views of scenic resources from eligible or designated scenic highways, such as SR 33, would be affected by this alternative. The views of Matilija Dam by travelers on SR 33 would be replaced with unobstructed views of the natural environment in Matilija Canyon, and would be considered an improvement to the scenic value of the highway. This enhancement would be considered a beneficial impact (**Class IV**) resulting from the project. Although portions of the Ventura River are visible from SR 33, views are largely screened by intervening terrain, vegetation, and structures and so would not change as a result of Alternative 1.

Impacts due to obstructed views of ridgelines would be similar to Alternative 4b, but less severe, as the increases in levee and floodwall heights under Alternative 1 are lower than in Alternative 4b. As with Alternative 4b, project activities associated with removal of the reservoir-area materials and dam would have no impact on views of ridgelines, and views of ridgelines from SR 33 would not be degraded by the project. Due to the distance between the trail and the levees and floodwalls, as well as the intervening terrain and vegetation, new levees and floodwalls or increases in the height of existing levees and floodwalls would not substantially damage views of ridgelines. Impacts could be adverse, but would be less than significant (**Class III**), and would be less than those described for Alternative 4b.

Impacts to views of shorelines and beaches would similarly be less than those described for Alternative 4b because of the lower heights of the levee and floodwall improvements under Alternative 1. Additionally, because of the lower level of flood control improvements required for Alternative 1, no new levee is required at Cañada Larga, and thus would not affect views of the river shoreline. Downstream flood protection measures would result in the following impacts to views of the Ventura River and its banks:

- **Camino Cielo/SR 33:** The 968-foot floodwall on the west side of Hwy 33 would range in height from 0.1 feet to 6.6 feet. The floodwall would be constructed just downslope of SR 33 to the west. Although the floodwall proposed for Alternative 1 would be lower than the floodwall required for Alternative 4b, introduction of the lower floodwall to this environment would still break up a dominantly natural area with a large, man-made feature. This would be considered a significant impact (**Class II**), but could be reduced to a less-than-significant level through implementation of Mitigation Measures AE-1 and AE-2.
- **Meiners Oaks:** As in Alternative 4b, a large portion of the levees and floodwall near Meiners Oaks and Robles Diversion would be obstructed from views by intervening terrain and vegetation. A portion of the levees and floodwall would be constructed up to 12 feet in height along the western property line of a number of Meiners Oaks residences and would also cross a portion of the OVLC Rice Canyon and East/West River Bottom Loop Trails. Views from the residences and trails of dense oak woodland vegetation would be replaced and dominated by views of the levees and floodwall. As in Alternative 4b, this impact would be significant (**Class II**), but implementation of Mitigation Measure AE-1 would reduce the visual impacts to the residences to less than-significant levels and implementation of Mitigation Measure AE-2 would reduce the aesthetic impact to recreational trail users to less-than-significant levels.
- **Live Oaks:** A floodwall would be raised along this portion of the river to nearly seven feet. As with Alternative 4b, most of the properties along Riverside Road, which back up to the existing levee along the river, would only marginally alter the views of the opposite valley wall. The construction of a seven foot floodwall behind a small number of properties along the southern portion of Riverside Road, however, would result in substantial damage to views of the Ventura River and the opposite valley wall. Due to the proximity of these properties to the river channel, there is little flexibility in shifting the location of the proposed floodwall further from their property lines. For this reason, the floodwall at this location would result in significant (**Class I**) unmitigable impacts.
- **Casitas Springs:** The alignment of the flood control improvements along Casitas Springs would be the same under Alternative 1 as described for Alternative 4b, but would only be raised up to 7.4 feet. Intervening vegetation largely screens the existing levee from residential views at the southern end of the proposed levee, and would also screen the levee even with an increase in height. Impacts at this location could be adverse (**Class III**), but would be less than significant and would be less than described for Alternative 4b.

  Grasses and other field vegetation would largely screen an increase in the height of the levees and floodwall from users of the Ojai Valley Trail along the east side of the open space fields. Set against the backdrop of the opposing valley wall and screened by vegetation, increased levee height would not result in a substantial change to views from the trail. Impacts would be adverse, but less than significant (**Class III**).

  As in Alternative 4b, however, the mobile home park would be directly adjacent to the proposed levee. An increase in the levee height to over seven feet would substantially impact views of the residents of the mobile home park. Due to the proximity of the residences to the river channel, it is unlikely that the alignment of the levee and floodwall could be moved to avoid substantially damaging views from the back of the park. Impacts would be significant and unmitigable (**Class I**).

Impacts resulting from the construction and filling of the slurry disposal site would be of the same type for Alternative 1 as for Alternative 4b, but would be a slightly greater magnitude due to the inclusion of the 770,000 cy of fine sediment left over from aggregate sale activities. Aesthetic impacts at the Rice Road disposal site would be significant (**Class II**), but could be reduced to less-than-significant levels with the implementation of Mitigation Measure AE-3. Impacts resulting from use of the North of Baldwin Road and Highway 150 sites could be adverse, but would be less than significant (**Class III**).

Impacts to views of beach shorelines would be the same as described for Alternative 4b and would not be adversely affected by project activities. In the long term, increased sand and sediment would be transported downstream from above the Matilija Dam, which could increase beach nourishment.

According to Appendices D and E of the Feasibility Study, however, it is unclear how this would affect beach conditions, and therefore beach aesthetics.

As described for Alternative 4b, the project would not degrade any rare or unique scenic features in the region other than Matilija Dam, and would allow for the enhancement of previously valued aesthetic features in the area, such as Hanging Rock. Enhancement of unique and historically significant landmarks such as this would be a beneficial (**Class IV**) impact resulting from the project.

Alternative 1, like Alternative 4b, would improve the natural environmental character of the region by returning Matilija Canyon to a more natural state as well as allowing for increased future beach nourishment. This type of improvement would be considered a beneficial (**Class IV**) impact resulting from the project.

Activities associated with the project, including giant reed removal, reservoir material excavation, the trucking of reservoir materials off site, dam demolition, bridge replacement, installation and improvement of downstream flood protection measures, and modifications to water supply facilities at Robles Diversion and Foster Park, would result in temporarily obstructed views to the Ventura River and temporary deteriorations in the aesthetic value of the project area. These impacts would result from the presence of equipment, materials, and work force at project construction, excavation, or demolition sites, as well as staging areas. Temporary impacts would also result from the temporary alteration of landforms and vegetation during project activities. Construction and excavation equipment would be seen by various viewers in close proximity to the sites, including nearby residences, recreationists on trails and roads, motorists, and pedestrians.

These impacts would be most severe for activities associated with the excavation and sale of aggregate materials from the reservoir area, which would take up to ten years. Residents in the Matilija Canyon and Matilija Canyon Ranch communities would have views of the aggregate sale and trucking activities from Matilija Road for this extended period, until all marketable aggregate is removed from behind the dam. Dust and noise associated with trucking the material off site would also contribute to the temporary degradation of the aesthetic value of the area. The duration of these impacts would be more extended than Alternative 4b. Under this alternative, users of Matilija Road, particularly residents of Matilija Canyon, would contend with approximately 420 trips by large haul trucks per day, degrading the scenic value of this two-lane road that winds through largely pristine wilderness. Although impacts could be reduced by the implementation of Mitigation Measure AE-4, due to the extended duration and frequent disturbance resulting from the hauling of marketable aggregate off site, temporary impacts resulting from project activities would be significant and unmitigable (**Class I**).

5.5.5 Alternative 2a: Full Dam Removal/Natural Sediment Transport – Slurry "Reservoir Area" Fines Off Site

The effects on visual resources associated with this alternative would be similar to those described for Alternative 4b. The primary difference from an aesthetic perspective between Alternative 2a and Alternative 4b is the difference in the disposition of sediment in the reservoir area following dam removal and the time required for the reservoir area to return to its pre-dam topography. Impacts resulting from downstream flood protection measures, the slurry disposal site, giant reed removal, bridge replacement, and modifications to water supply facilities at Foster Park and Robles Diversion would be the same for Alternative 2a as for Alternative 4b.

The aesthetic impact of the elimination of Lake Matilija would be the same for Alternative 2a as for Alternatives 4b and 1. The removal of material filling the reservoir, removal of the dam, and eradication of giant reed would return Matilija Canyon to a more natural state, and improve the aesthetic value of Matilija Creek and Canyon for viewers. Additionally, as the reservoir area materials remaining after the slurry operation would be allowed to erode naturally, over time, the storm events would return the canyon topography to a more natural state than the landscaped stabilization of materials that would occur under Alternative 4b. While Lake Matilija would be eliminated under this alternative, the eventual return to a natural landscape would be considered a beneficial aesthetic impact (**Class IV**) resulting from the project.

As in Alternatives 4b and 1, no views of scenic resources from eligible or designated scenic highways, such as SR 33, would be affected by this alternative. The views of Matilija Dam by travelers on SR 33 would be replaced with unobstructed views of the natural environment in Matilija Canyon, and would be considered an improvement to the scenic value of the highway. This enhancement would be considered a beneficial impact (**Class IV**) resulting from the project. Although portions of the Ventura River are visible from SR 33, views are largely restricted by intervening vegetation, terrain, and structures. Because of this, the downstream flood protection measures would not degrade views of the river from the highway due to intervening terrain and topography. No impacts would occur.

Impacts due to obstructed views of ridgelines would be the same to Alternative 4b. As with Alternative 4b, project activities associated with removal of the reservoir-area materials and dam would have no impact on views of ridgelines, and views of ridgelines from SR 33 would not be degraded by the project. Due to the distance between the trail and the levees and floodwalls, as well as the intervening terrain and vegetation, new levees and floodwalls or increases in the height of existing levees and floodwalls would not substantially damage views of ridgelines. Impacts could be adverse, but would be less than significant (**Class III**).

Impacts to views of shorelines and beaches would the same as those described for Alternative 4b. Project activities above Matilija Dam would not interfere with views of shorelines along beaches or rivers.

Downstream flood protection measures would be the same as described for Alternative 4b and would result in the following impacts to views of the Ventura River and its banks:

- **Camino Cielo/SR 33:** The 968-foot floodwall on the west side of SR 33 would range in height from 4.1 feet to 10.6 feet just downslope of SR 33 to the west. Construction of the floodwall just west of SR 33 would introduce a large, man-made feature into a dominantly natural area. This would be considered a significant impact (**Class II**), but could be reduced to a less-than-significant level through implementation of Mitigation Measures AE-1 and AE-2.
- **Meiners Oaks:** Views from the residences and OVLC Rice Canyon and East/West River Bottom Loop Trails of dense oak woodland vegetation would be replaced and dominated by views of the levees and floodwall,

which could reach up to 17 feet in height. Although this impact would be significant (**Class II**), implementation of Mitigation Measure AE-1 would reduce the visual impacts to the residences to less-than-significant levels and implementation of Mitigation Measure AE-2 would reduce the aesthetic impact to recreational trail users to less-than-significant levels.

- **Live Oaks:** The levees and floodwall along this portion of the river would be raised between four and 13 feet. Increasing the height of the levee along most of the properties at this location would increase views of introduced, man-made structures, but would only marginally alter the views of the opposite valley wall. For a small number of properties along the southern portion of Riverside Road, increasing the height of the levee to nearly 13 feet would result in a substantial blockage of views. Due to the proximity of these properties to the river channel, there is little flexibility in shifting the location of the proposed levee and floodwall further from their property lines. For this reason, the levee and floodwall at this location would result in significant (**Class I**), unmitigable impacts.

- **Casitas Springs:** Intervening vegetation largely screens the existing levee from residential views at the southern end of the proposed levee, and would also screen the levee even with an increase in height. Impacts at this location could be adverse (**Class III**), but would be less than significant.

  Grasses and other field vegetation would help screen an increase in the height of the levees and floodwall from users of the Ojai Valley Trail along the east side of the open space fields. Set against the backdrop of the opposing valley wall and screened by vegetation, increased levee height would result in a substantial change to views from the trail. Impacts would be adverse, but less than significant (**Class III**).

  As in Alternative 4b, however, the mobile home park would be directly adjacent to the proposed levee. An increase in the levee height to over 13 feet would substantially impact views of the residents of the mobile home park. Due to the proximity of the residences to the river channel, it is unlikely that the alignment of the levee and floodwall could be moved to avoid substantially damaging views from the back of the park. Impacts would be significant and unmitigable (**Class I**).

- **Cañada Larga:** As the levee at this location would pass through an area largely consisting of open space and industrial areas, there are few opportunities to view the Ventura River along this area. Views of the river from SR 33 at this location are heavily screened by vegetation and the intervening petroleum facilities. Similarly, views of a levee built along this location would also be screened by heavy vegetation and intervening terrain and structures. Impacts are considered less than significant (**Class III**).

Impacts resulting from the construction and filling of the slurry disposal site would be of the same type for Alternative 2a as for Alternative 4b. Aesthetic impacts at the Rice Road disposal site would be significant (**Class II**), but could be reduced to less-than-significant levels with the implementation of Mitigation Measure AE-3. Impacts resulting from use of the North of Baldwin Road and Highway 150 sites could be adverse, but would be less than significant (**Class III**).

Views of beach shorelines would not be adversely affected by project activities. In the long term, increased sand and sediment would be transported downstream from above the Matilija Dam, which could increase beach nourishment. According to Appendices D and E of the Feasibility Study, however, it is unclear how this would affect beach conditions, and therefore beach aesthetics.

As described for Alternatives 4b and 1, the project would not degrade any rare or unique scenic features in the region other than Matilija Dam, and would allow for the enhancement of previously valued aesthetic features in the area, such as Hanging Rock. Enhancement of unique and historically significant landmarks such as this would be a beneficial (**Class IV**) impact resulting from the project.

Alternative 2a would improve the natural environmental character of the region by returning Matilija Canyon to a more natural state than either Alternatives 4b or 1, as well as allowing for increased future beach nourishment. This type of improvement would be considered a beneficial (**Class IV**) impact resulting from the project.

Temporary construction activities associated with the project would be similar to those described for Alternative 4b, but without the excavation and stabilization of reservoir material following slurry activities and without construction of the locally preferred desilting basin. Other temporary construction activities, however, would be the same as Alternative 4b and would result in the same impacts. Without the stabilization activities after the reservoir area fines had been slurried, and without the desilting basin, the magnitude of impacts associated with Alternative 2a would be less than Alternative 4b. Impacts from the presence of equipment, materials, and work force at project construction, excavation, or demolition sites, as well as staging areas would still occur at project sites. View durations would generally be brief, between one and four months, and the duration would be more extended for residents in the Matilija Canyon, would be up to 18 months. These impacts would be significant (**Class II**), but the implementation of Mitigation Measure AE-4 would ensure that impacts to these viewers are reduced to a less-than-significant level.

5.5.6 Alternative 2b: Full Dam Removal/Natural Sediment Transport – Natural Transport of "Reservoir Fines"

Aesthetic impacts for Alternative 2b are largely identical to Alternative 2a, with the exception that the 94-acre slurry disposal site along Rice Road would not be required, and therefore would not result in any impacts to the Rice Road area. Impacts occurring as a result of the excavation and stockpiling of reservoir area fines upstream of the dam area would occur in Alternative 2b instead of impacts resulting from the slurrying operation. The intensity of these operations would be similar, however, mainly differing in the stockpiling of fines in Alternative 2b increasing activity upstream of the dam in the eastern portion of the reservoir area. Much like the temporary aesthetic impacts resulting from construction activities, the stockpiling activities could be a significant (**Class II**) aesthetic disruption, but would be mitigated to a less-than-significant level with the implementation of Mitigation Measure AE-1. All other aesthetic impacts resulting from Alternative 2b would be the same as those described for Alternative 2a.

5.5.7 Alternative 3a: Incremental Dam Removal/Natural Sediment Transport - Slurry "Reservoir Area" Fines Off Site

Aesthetic impacts resulting from Alternative 3a are nearly identical the same as those described for Alternative 2a. All impacts associated with giant reed removal, bridge replacement, installation and improvement of downstream flood protection measures, and modifications to water supply facilities at Robles Diversion and Foster Park would be identical to impacts described for Alternative 2a. As with Alternative 2a, the levees and floodwalls required for this alternative would result in significant (**Class II**), but mitigable impacts at Camino Cielo and Meiners Oaks and significant, unmitigable (**Class I**) impacts at Live Oaks and Casitas Springs. Implementation of Mitigation Measures AE-1 and AE-2 would reduce the impacts at Camino Cielo and Meiners Oaks to less-than-significant levels. Impacts resulting from use of one of the three slurry disposal sites would be the same as described for Alternative 2a. Impacts at the Rice Road site would be significant (**Class II**), but with the implementation of Mitigation Measure AE-3 would be reduced to less-than-significant levels. Any impacts resulting from use of the North of Baldwin Road and Highway 150 sites could be adverse, but would be less than significant (**Class III**).

Temporary impacts associated with the excavation and slurrying of the reservoir area fines and removal of the dam, however, would be different from impacts described for Alternative 2a because of the incremental dam removal process. Although the incremental dam removal process increases the total time required for completion of the project, the total amount of work is roughly the same, but broken into two separate phases. Temporary degradations to the aesthetic quality of the Matilija Canyon and the slurry disposal site resulting from the alteration of landforms and vegetation would be extended over a longer period than those experienced for Alternative 2a.

Temporary disruptions to the aesthetic quality of the Matilija Canyon and the slurry disposal sites due to the presence of equipment, materials, and work force at project sites and staging areas would be of a shorter duration than similar work in Alternative 2a, but these impacts would occur twice. The temporary impacts resulting from the incremental dam removal process in Alternative 3a would be greater in magnitude than Alternative 2a. Although these temporary impacts would be significant (**Class II**), implementation of Mitigation Measure AE-4 would ensure that they would be reduced to less-than-significant levels.

5.5.8 Alternative 3b: Incremental Dam Removal/Natural Sediment Transport - Natural Transport of "Reservoir Fines"

Aesthetic impacts resulting from Alternative 3b are nearly identical the same as those described for Alternative 2b. All impacts associated with giant reed removal, bridge replacement, installation and improvement of downstream flood protection measures, and modifications to water supply facilities at Robles Diversion and Foster Park would be identical to impacts described for Alternative 2b. As with Alternative 2b, the levees and floodwalls required for this alternative would result in significant (**Class II**), but mitigable impacts at Camino Cielo and Meiners Oaks and significant, unmitigable (**Class I**) impacts at Live Oaks and Casitas Springs. Implementation of Mitigation Measures AE-1 and AE-2 would reduce the impacts at Camino Cielo and Meiners Oaks to less-than-significant levels. Impacts at the Rice Road site would be significant (**Class II**), but with the implementation of Mitigation Measure AE-3 would be reduced to less-than-significant levels. Any impacts resulting from use of the North of Baldwin Road and Highway 150 sites could be adverse, but would be less than significant (**Class III**).

Temporary impacts associated with the excavation and stockpiling of the reservoir area fines and removal of the dam, however, would be different from impacts described for Alternative 2b because of the incremental dam removal process. As described for Alternative 3a, the incremental dam removal process increases the total time required for completion of the project, but the total amount of work is roughly the same, only broken into two separate phases. Temporary degradations to the aesthetic quality of the Matilija Canyon resulting from the alteration of landforms and vegetation would be longer than those experienced for Alternative 2b. Temporary disruptions to the aesthetic quality of the Matilija Canyon due to the presence of equipment, materials, and work force at project sites and staging areas would be of a shorter duration than similar work in Alternative 2b, but these impacts would occur twice. The temporary impacts resulting from the incremental dam removal process in Alternative 3b would be greater in magnitude than Alternative 2b. Although these temporary impacts would be significant (**Class II**), implementation of Mitigation Measure AE-4 would ensure that they would be reduced to less-than-significant levels.

5.5.9 Alternative 4a: Full Dam Removal/Long-Term Sediment Transport - Long-Term Transport Period

Alternative 4a requires the same low level of downstream flood protection as described in Alternative 1, so all impacts associated with these flood control measures in Alternative 4a are identical to those described for Alternative 1. With the exception of temporary impacts associated with the excavation and stockpiling of the reservoir area material and removal of the dam, aesthetics impacts resulting from Alternative 4a are identical to those described for Alternative 4b. As with Alternative 1, the levees and floodwalls required for this alternative would result in significant (**Class II**), but mitigable impacts at Camino Cielo and Meiners Oaks and significant, unmitigable (**Class I**) impacts at Live Oaks and Casitas Springs. Implementation of Mitigation Measures AE-1 and AE-2 would reduce the impacts at Camino Cielo and Meiners Oaks to less-than-significant levels. Impacts at the Rice Road site would be significant (**Class II**), but with the implementation of Mitigation Measure AE-3 would be reduced to less-than-significant levels. Any impacts resulting from use of the North of Baldwin Road and Highway 150 sites could be adverse, but would be less than significant (**Class III**).

Temporary impacts resulting from the dam removal and material storage on site would be of the same nature and type as those described for Alternative 4b, but greater due to the additional burial of concrete rubble from the dam in the fill sites and the additional slope protection. Although the temporary impacts associated with Alternative 4a would be greater than those described for Alternative 4b and would be considered significant (**Class II**), implementation of Mitigation Measure AE-1 would reduce impacts to a less-than-significant level.

Figure 5.5-1: Picture taken at Rice Road upstream of Rice Road Slurry Disposal Site looking downstream

Figure 5.5-2: Picture taken at Rice Road downstream of Rice Road Slurry Disposal Site looking upstream

Matilija Dam Ecosystem Restoration Project

Figures 5.5-1 and 5.5-2

Photos of Rice Road Slurry Disposal Site

Matilija Dam Ecosystem Restoration Project

Figures 5.5-3 and 5.5-4

Photos of Highway 150 Bridge Slurry Disposal Site

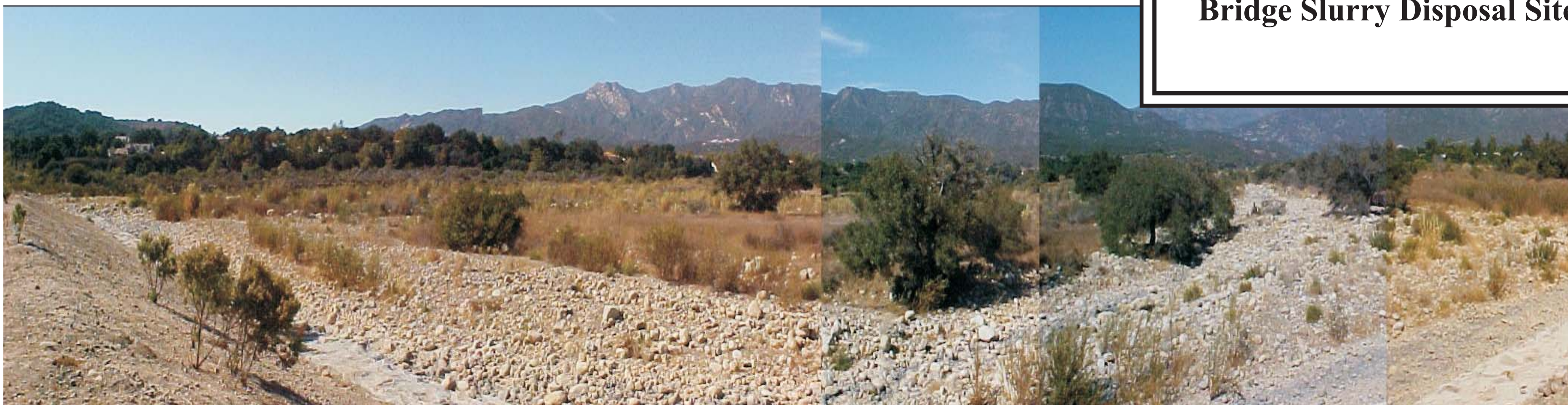


Figure 5.5-3: Panoramic view of Highway 150 Bridge Slurry Disposal Site Sub-site 1

Figure 5.5-4: Panoramic view of Highway 150 Bridge Slurry Disposal Site Sub-site 2

Matilija Dam Ecosystem Restoration Project

Figures 5.5-5, 5.5-6 and 5.5-7

Photos of Highway 150 Bridge Slurry Disposal Site

Figure 5.5-5: Panoramic view of Highway 150 Bridge Slurry Disposal Site Sub-site 3

Figure 5.5-6: View south at middle of Highway 150 Bridge Slurry Disposal Site Sub-site 4

Figure 5.5-7: View north at middle of Highway 150 Bridge Slurry Disposal Site Sub-site 4

5.6 AIR QUALITY

5.6.1 Impact Significance Criteria

The following criteria are based on the California Environmental Quality Act and Ventura County guidelines for determining the significance of environmental impacts. Where there are differences, the more stringent criteria would be used in the analysis. The following significance criteria would be used to evaluate air quality impacts in the study area.

- Conflict with or obstruct implementation of the VCAPCD Air Quality Management Plan (NEPA and CEQA Threshold).
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation, whether solely or cumulatively[1]. (NEPA and CEQA Threshold)
- Result in emissions greater than 25 pounds per day of NOx or ROC, or greater than 5 pounds per day of NOx or ROC for project emissions within the Ojai Planning Area of the County, see Figure 5.6-1 for the boundaries of the Ojai Planning Area). (VCAPCD CEQA Significance Threshold[2]).
- Expose sensitive receptors or project workers to substantial pollutant concentrations, or expose a substantial number of people to objectionable odors (CEQA Significance Threshold).
- Result in non-compliance with the federal General Conformity Rule[3] (40 CFR Parts 93, Subpart B). (NEPA Significance Threshold)

5.6.2 No Action Alternative (Future Without-Project)

Under the No Action Alternative, the project would not be implemented, thereby avoiding all potential impacts that would have been associated with it, including air pollutant emissions associated with demolition/construction activities and truck trips for hauling equipment, materials, and debris. Therefore, implementation of the No Action Alternative would not result in any adverse air quality impacts. However, at some unspecified future date, dam removal may be necessitated due to structural deterioration.

Per the County's 1995 AQMP Revision, future air quality conditions within the study area would continue to improve. The 1995 Revision indicates that Ventura County would attain the Federal one-hour standard by 2005.

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1 This is a NEPA and CEQA significance threshold when assessing the potential to violate NAAQS, but only a CEQA significance threshold when assessing the potential to violate CAAQS.

2 Ventura County does not have specific significant emission thresholds for construction projects (VCAPCD 2004); the emission values presented are intended operating area and point source emissions only. However, the County recommends that construction emissions be reduced through appropriate mitigation for projects that have estimated construction emissions in excess of the operating emission source thresholds. Therefore, if the emission thresholds are exceeded but appropriate mitigation measures are applied then the impact related for this significance criteria is considered less than significant after mitigation (Class II).

3 The study area is in severe and moderate non-attainment of the 1-hour and 8-hour NAAQS for ozone (O_3), respectively, and is in attainment of all other NAAQS; therefore, as required under §93.153 (b)(1), a General Conformity determination would be required if the annual emissions of ozone precursors (i.e., nitrogen oxides, NO_x, and reactive organic compounds, ROC) are predicted to be greater than 25 tons per year. The 8-hour ozone NAAQS non-attainment designations have been finalized and will become effective on June 15, 2004, and conformity will be based on the 8-hour non-attainment designation starting one year after the effective date of the 8-hour designation, or June 15, 2005 (USEPA, 2003 and 2004).

5.6.3 Alternative 4b (Recommended Plan): Full Dam Removal/Long-Term Sediment Transport - Short-Term Transport Period

Construction of Alternative 4b would result in short-term (approximately two years from project initiation to dam removal) air quality impacts due to diesel exhaust emissions from on-site construction equipment and vehicles such as bulldozers, loaders, excavators, pumps, dump trucks, etc., as well as fugitive dust generated by earth movement and the operation of vehicles on unpaved surfaces. Off-site emissions would also be generated from vehicles transporting workers to and from the job sites and from heavy diesel truck trips required to haul equipment and materials to and from the various project construction sites. It is assumed that by the time the project is initiated ultra-low sulfur diesel would be required to be used for on-road diesel equipment, would be readily available, and as a project commitment would be used to fuel all offroad diesel equipment to minimize diesel PM_{10} impacts. Table 5.6-1 provides the total estimated maximum annual unmitigated and mitigated emissions for Alternative 4b. Refer to Appendix G (Air Quality) for the methodology, assumptions, and emission factors used to estimate emissions.

Table 5.6-1: Estimated Maximum Annual Emissions for Alternative 4b

Emissions	NOx	CO	ROC	SOx	PM_{10}
Unmitigated Emissions	296.1	83.9	18.1	0.2	163.0
Mitigation Reduction	-219.5	-39.7	-11.3	-0.1	-127.7
Mitigated Emissions	**76.6**	**44.2**	**6.8**	**0.1**	**35.3**

Notes: Emissions are presented in tons per year. Estimated mitigated emissions assume all stationary construction equipment would use electric power (except dredges), offroad diesel equipment would at a minimum use USEPA Tier 1 compliant engines, and all feasible fugitive dust measures would be implemented.

The activities and emissions that would occur under Alternative 4b and the other project alternatives in no way conflicts with or obstruct implementation of the current VCAPCD Air Quality Management Plan. Based on the attainment date given in the last update to the Plan, the project would occur after the County attains the 1-hour ozone standard, which is the only pollutant standard covered under the current Plan. Therefore, the impact to this significance criteria is less-than-significant (**Class III**) for all action alternatives, no mitigation measures are required, and this issue is not addressed under the other project alternative impact discussions.

Alternative 4b and the other project alternatives would create PM_{10} emissions that could potentially cause new or contribute substantially to existing PM_{10} CAAQS violations to nearby receptors at the various project locations. While the Ojai monitoring station has not shown any recent violations of the CAAQS, other stations within Ventura County, including the El Rio station near the border of Ventura and Oxnard, have shown violations. Due to the overall magnitude of the PM_{10} emissions estimated for this alternative, and similarly for all of the other action alternatives, the PM_{10} ambient air quality impact from this alternative is considered to be a significant and unavoidable (**Class I**) impact, even with the implementation of all feasible PM_{10} mitigation measures (Mitigation Measures A-1 through A-4 and A-6 through A-11). This issue is not addressed again under the other project alternative impact discussions.

The project would not have the potential to cause any other new violation or contribute substantially to any other existing CAAQS or NAAQS violation. However, the mitigation measures being proposed to mitigate the PM_{10} emissions would also significantly reduce the NO_x, CO, and ROC emissions.

As shown in Table 5.6-1 (and Appendix G), unmitigated emissions associated with Alternative 4b would easily exceed the Ventura County operational standards of 25 pounds per day of NO_x and ROC (or 5 pounds per day for the various construction project sites located within the Ojai Planning Area). As noted previously, the County recommends that construction emissions be reduced through appropriate mitigation for projects that have estimated construction emissions in excess of the operating emission source thresholds. Mitigation Measures A-1 through A-4 have been proposed as appropriate mitigation to reduce NOx and ROC emissions from the construction activities. Since appropriate mitigation measures would be applied the impacts related to this significance criteria are considered less than significant after mitigation (**Class II**). This impact level is the same for all action alternatives and this issue is not addressed under the other project alternative impact discussions.

The unmitigated project emissions may have the potential to expose sensitive receptors or project workers to substantial concentrations of pollutants, including diesel particulate, a toxic air pollutant, resulting in significant, but mitigable (**Class II**) impacts. However, the project mitigation (Mitigation Measures A-1 through A-4) would reduce the project emission potential, particularly the diesel particulate emissions, substantially. Additionally, the potential for substantial worker exposure to particulate emissions will be mitigated through the incorporation of appropriate respiratory protection (Mitigation Measure A-12).

The potential for exposure to objectionable odors during the project alternatives is low. However, certain activities, such as non-native aquatic fauna eradication and channel mud dredging and disposal, may create anaerobic decomposition that may create temporary odor impacts. However, proper management (such as quick retrieval and disposal of dead fish, proper mixing of arundo chips when they are being dried, mixing of surface and lower sediments when slurrying, etc.) during these activities should reduce odor impacts to less than significant (**Class III**).

The Ventura County Air Quality Assessment Guidelines (VCAPCD 2003) indicate that earthmoving projects have the potential to create significant Valley Fever impacts. Specific factors that indicate a project's potential to cause significant Valley Fever impacts include: disturbing the top soil of undeveloped lands; dry, alkaline, sandy soils; virgin, undisturbed, non-urban areas among other factors, which describe certain activities and areas of the project.[4] Therefore, there may be the potential for the project to cause significant Valley Fever impacts, and feasible mitigation (A-13) shall be implemented to mitigate this potential impact to less-than-significant levels (**Class II**).

The potential for exposing sensitive receptors or project workers to substantial pollutant concentrations, or exposing a substantial number of people to objectionable odors would be mitigated to less than

[4] It should be noted that no records have been found to suggest that the Matilija Creek bed, Ventura River channel, or other areas that may be disturbed as part of this project have ever been found to have the fungus that causes Valley Fever, but certain project areas do include suitable habitat for this fungus.

significant after mitigation (**Class II**). These findings are similar for all of the project alternatives and this issue is not addressed under the other project alternative impact discussions.

The annual NOx emissions from Alternative 4b, and all other project alternatives would exceed the General Conformity Rule *de minimis* emission threshold of 25 tons per year (ROC emission would not exceed 25 tons per year for any project alternative). However, it is assumed through mitigation measure AQ-5 that NO_x offsets would be obtained to fully mitigate the NO_x emissions during all project years with emissions greater than 25 tons per year. Therefore, with this mitigation measure Alternative 4b would comply with General Conformity Rule requirements, a comprehensive Air Quality Conformity Analysis would not be required, and the project impacts would be less than significant with mitigation (**Class II**). These findings are similar for all of the project alternatives; however, the quantity of required emission offsets would vary for each project alternative.

The current General Conformity Rule requirements will change as of June 15, 2005. At that time the 8-hour ozone designation will become the applicable conformity standard. Ventura County has been designated as a moderate non-attainment area for the 8-hour ozone NAAQS, effective June 15, 2004, and will have until June 2010 to attain the standard. The NOx and VOC *de minimis* emission thresholds for General Conformity in a moderate ozone non-attainment area are 100 tons per year. It is expected that a revised General Conformity finding will be made for this project sometime after June 15, 2005; and at that time it will be found that no additional offset mitigation, per mitigation measure AQ-5, will be required for this project alternative or any other project alternative except Alternative 1.

Mitigation Measures A-1 through A-4 (see below) are recommended to reduce impacts from equipment tailpipe emissions to the extent feasible.

A-1 **Limit engine idling.** Prohibit private vehicle engine idling in excess of two minutes, restrict diesel engine idle time, to the extent practical, to no more than 10 minutes.

A-2 **Low emission diesel engines.** Require the use of certified low emission diesel engines (i.e., CARB/EPA Tier 1, 2, 3, or 4 certified off-road equipment) for diesel off-road equipment and cutterhead dredge pump engines, with the minimum requirement being CARB/EPA Tier 1 engines.

A-3 **Limit use of internal combustion engines.** Utilize electrical power from the grid rather than internal combustion engines or internal combustion electric power generators for all stationary equipment, such as the stationary water pumps and slurry pumps (except the dredge engines).

A-4 **Low-emission vehicles.** Utilize low-emission on-road construction fleet vehicles, if available.

Mitigation Measure A-5 is recommended to comply with General Conformity Rule requirements, if necessary.

A-5 **NO_x emission offsets.** Provide NO_x emission offsets to fully offset the project emissions when they are predicted to be greater than the appropriate rate listed in 40 CFR §93.153(a)(1).

Implementation of Mitigation Measures A-6 through A-11 would minimize the potential impacts associated with fugitive dust emissions to the extent feasible.

A-6 **Watering areas to reduce dust.** Pre-grading/excavation activities shall include watering the area to be graded or excavated before commencement of grading or excavation operations. Application of water (preferably reclaimed, if available) should penetrate sufficiently to minimize fugitive dust during grading activities.

A-7 **Controlling fugitive dust.** Fugitive dust produced during grading, excavation, and construction activities shall be controlled by the following activities:

- All trucks shall be required to cover their loads as required by California Vehicle Code §23114
- Sweep streets at the end of the day if visible soil material is carried onto adjacent public paved roads (recommend water sweepers with reclaimed water)
- Install wheel washers where vehicles enter and exit unpaved roads onto paved roads, or wash off trucks and any equipment leaving the site each trip
- Pave construction roads that have a traffic volume of more than 50 daily trips by construction equipment, 150 daily trips for all vehicles
- Pave all construction access roads for at least 100 feet from the main road to the project site
- Pave construction roads that have a daily traffic volume of less than 50 vehicular trips
- All graded and excavated material, exposed soil areas, and active portions of the construction site, including unpaved on-site roadways, shall be treated to prevent fugitive dust. Treatment shall include, but no necessarily be limited to, periodic watering, application of environmentally safe soil stabilization materials, and/or roll-compaction as appropriate. Watering shall be done as often as necessary and reclaimed water shall be used whenever possible.

A-8 **Dust stabilization.** Graded and/or excavated inactive areas of the construction site shall be monitored by the construction contractor at least weekly for dust stabilization. Soil stabilization methods, such as water and roll-compaction, and environmentally safe dust control materials, shall be periodically applied to portions of the construction site that are inactive for over four days. If no further grading or excavation operations are planned for the area, the area should be seeded and watered until grass growth is evident, or periodically treated with environmentally safe dust suppressants, to prevent excessive fugitive dust.

A-9 **Traffic speed limit signs.** Signs shall be posted on site that limit traffic to 15 miles per hour or less.

A-10 **Excessive winds.** During period of high winds (i.e., wind speed sufficient to cause fugitive dust to impacts adjacent properties), all clearing, grading, earth moving, and excavation operations shall be curtailed to the degree necessary to prevent fugitive dust created by on-site activities and operations from being a nuisance or hazard, either off-site or on-site activities and operations from being a nuisance or hazard, either off site or on site. The site superintendent/ supervisor shall use his/her discretion in conjunction with the APCD in determining when winds are excessive.

A-11 **Street sweeping.** Adjacent streets and roads shall be swept at least once per day, preferably at the end of the day, if visible soil material is carried over to adjacent streets and roads.

Implementation of Mitigation Measures A-12 is recommended to minimize the potential impact to project workers associated with fugitive dust emissions to the extent feasible. Mitigation Measure A-13 is recommended to reduce potential impacts to project workers and the general public from Valley Fever to the extent feasible.

A-12 **Respiratory protection.** Personnel involved in grading operations, including contractors and subcontractors, should be advised to wear respiratory protection in accordance with California Division of Occupational Safety and Health regulations.

A-13 **Valley Fever.** Valley Fever mitigation measures shall be implemented to the extent necessary and feasible. An assessment of the various project areas and their construction activities will be performed by a qualified medical professional or toxicologist prior to ground disturbance and appropriate feasible mitigation, including the consideration of the Valley Fever mitigation measures recommended in the 2003 Ventura County Air Quality Assessment Guidelines, shall be implemented as deemed necessary to mitigate potentially significant impacts.

5.6.4 Alternative 1: Full Dam Removal/Mechanical Sediment Transport – Dispose of Fines, Sell Aggregate

Construction of Alternative 1 would result in relatively short-term (approximately two years from project initiation to dam removal and an additional nine years to complete the aggregate handling and sales from the site) air quality impacts due to diesel exhaust emissions from on-site construction equipment and vehicles such as bulldozers, loaders, excavators, pumps, dump trucks, etc., as well as fugitive dust generated by earth movement and the operation of vehicles on unpaved surfaces. Off-site emissions would also be generated from vehicles transporting workers to and from the job sites and from heavy diesel truck trips required to haul equipment and materials to and from the various project construction sites. In addition, Alternative 1 would require thousands of haul trips a month for up to ten years to transport marketable aggregate from the reservoir area. Table 5.6-2 provides the total estimated maximum annual unmitigated and mitigated emissions for Alternative 1. Refer to Appendix G (Air Quality) for the methodology, assumptions, and emission factors used to estimate emissions.

Table 5.6-2: Estimated Maximum Annual Emissions for Alternative 1

Emissions	NOx	CO	ROC	SOx	PM_{10}
Unmitigated Emissions	398.9	144.2	24.9	0.4	349.7
Mitigation Reduction	-201.2	-54.5	-13.4	-0.1	-213.2
Mitigated Emissions	**197.7**	**89.7**	**11.5**	**0.3**	**136.6**

Notes: Emissions are presented in tons per year. Estimated mitigated emissions assume all stationary construction equipment would use electric power (except dredges), offroad diesel equipment would at a minimum use USEPA Tier 1 compliant engines, and all feasible fugitive dust measures would be implemented.

Although the emissions predicted from this alternative are considerably greater than those predicted for Alternative 4b (see Table 5.6-1), the impact classifications are identical, and this alternative would need to implement the same mitigation measures to mitigate the project's PM_{10}, NO_x, and ROC emissions to the extent feasible. The only significant difference might be in the application of mitigation measure AQ-5, which in the future may be based on a trigger of 100 tons per year rather than 25 tons per year of NO_x and ROC, meaning that this project alternative would be the only alternative that would need to provide NO_x offsets to comply with General Conformity requirements.

5.6.5 Alternative 2a: Full Dam Removal/Natural Sediment Transport – Slurry "Reservoir Area" Fines Off Site

Similar to Alternatives 4a and 1, construction of Alternative 2a would result in relatively short-term (approximately two years) air quality impacts due to diesel exhaust emissions from on-site construction equipment and vehicles such as bulldozers, loaders, excavators, pumps, dump trucks, etc., as well as fugitive dust generated by earth movement and the operation of vehicles on unpaved surfaces. Off-site emissions would also be generated from vehicles transporting workers to and from the job sites and from heavy diesel truck trips required to haul equipment and materials to and from the various project construction sites. Table 5.6-3 provides the total estimated maximum annual unmitigated and mitigated emissions for Alternative 2a. Refer to Appendix G (Air Quality) for the methodology, assumptions, and emission factors used to estimate emissions.

Table 5.6-3: Estimated Maximum Annual Emissions for Alternative 2a

Emissions	NOx	CO	ROC	SOx	PM_{10}
Unmitigated Emissions	273.4	71.3	16.1	0.2	97.4
Mitigation Reduction	-217.4	-35.2	-10.3	-0.1	-72.4
Mitigated Emissions	**56.0**	**36.1**	**5.8**	**0.1**	**25.0**

Notes: Emissions are presented in tons per year. Estimated mitigated emissions assume all stationary construction equipment would use electric power (except dredges), offroad diesel equipment would at a minimum use USEPA Tier 1 compliant engines, and all feasible fugitive dust measures would be implemented.

Although the emissions predicted from this alternative are lower than those predicted for Alternative 4b (see Table 5.6-1), the impact classifications are identical, and this alternative would need to implement the same mitigation measures to mitigate the project's PM_{10}, NO_x, and ROC emissions to the extent feasible.

5.6.6 Alternative 2b: Full Dam Removal/Natural Sediment Transport – Natural Transport of "Reservoir Fines"

As with the other alternatives, construction of Alternative 2b would result in relatively short-term (approximately 18 months from initiation to dam removal) air quality impacts due to diesel exhaust emissions from on-site construction equipment and vehicles such as bulldozers, loaders, excavators, dump trucks, etc., as well as fugitive dust generated by earth movement and the operation of vehicles on unpaved surfaces. Under Alternative 2b, fine sediments behind the dam would be allowed to naturally transport down stream. Therefore, stationary slurry and water pumps for sediment removal would not be required. Off-site emissions would be generated from vehicles transporting workers to and from the job sites and from heavy diesel truck trips required to haul equipment and materials to and from the various project construction sites. Table 5.6-4 provides the total estimated maximum annual unmitigated and mitigated emissions for Alternative 2b. Refer to Appendix G (Air Quality) for the methodology, assumptions, and emission factors used to estimate emissions.

Although the emissions predicted from this alternative are lower than those predicted for Alternative 4b (see Table 5.6-1), the impact classifications are identical, and this alternative would need to implement the same mitigation measures to mitigate the project's PM_{10}, NO_x, and ROC emissions to the extent feasible.

Table 5.6-4: Estimated Maximum Annual Emissions for Alternative 2b

Emissions	NOx	CO	ROC	SOx	PM_{10}
Unmitigated Emissions	68.0	49.2	8.5	0.1	122.2
Mitigation Reduction	-6.7	-9.9	-1.9	0.0	-71.7
Mitigated Emissions	**61.3**	**39.3**	**6.6**	**0.1**	**50.5**

Notes: Emissions are presented in tons per year. Estimated mitigated emissions assume all stationary construction equipment would use electric power (except dredges), offroad diesel equipment would at a minimum use USEPA Tier 1 compliant engines, and all feasible fugitive dust measures would be implemented.

5.6.7 Alternative 3a: Incremental Dam Removal/Natural Sediment Transport - Slurry "Reservoir Area" Fines Off Site

Similar to the other alternatives, construction of Alternative 3a would result in relatively short-term (approximately 18 months for the first phase) air quality impacts due to diesel exhaust emissions from on-site construction equipment and vehicles such as bulldozers, loaders, excavators, pumps, dump trucks, etc., as well as fugitive dust generated by earth movement and the operation of vehicles on unpaved surfaces. Off-site emissions would also be generated from vehicles transporting workers to and from the job sites and from heavy diesel truck trips required to haul equipment and materials to and from the various project construction sites. Table 5.6-5 provides the total estimated maximum annual unmitigated and mitigated emissions for Alternative 3a. Refer to Appendix G (Air Quality) for the methodology, assumptions, and emission factors used to estimate emissions.

Table 5.6-5: Estimated Maximum Annual Emissions for Alternative 3a

Emissions	NOx	CO	ROC	SOx	PM_{10}
Unmitigated Emissions	280.3	75.4	16.7	0.2	133.7
Mitigation Reduction	-214.7	-35.0	-10.3	-0.1	-102.4
Mitigated Emissions	**65.6**	**40.4**	**6.4**	**0.1**	**31.3**

Notes: Emissions are presented in tons per year. Estimated mitigated emissions assume all stationary construction equipment would use electric power (except dredges), minimum Tier 1 offroad equipment would be used, and all feasible fugitive dust measures would be implemented.

Although the emissions predicted from this alternative are lower than those predicted for Alternative 4b (see Table 5.6-1), the impact classifications are identical, and this alternative would need to implement the same mitigation measures to mitigate the project's PM_{10}, NO_x, and ROC emissions to the extent feasible.

5.6.8 Alternative 3b: Incremental Dam Removal/Natural Sediment Transport - Natural Transport of "Reservoir Fines"

Construction of Alternative 3b would result in relatively short-term (approximately 18 months for the first phase) air quality impacts due to diesel exhaust emissions from on-site construction equipment and vehicles such as bulldozers, loaders, excavators, dump trucks, etc., as well as fugitive dust generated by earth movement and the operation of vehicles on unpaved surfaces. As with Alternative 2b, under Alternative 3b, fine sediments behind the dam would be allowed to naturally transport down stream. Therefore, stationary slurry and water pumps for sediment removal would not be required. Off-site emissions would be generated from vehicles transporting workers to and from the job sites and from heavy diesel truck trips required to haul equipment and materials to and from the various project construction sites. Table 5.6-6 provides the total estimated maximum annual unmitigated and mitigated emissions for Alternative 3b. Refer to Appendix G (Air Quality) for the methodology, assumptions, and emission factors used to estimate emissions.

Table 5.6-6: Estimated Maximum Annual Emissions for Alternative 3b

Emissions	NOx	CO	ROC	SOx	PM_{10}
Unmitigated Emissions	54.9	41.5	7.3	0.1	116.9
Mitigation Reduction	-3.7	-6.8	-1.4	0.0	-70.8
Mitigated Emissions	**51.2**	**34.7**	**5.9**	**0.1**	**46.1**

Notes: Emissions are presented in tons per year. Estimated mitigated emissions assume all stationary construction equipment would use electric power (except dredges), offroad diesel equipment would at a minimum use USEPA Tier 1 compliant engines, and all feasible fugitive dust measures would be implemented.

Although the emissions predicted from this alternative are lower than those predicted for Alternative 4b (see Table 5.6-1), the impact classifications are identical, and this alternative would need to implement the same mitigation measures to mitigate the project's PM_{10}, NO_x, and ROC emissions to the extent feasible.

5.6.9 Alternative 4a: Full Dam Removal/Long-Term Sediment Transport - Long-Term Transport Period

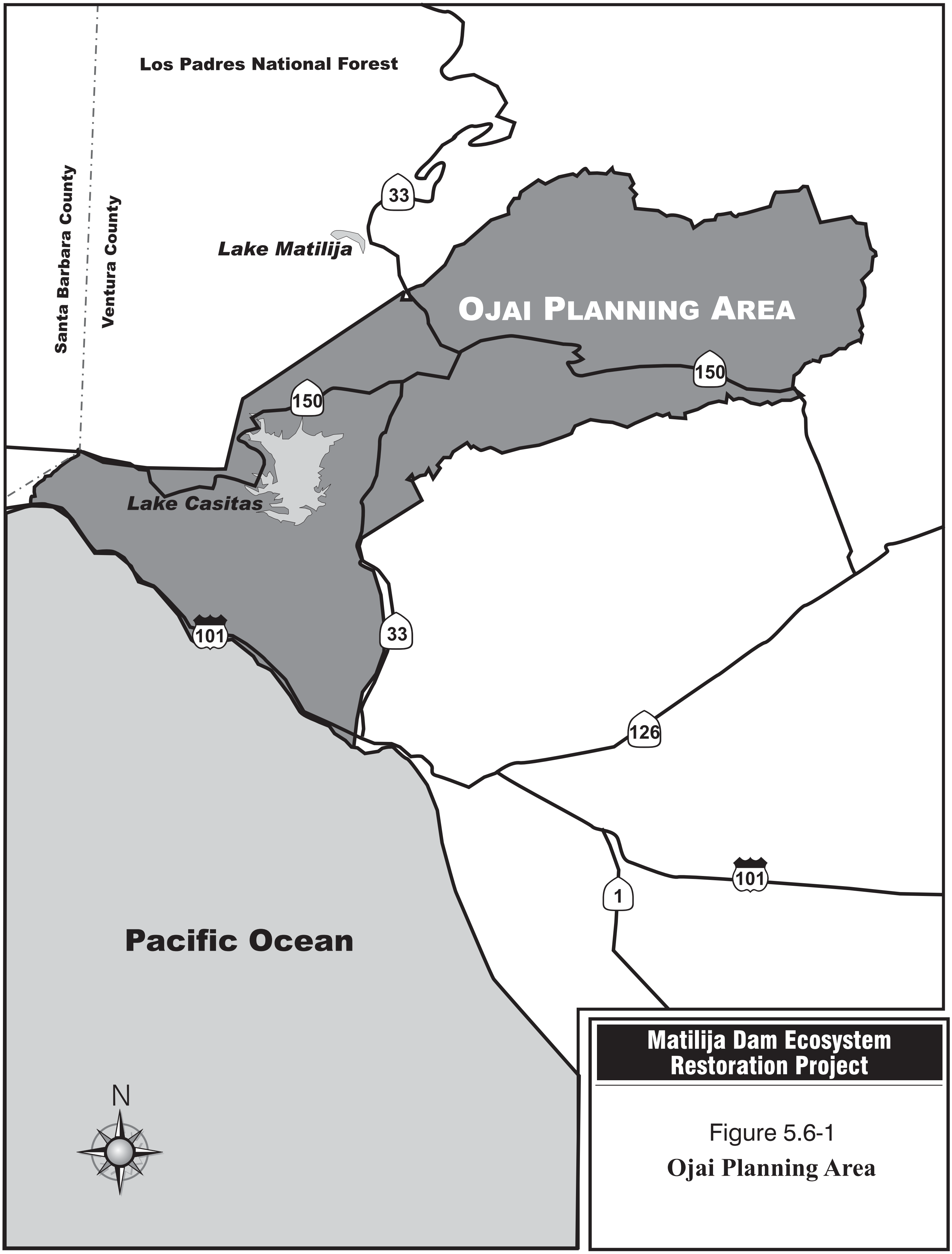
As with the other alternatives, construction of Alternative 4a would result in relatively short-term (approximately two years from project initiation to dam removal) air quality impacts due to diesel exhaust emissions from on-site construction equipment and vehicles such as bulldozers, loaders, excavators, pumps, dump trucks, etc., as well as fugitive dust generated by earth movement and the operation of vehicles on unpaved surfaces. Off-site emissions would also be generated from vehicles transporting workers to and from the job sites and from heavy diesel truck trips required to haul equipment and materials to and from the various project construction sites. Table 5.6-7 provides the total estimated maximum annual unmitigated and mitigated emissions for Alternative 4a. Refer to Appendix G (Air Quality) for the methodology, assumptions, and emission factors used to estimate emissions.

Table 5.6-7: Estimated Maximum Annual Emissions for Alternative 4a

Emissions	NOx	CO	ROC	SOx	PM_{10}
Unmitigated Emissions	292.3	81.7	17.8	0.2	127.2
Mitigation Reduction	-222.6	-40.6	-11.3	-0.1	-88.1
Mitigated Emissions	**69.7**	**41.0**	**6.5**	**0.1**	**39.0**

Notes: Emissions are presented in tons per year. Estimated mitigated emissions assume all stationary construction equipment would use electric power (except dredges), offroad diesel equipment would at a minimum use USEPA Tier 1 compliant engines, and all feasible fugitive dust measures would be implemented.

Although the emissions predicted from this alternative are lower than those predicted for Alternative 4b (see Table 5.6-1), the impact classifications are identical, and this alternative would need to implement the same mitigation measures to mitigate the project's PM_{10}, NO_x, and ROC emissions to the extent feasible.



Matilija Dam Ecosystem Restoration Project

Figure 5.6-1
Ojai Planning Area

5.7 NOISE

5.7.1 Impact Significance Criteria

In accordance with NEPA and CEQA, the effects of a project are evaluated to determine if they would result in a significant adverse impact on the environment. This EIS/EIR focuses on the potential effects of the Proposed Action and offers mitigation measures to reduce or avoid any significant impacts. Activities of the Proposed Action would be considered significant if:

- Within Ventura County, noise generators proposed to be located near any noise sensitive use cause outdoor noise levels to exceed a 1 hour L_{eq} of 55 dBA or ambient noise levels to increase by 3 dBA, whichever is greater, during any hour from 6:00 a.m. to 7:00 p.m.
- Within Ventura County, noise generators proposed to be located near any noise sensitive use cause outdoor noise levels to exceed a 1 hour L_{eq} of 50 dBA or ambient noise levels to increase by 3 dBA, whichever is greater, during any hour from 7:00 p.m. to 10:00 p.m.
- Within Ventura County, noise generators proposed to be located near any noise sensitive use cause outdoor noise levels to exceed a 1 hour L_{eq} of 45 dBA or ambient noise levels to increase by 3 dBA, whichever is greater, during any hour from 10:00 p.m. to 6:00 a.m.
- Within the City of Ojai, exterior residential noise levels on a cumulative basis per hour exceed 55 dBA in the day (10:00 a.m. to 7:00 p.m.) and 45 dBA at night (7:00 p.m. to 10:00 a.m.).
- Within the City of Ojai, interior residential noise levels exceed 45 dBA for all hours of the day for more than five minutes in any hour, a 50 dBA level is exceeded for a cumulative period of more than one minute in an hour, and a 55 dBA level is exceeded for any time period.
- Within the City of Ojai, construction is performed on weekends or City of Ojai holidays, and construction equipment is not operated with standard factory silencer and/or muffler equipment.
- Within the City of San Buenaventura, exterior noise levels near noise sensitive and residential properties exceed 50 dBA between 7:00 a.m. and 10:00 p.m. and 45 dBA between 10:00 p.m. and 7:00 a.m.

In addition to the impact significance criteria referenced above, Section 4.7.3 details the federal, State, and local plans, policies, and regulations for noise-related issues.

5.7.2 No Action Alternative (Future Without-Project)

Under the No Action Alternative, the demolition and construction activities associated with the Proposed Action would not occur. Therefore, no direct noise impacts would result from the No Action Alternative. However, it should be noted that the dam would eventually need to be demolished due to age and structural deterioration. An estimated additional six million cubic yards of sediment, beyond what is currently trapped, are expected to accumulate in the reaches behind Matilija Dam in the next 50 years. As such, delaying the demolition of the dam would ultimately require increased construction activities to restore the area. To further add to the impacts associated with delaying the removal of Matilija Dam, the Ventura County population is expected to increase by approximately 240,000 individuals between 2000 and 2020 (DOF, 2001). Urban development, including associated automobile and truck traffic, would increase due to this projected population growth. Consequently, noise generated as part of the dam removal process would potentially impact a greater number of sensitive receptors if completed at a later date.

5.7.3 Alternative 4b (Recommended Plan): Full Dam Removal/Long-Term Sediment Transport - Short-Term Transport Period

Dam Removal and Sediment Management

Alternative 4b would involve removing the dam in one continuous process. Fines would be disposed by slurry, and the remaining sediment trapped behind the dam would be temporarily placed in storage locations within the original reservoir limits and stabilized using soil cement in a manner that would allow sediments to erode naturally. Construction activities would include: removal of fine sediment by sluicing and/or dredging, excavating a channel through the remaining sediments, addition of soil cement revetment to protect storage areas, removal of the entire dam, and removal of all soil cement revetment following sufficient evacuation of stored sediment from within the original reservoir limits.

On-site Sources. During construction, residences in the vicinity of Matilija Dam (i.e., nearby residences of Matilija Canyon) would be exposed to noise generated by various pieces of construction equipment operating within the main project area (i.e., Matilija Dam), as well as controlled blasting required for removal of the dam structure. The actual magnitude of construction noise impacts would depend on the type of construction activity, the noise level generated by various pieces of construction equipment, the duration of the activity, the distance between the activity and the sensitive noise receptors, and whether local barriers and topography provide shielding effects. Table 5.7-1 summarizes noise levels produced by construction equipment *commonly* used on construction projects. Generally, temporary noise levels adjacent to construction areas range from 75 to 90 dBA, depending on the distance the receptor is from the source of noise.

Table 5.7-1: Noise Emission Characteristics of Construction Equipment

Type of Equipment	Typical Noise Level, dBA at 50 feet
Backhoe	80
Bulldozer	85
Chain Saw	86
Chipper	90
Compactor	82
Concrete pump	82
Crane, Mobile	83
Grader	85
Generator	81
Jack Hammer	88
Loader	85
Paver	89
Pneumatic tool	85
Pump	76
Rock Drill	98
Scraper	89
Truck	88

Source: FTA, 1995; NIOSH, 2000; and CPWR, 2003.

From a noise generation perspective, a reasonable worst-case assumption is that the three loudest pieces of equipment (chipper, scrapper, and rock drill) would operate simultaneously and continuously during any given one-hour period. This does not refer to the number of total pieces of equipment that could operate at the same time over the entire Matilija Dam project site, but rather identifies the amount of equipment that can reasonably be heard at the same time in the same local area. The combined sound level of the three loudest pieces of equipment would be approximately 99.1 dBA L_{eq} measured at 50 feet. Based on a 6 dBA decrease, or 20 times the log of the distance for every doubling of distance for stationary sources (treating the main project site as a whole), noise levels would remain above the significance threshold of 55 dBA (Ventura County 1-hour L_{eq} standard) at a distance of one mile from the project site; however, this does not account for local barriers and topography which may greatly reduce noise levels.

Off-site Sources. For the slurry operation, sediment would be converted to slurry and transported by pipeline to one of the three potential disposal sites. Two 12-inch cutter head suction dredges operating 24 hours a day, seven days a week would be utilized to slurry the fine sediment from behind the dam. Construction of the slurry and fresh water pipelines, as well as the disposal site, would expose residences, such as the residents of the Meiners Oaks, Mira Monte, Live Oaks, and the Baldwin Road areas to noise generated by various pieces of construction equipment. Construction activities at the disposal site may include construction of containment dikes, interior dikes, collection systems, settlement ponds, observation and pumping wells, rerouting drainage, and clearing of vegetation. Equipment may include dozers, scrapers, loaders, and water trucks.

Modifications for sediment aggradation impacts would include constructing a sediment bypass structure and replacing the existing timber overflow weir structure with a concrete structure at Robles Diversion Dam, as well as constructing two groundwater supply wells at the City of Ventura water supply facilities at Foster Park. As a local betterment for Alternative 4b, a desilting basin would also be constructed to settle out fine sediment prior to conveyance to Lake Casitas. The proposed desilting basin would require excavation and levee construction to contain the diverted flows and a geofabric liner. Sludge would require periodic removal and disposal to a nearby storage site.

Concrete rubble from the dam would be processed, as needed, using a hoe-ram and transported to Hanson Aggregates via State Route (SR) 33 – Highway 101 – Highway 126 - local roads (approx. 28 miles one-way). It should be noted that the contractor may choose to process the material for sale on site. Metal debris from the dam would be hauled from the site and salvaged. Non-recyclable items would be trucked to the Toland Road landfill. The truck route would be SR 33 – Highway 101 – Highway 126 (approx. 41 miles) to avoid passing through the central Ojai, with an alternate route of SR 33 – Highway 150 – Highway 126 through the City of Ojai. Trucking activities associated with the removal of concrete rubble, as well as trucking associated with equipment transport, material deliveries, worker travel, and transport of sediment to the downstream flood control protection sites could create a substantial amount of noise (approximately 70 dBA to 80 dBA at 50 feet) for local residence along the truck routes. Approximately 53,000 truck trips (i.e., heavy-duty vehicles) are estimated for Alternative 4b. Application of best management practices to minimize travel in residential neighborhoods and to limit travel to certain hours of the day would help to reduce the impact of construction-related noise.

The expected duration for Alternative 4b is two years (24 months) to complete sediment removal (by slurry), dam removal, excavation of the channel, and construction of the soil cement revetment, with a total duration of approximately ten years for natural transport of sediments and natural revegetation.

Downstream Flood Protection

Flood control protection measures would include the purchase and removal of the Matilija Hot Springs facility, 11 structures and the bridge at Camino Cielo, and replacement of the Santa Ana Bridge. Construction activities associated with the Camino Cielo and Santa Ana Bridges are expected to last approximately 18 and 24 months, respectively. Noise generated as part of these construction activities, specifically the replacement of the Santa Ana Bridge, would have a potentially significant effect on the residences of Oak View, which includes the Oak View Public Elementary School, located at 555 Mahoney Avenue.

Levees and floodwalls would also be constructed or enlarged along SR 33 south of Camino Cielo Bridge and in the community of Meiners Oaks, Live Oaks, and Casitas Springs. Additionally, the existing levee at Cañada Larga would be raised. Construction activities associated with the levees and floodwalls are expected to last approximately one to two months. Many of these levees and floodwalls would border or be located near residential areas including Meiners Oaks (Meiners Oaks/Robles Levee/Floodwall/Levee), Live Oaks, Oak View (Live Oaks Levee/Floodwall), and Casitas Springs (Casitas Levee/Floodwall/Levee). Those residences located nearby the downstream flood control protection construction areas would be exposed to noise generated by various pieces of construction equipment, such as dozers, scrapers, loaders, and water trucks operating within these construction areas.

Giant Reed Removal

Prior to any earthmoving or dam deconstruction activity, the reservoir basin would be stripped of all vegetation, including giant reed (*Arundo donax*). Following removal, the giant reed would be chipped and temporarily stockpiled. Following completion of work, the giant reed would be spread out to dry and then removed from the site. Construction activities associated with giant reed removal would generally involve the use of loud hand-held equipment, such as chain saws, as well as chippers, scrapers, flail mowers, and landscape loaders.

Operation and Maintenance

Maintenance would include annual removal of sediment deposited behind Robles Diversion Dam. With the addition of the sediment bypass structure, the amount of excavation required and deposition amounts should be similar to those currently occurring. Noise impacts associated with the use of heavy construction equipment for removal of sediment would be short-term in nature and would not be expected to increase beyond the No Action Alternative.

Other maintenance activities associated with Alternative 4b would include periodic grading of material behind the temporary soil cement revetment at Matilija Dam to avoid undermining of the revetment and to improve erosion potential. All soil cement revetment would be removed from the site following sufficient evacuation of stored sediment from within the original reservoir limits. These activities would be short-term in nature and would cease after the soil cement revetment is removed.

Additional maintenance activities would include periodic removal and disposal of sludge from the desilting basin to a nearby storage site.

Findings and Mitigation Measures

The Ventura County General Plan specifies that the significance criteria for Ventura County does not apply to noise generated during the construction phase of a project if a statement of overriding considerations is adopted by the decision-making body in conjunction with the certification of a final Environmental Impact Report. Construction activities associated with Alternative 4b would be considered a noise generator under the County's noise policy. Potentially sensitive receptors located upstream of Matilija Dam, along the truck routes, in the vicinity of the flood protection control measures, along the slurry and fresh water pipeline routes, and nearby Robles Diversion Dam, Foster Park, the disposal site, and the desilting basin would be impacted by noise during construction. Thus, Ventura County thresholds are applicable to Alternative 4b. City of Ojai thresholds are also applicable, assuming trucks would pass through the City of Ojai.

Noise generated from construction, trucking, and giant reed removal activities, as well as operation and maintenance activities, would be expected to cause a significant and unavoidable impact (**Class I**).

Mitigation Measures N-1 through N-9 are designed to reduce construction noise levels as much as feasible, thereby minimizing the associated noise impact.

N-1 **Limit hours of hand-held equipment use.** Use of loud hand-held construction equipment, such as chain saws, heavy-duty construction equipment, and trucks shall not occur between the hours of 7:00 p.m. and 7:00 a.m., except for dredging, slurrying, and associated water conveyance activities, which are planned to occur 24 hours a day, 7 days a week.

N-2 **Limit hours of heavy-duty equipment use.** Within the City of Ojai, use of heavy-duty construction equipment or trucks shall not occur between the hours of 7:00 p.m. and 10:00 a.m.

N-3 **Use of muffler equipment.** Construction equipment shall be operated with standard factory silencer and/or muffler equipment. Equipment engine covers shall be in place and mufflers shall be in proper working order.

N-4 **Locate haul routes away from sensitive receptors.** Haul routes, staging areas, and construction activities shall be located to avoid noise impacts to sensitive receptors (schools, hospitals, residential areas, etc.), whenever possible. If necessary, noise curtains or shields shall be implemented to reduce noise levels to the extent feasible.

N-5 **Use of electric motors.** The construction contractor shall use electric motors to the extent feasible for all stationary equipment (i.e., pumps). Stationary equipment located at Lake Casitas shall be enclosed to limit impacts to recreational users.

N-6 **Controlled blasts.** All blasts at Matilija Dam shall be controlled. Records detailing each individual blast shall be maintained and available on site.

N-7 **Use of hearing protection.** Hearing protection shall be provided to all worksite personnel during blasting operations, and as needed for general construction activities to meet the requirements of OSHA standards (29 CFR 1910.95, Subpart G) and USEPA standards. In the event of complaints by worksite personnel, a Noise Monitoring Program shall be implemented as discussed in OSHA 29 CFR 1910.95, Subpart G, Appendix G.

N-8 **Public notice of construction.** The construction contractor shall provide advance notice of the start of construction for the project to all residences within one mile of the main construction area (i.e., Matilija Dam), and those residences adjacent to the downstream flood protection improvements (levees, floodwalls, and bridges). The announcement shall state specifically where and when construction will occur and provide contact information for public questions or comments. The construction contractor shall serve as the contact person in the event that noise levels during construction become disruptive to local residents. A sign shall be posted at the various sites with the contact phone number, and include general contact information for public questions or comments.

N-9 **Noise monitoring.** In the event of complaints by local residents, the construction contractor shall monitor noise from construction activity. Noise shall be measured at the exterior wall(s) of those residents filing a complaint or a representative location. In the event that construction noise exceeds the specified limits (1-hour L_{eq} of 55 dBA), the responsible construction activity shall cease until appropriate measures are implemented to reduce noise levels to the extent feasible.

5.7.4 Alternative 1: Full Dam Removal/Mechanical Sediment Transport – Dispose of Fines, Sell Aggregate

Dam Removal and Sediment Management

On-site Sources. Similar to Alternative 4b, Alternative 1 would involve removing the dam in one continuous process. The majority of the sediment behind the dam would be removed mechanically, and fines would be disposed by slurry. Unlike Alternative 4b, concrete from the dam would be crushed onsite and sold as aggregate. All aggregate would be sold and removed from the reservoir basin by trucking. Residual fine sediment remaining after the completion of aggregate sales would be trucked to the disposal site. Construction activities would include: removal of fine materials against the dam by sluicing and/or dredging, constructing a 60-foot wide channel along the south side of the reservoir to convey flows through the reservoir basin, constructing a temporary soil cement revetment, and removal of the entire dam. Construction equipment would include suction dredges (for slurry), excavators, tractors, loaders, dump trucks, and water trucks. Noise levels from construction and blasting activities at the main project site (i.e., Matilija Dam) would be similar to Alternative 4b.

Off-site Sources. Similar to Alternative 4b, Alternative 1 would slurry fines to one of the three potential disposal sites exposing residents along the pipeline alignments and nearby the disposal site, such as the residents of Meiners Oaks, Mira Monte, Live Oaks, and the Baldwin Road areas to noise generated by various pieces of equipment operating within the construction zones. Other off-site noise sources would include constructing a sediment bypass structure and modifying the existing timber overflow weir structure at Robles Diversion Dam.

The greatest difference between Alternative 1 and Alternative 4b relates to how the aggregate materials are removed from the site. For Alternative 4b, a portion of the trapped sediment would be temporarily stored and stabilized within the original reservoir limits in a manner that would allow sediments to erode naturally. For Alternative 1, the marketable portion of the trapped sediment would be processed and sold on-site as aggregate. Marketable aggregate materials would be trucked throughout Ventura and southern Santa Barbara Counties. Potential routes for trucking of marketable materials include: (1) "SR 33 – Highway 101 – local roads," and/or (2) "SR 33 – Highway 150 – Highway 126 – local roads". The later of these routes would pass through the City of Ojai. A total of 144,444 truck trips at 40 trips per day over ten years would be required just to dispose of the marketable materials. Residual fine sediment remaining after the completion of aggregate sales would be trucked to the disposal site. Non-recyclable items would be trucked to the Toland Road landfill. A total of approximately 188,000 truck trips were estimated for Alternative 1. These trucking activities could create a substantial amount of noise (approximately 70 dBA to 80 dBA at 50 feet) for local residence along the truck routes. Application of best management practices to minimize travel in residential neighborhoods and to limit travel to certain hours of the day would help to reduce the impact of construction-related noise.

The expected duration for Alternative 1 is approximately two years (24 months) for dam removal and slurry operations, and 10 years for aggregate sales and revegetation activities.

Downstream Flood Protection

Similar to Alternative 4b, Matilija Hot Springs, 11 structures in the Camino Cielo area, and the Camino Cielo Bridge would be purchased and removed, and the Santa Ana Bridge would be replaced. However, the levee and floodwall construction along SR 33, south of Camino Cielo Bridge and in the communities of Meiners Oaks, Live Oaks, and Casitas Springs would be less than Alternative 4b. Additionally, the existing levee at Cañada Larga would not be raised. Therefore, localized noise impacts associated with downstream flood protection measures would be less than Alternative 4b. Residences located nearby the downstream flood protection construction areas would be exposed to noise generated by various pieces of construction equipment, such as dozers, scrapers, loaders, and water trucks operating within these construction areas.

Giant Reed Removal

Giant reed (*Arundo donax*) removal activities under Alternative 1 would be similar to Alternative 4b.

Operation and Maintenance

Maintenance would include annual removal of sediment deposited behind Robles Diversion Dam. With the addition of the sediment bypass structure, the amount of excavation required and deposition amounts should be similar to those currently occurring. Noise impacts associated with the use of heavy construction equipment for removal of sediment would be short-term in nature and would not be expected to increase beyond the No Action Alternative.

Findings and Mitigation Measures

As a result of sales of aggregate materials, Alternative 1 would substantially increase the duration and extent of noise associated with off-site trucking, as compared to Alternative 4b. Noise generated from construction, trucking, and giant reed removal activities, as well as operation and maintenance activities, for Alternative 1 is expected to cause a significant and unavoidable impact (**Class I**). Mitigation Measures N-1 through N-9, presented above, are recommended to reduce construction noise levels to the extent feasible, thereby minimizing the associated noise impact.

5.7.5 Alternative 2a: Full Dam Removal/Natural Sediment Transport – Slurry "Reservoir Area" Fines Off Site

Dam Removal and Sediment Management

On-site Sources. Similar to Alternative 4b, Alternative 2a would involve removing the dam in one continuous process with the majority of the sediment behind the dam being removed mechanically. Fines would be disposed by slurry, and the remainder would be disposed through natural sediment transport. However, soil cement would not be required, and the remaining sediment trapped behind the dam would be allowed to erode within the original reservoir limits. Construction activities would include: removal of fine sediment by sluicing and/or dredging, removal of the entire dam, and constructing a small pilot channel through the reservoir basin. Construction equipment would include suction dredges (for slurry), excavators, tractors, loaders, dump trucks, and water trucks. Noise levels from construction and blasting activities at the main project site (i.e., Matilija Dam) would be similar to Alternative 4b.

Off-site Sources. Off-site noise sources under Alternative 2a would be similar to Alternative 4b. However, a desilting basin would not be required and approximately 300 fewer truck trips would be necessary as soil cement would not be required.

The expected duration for Alternative 2a is approximately two years (24 months).

Downstream Flood Protection

Flood control protection measures under Alternative 2a would be similar to Alternative 4b.

Giant Reed Removal

Giant reed (*Arundo donax*) removal activities under Alternative 2a would be similar to Alternative 4b.

Operation and Maintenance

Operation and maintenance activities under Alternative 2a would be similar to Alternative 1, which would be less than Alternative 4b.

Findings and Mitigation Measures

Noise-related impacts associated with Alternative 2a would be most similar to those discussed for Alternative 4b, although slightly less due to the reduced construction activities that would occur at the main project site (only a small pilot channel and no soil cement), reduced off-site trucking, and reduced activities associated with operations and maintenance. Based on the significance criteria, noise generated from construction, trucking, and giant reed removal activities, as well as operation and maintenance activities, for Alternative 2a is expected to cause a significant and unavoidable impact (**Class I**). Mitigation Measures N-1 through N-9, presented above, are recommended to reduce construction noise levels to the extent feasible, thereby minimizing the associated noise impact.

5.7.6 Alternative 2b: Full Dam Removal/Natural Sediment Transport – Natural Transport of "Reservoir Fines"

Alternative 2b would involve similar dam removal, downstream flood protection, and giant reed removal activities to Alternative 2a; however, instead of fine sediments behind the dam being slurried downstream, only a portion of the sediment would be excavated to ensure safe removal of the dam in one phase. This sediment would be stockpiled upstream, and would ultimately be eroded by storms and transported downstream. Construction equipment to complete excavation would include excavators, barge-mounted clamshell dredges, land-based clamshells, dump trucks, and water trucks. Off-site noise sources would be similar to Alternative 2a, although, approximately 600 fewer truck trips would be required as a result of natural transport of fine sediments (i.e., no slurry). Unlike Alternative 2a, Alternative 2b would require the purchase of replacement water from an outside supplier to replenish Lake Casitas while maintenance activities are performed at the Robles diversion facility.

The expected duration for Alternative 2b is approximately 18 months for dam removal, and up to seven years for natural sediment removal, which is dependent on local hydrology.

Operation and Maintenance

Similar to Alternative 4b, maintenance would include removal of sediment deposited behind Robles Diversion Dam. During the initial years, however, maintenance would be much greater than Alternative 4b (and 2a). Impacts from fine sediment would cause operations at the Robles diversion facility to cease while maintenance cleanout could be performed. Noise impacts associated with the use of heavy construction equipment for removal of sediment would be short-term in nature.

Findings and Mitigation Measures

Alternative 2b would have reduced construction noise impacts compared to Alternative 2a, as a result of natural erosion of sediment (i.e., no impacts along the slurry and fresh water pipeline alignments and nearby the disposal site, as well as reduced truck trips). Additional maintenance activities at the Robles diversion facility would cause greater noise impacts to potentially sensitive receptors located nearby compared to Alternative 2a, however these would be infrequent and short-term in nature. Noise generated from construction, trucking, and giant reed removal activities, as well as operation and maintenance activities for Alternative 2b is expected to cause a significant and unavoidable impact

(**Class I**). Mitigation Measures N-1 through N-9, presented above, are recommended to reduce construction noise levels as much as feasibly possible, thereby minimizing the associated noise impact.

5.7.7 Alternative 3a: Incremental Dam Removal/Natural Sediment Transport - Slurry "Reservoir Area" Fines Off Site

Alternative 3a would involve similar sediment management, giant reed removal, and off-site construction activities to Alternative 2a; however, the dam would be removed in two phases. As such, the construction activities would occur more frequently as a result of having multiple phases to remove an equivalent amount of material. Additionally, with construction occurring in phases, with up to seven years between phases (drought conditions), it is assumed that construction equipment would be removed between phases.

Operation and Maintenance

Operation and maintenance activities under Alternative 3a would be similar to Alternative 1.

Findings and Mitigation Measures

It is expected that the transportation of construction equipment to and from the project site between phases, as well as the longer period of time involved to complete the dam removal (i.e., construction workers commuting to the site over a longer period of time), would cause increased noise impacts compared to Alternative 2a. Therefore, the noise impacts associated with Alternative 3a are expected to be slightly greater than Alternative 2a.

Based on the significance criteria, noise generated from construction, trucking, and giant reed removal activities, as well as operation and maintenance activities, for Alternative 3a is expected to cause a significant and unavoidable impact (**Class I**). Mitigation Measures N-1 through N-9, presented above, are recommended to reduce construction noise levels as much as feasibly possible, thereby minimizing the associated noise impact.

5.7.8 Alternative 3b: Incremental Dam Removal/Natural Sediment Transport - Natural Transport of "Reservoir Fines"

Alternative 3b involves similar sediment management, giant reed removal, off-site construction, operations and maintenance activities to Alternatives 2b; however, the dam would be removed in two phases. As was discussed for Alternative 3a, construction activities would occur more frequently, as a result of having multiple phases, and construction equipment would be removed between phases.

Findings and Mitigation Measures

It is expected that the transportation of construction equipment to and from the project site between phases, as well as the longer period of time involved to complete the dam removal (i.e., construction workers commuting to the site over a longer period of time), would cause increased construction-related noise impacts as compared to Alternative 2b. Therefore, the noise impacts of Alternative 3b are expected to be greater than Alternative 2b.

Noise impacts associated with Alternative 3b are expected to be less than Alternatives 2a and 3a as a result of natural erosion of sediment (i.e., no impacts along the slurry and fresh water pipeline alignments and nearby the disposal site). Based on the significance criteria, noise generated from construction, trucking, and giant reed removal activities, as well as operation and maintenance activities, for Alternative 3b is expected to cause a significant and unavoidable impact (**Class I**). Mitigation Measures N-1 through N-9, presented above, are recommended to reduce construction noise levels as much as feasibly possible, thereby minimizing the associated noise impact.

5.7.9 Alternative 4a: Full Dam Removal/Long-Term Sediment Transport - Long-Term Transport Period

Dam Removal and Sediment Management

Alternative 4a involves similar sediment management activities to Alternatives 4b; however, the remaining sediment trapped behind the dam would be permanently rather than temporarily stabilized within the original reservoir limits. Permanent stabilization of the sediment would involve additional truck trips compared to Alternative 4a to import riprap, which would potentially cause a greater disturbance to residences of Matilija Canyon, specifically along SR 33 between the quarry site and the main project site (approximately 5 miles). Additionally, the disposal site would require more extensive construction to accommodate the larger amount of material to be slurried from the project site. However, concrete rubble would be buried in the storage area fills rather an being process and transported from the site, additional groundwater wells would not be required at Foster Park, and no desilting basin would be required. Overall, approximately 43,500 truck trips are estimated for Alternative 4a, which equates to over 9,600 fewer truck trips than Alternative 4b.

The expected duration for Alternative 4a is two years (24 months) including sediment removal (by slurry), dam removal, excavation of the channel, riprap stone protection placement and revegetation activities.

Downstream Flood Protection

Flood control protection measures under Alternative 4a would be similar to Alternative 1, which are less than Alternative 4b.

Giant Reed Removal

Giant reed (*Arundo donax*) removal activities under Alternative 4a would be similar to Alternative 4b.

Operation and Maintenance

Operation and maintenance activities under Alternative 4a would be similar to Alternative 1, which are less than Alternative 4b.

Findings and Mitigation Measures

Noise impacts to residences of Matilija Canyon along SR 33 between the quarry site and the main project site, as well as residences nearby the disposal site, would be greater for Alternative 4a compared to Alternative 4b. However, the total duration for construction activities, including maintenance activities at the main project site, would be considerably less (2 years verses 10 years), fewer truck trips would be required overall, downstream levees and floodwalls would be smaller and fewer would be needed, and additional groundwater wells would not be required at Foster Park. However, based on the significance criteria, noise generated from construction, trucking, and giant reed removal activities, as well as operation and maintenance activities, associated with Alternative 4a is expected to cause a significant and unavoidable impact (**Class I**). Mitigation Measures N-1 through N-9, presented above, are recommended to reduce construction noise levels as much as feasibly possible, thereby minimizing the associated noise impact.

5.8 SOCIOECONOMICS

5.8.1 Impact Significance Criteria

The criteria used to determine socioeconomics impacts within the study area are based on the Recommended Plan's potential to cause population, employment, and housing impacts. The following would be considered significant impacts:

- Temporary project-induced labor shortages as a result of construction activities, or long-term decrease in local employment as a result of operational activities.
- Shortage in temporary housing during project construction, or substantial increase in demand for permanent housing due to project operation.
- Temporary or permanent disruption or displacement of local business caused either directly or indirectly by the proposed project.
- Disproportionately high and adverse impacts on minority or low-income populations.
- Displacement of substantial numbers of people or existing housing, necessitating the construction of replacement housing elsewhere.

5.8.2 No Action Alternative (Future Without-Project)

Under the No Action Alternative, no action would be initiated by the Corps or local sponsor to remove Matilija Dam. The retention of the dam and filling of the Matilija Reservoir under the future without-project scenario would have no significant impact on socioeconomics for the western Ventura County region.

The Ventura County population is expected to increase by approximately 240,000 individuals between 2000 and 2020 (DOF, 2001). The Southern California Association of Governments estimates that the City of Ojai will grow by 1,500 people by the year 2025 and that the population of the City of Ventura will increase by 27,000 by the year 2025. Employment in Ventura County is expected to increase by 20,600 positions by 2025, while employment in the Cities of Ojai and Ventura is estimated to increase by 300 and 20,000 positions respectively (SCAG, 2001). As the General Plans of the region show few planned residential or commercial areas in the immediate vicinity of Matilija Creek and the Ventura River, any alterations to the river that may occur under the future without-project scenario are unlikely to impact population or housing growth in the region (County of Ventura, 1988; City of Ojai, 1997, City of San Buenaventura, 2000).

5.8.3 Alternative 4b (Recommended Plan): Full Dam Removal/Long-Term Sediment Transport - Short-Term Transport Period

The project is expected to utilize the construction labor force within daily commuting distance (i.e., Ventura County and possibly Santa Barbara and Los Angeles Counties) to the greatest extent feasible. With the large construction labor pool in Ventura County and its neighboring counties, the labor force necessary for construction of this option would be adequate. No labor shortages for the project are expected. Therefore, no significant labor force impacts would occur (**Class III**).

Because few, if any, workers are expected to relocate to the area, no new housing would be needed for the project, no housing would be displaced, and no new competition for existing housing would be likely to occur. Temporary accommodations may be needed during construction. However, the numerous hotels and motels in the area would accommodate this need and impacts would not be significant (**Class III**).

The project would beneficially impact the local economy for the two-year duration of the project by employing local workers, and with use of native plant nurseries for vegetation restoration materials (**Class IV**).

Although the majority of activities associated with this alternative would be located behind Matilija Dam, construction of downstream flood protection measures would require the purchase and removal of Matilija Hot Springs, a commercially run retreat center, and 11 structures near the Ventura River along Camino Cielo. All relocations would comply with both the State (California Government Code 33410–33418) and Federal (49 CFR Part 24) Uniform Relocation Act Relocation Assistance and Real Property Acquisition Guidelines. Compliance with these guidelines would ensure the displacement of Matilija Hot Springs and any commercial agricultural activities along Camino Cielo would not result in any significant impacts (**Class III**) related to business displacement. Although these businesses would be displaced, this alternative would not result in a substantial decrease in public tax revenues.

Environmental Justice

Executive Order 12898 is intended to ensure that federal agencies identify and address "disproportionately high and adverse human health or environmental effects" of federal projects on minority and low-income populations (USEPA, 1998). The purpose of an environmental justice screening analysis is to determine whether a low-income and/or minority (people of color) population exists within the potential affected area of a proposed action. As defined by the "Final Guidance for Incorporating Environmental Justice Concerns" contained in USEPA's NEPA Compliance Analysis (Guidance Document) (USEPA, 1998), minority (people of color) populations are identified where either:

- The minority population of the affected area is greater than 50 percent of the affected area's general population; or
- The minority population percentage of the area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

In 1997, the President's Council on Environmental Quality issued Environmental Justice Guidance that defines minorities as individuals who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black not of Hispanic origin; or Hispanic. Low-income populations are identified with the annual statistical poverty thresholds from the Census Bureau's Current Population Reports, Series P-60 on Income and Poverty (OMB, 1978).

Table 4.8-1 in Section 4.8 shows the number and percentage of minority population based on the 13 census tracts that comprise the general project area. Based on 2000 US Census Bureau information on racial demographics, 20.5 percent of the population in the project area is minority. Also shown within

Table 4.8-1 are the minority populations contained within Ventura County (30.1 percent), the City of Ventura (21.2 percent), and the City of Ojai (12.0 percent). Therefore, the proposed alternative would not disproportionately impact minority populations.

Established federal standards on low-income communities is defined as one whose general populations comprised of 50 percent or more people living under the poverty threshold of $17,050 (U.S. Department of Health and Human Services, 2000). As indicated earlier in Table 4.8-3, of the total 47,477 households identified within the 13 census tracts that comprise the general project area, in 2000, only 12.4 percent were identified as being below the poverty level. As shown in Table 4.8-3 the low-income population in Ventura County is 9.2 percent, the City of Ventura is 9.0 percent, and the City of Ojai is 10.7 percent. Since the percentage of people living under the poverty level is well below 50 percent, the proposed alternative would not disproportionately impact low-income populations.

The air quality and hazardous waste analyses performed for this alternative conclude that changes in air quality and public health indices that could occur as a result of project operations are below regulatory thresholds for significant impact. Therefore, no population, including populations defined as low-income or minority would be disproportionately impacted by the proposed alternative.

No environmental justice impacts would occur.

Residential Displacement

As discussed for impacts to commercial activities, Matilija Hot Springs and a number of structures along Camino Cielo would be purchased and removed for flood protection purposes. The Matilija Hot Springs retreat center includes private residences on its property and the majority of the structures to be removed along Camino Cielo are also residences. All relocations would comply with both the State and Federal Uniform Relocation Act Relocation Assistance and Real Property Acquisition Guidelines. Compliance with these guidelines would ensure that these displacement impacts are less than significant (**Class III**).

5.8.4 Alternative 1: Full Dam Removal/Mechanical Sediment Transport – Dispose of Fines, Sell Aggregate

Socioeconomic impacts resulting from Alternative 1 would be similar to those described for Alternative 4b. The major differences between Alternative 1 and Alternative 4b that would affect socioeconomic conditions for the area is 3.0 million cubic yards of the sediment behind the dam would be sold on site. The benefits and disruptions due to traffic to local businesses would likely occur over an estimated ten years that it would take to process and sell the marketable material behind the dam. Disruptions and displacement of businesses and homes as a result of flood protection measures would occur within two years of the project's initiation. While dam removal, sediment transport, and flood protection would increase downstream sediment impacts, the businesses and residences that would likely be affected by these impacts would be purchased and removed as a part of flood protection measures, just as described in Alternative 4b. Use of native plant nurseries for vegetation restoration materials, and use of low cost aggregate from local businesses would boost the local economy and likely result in beneficial impacts to local businesses (**Class IV**).

As discussed above for Alternative 4b, the project area does not contain concentrations of minority or low-income populations in excess of the defined Environmental Justice threshold; therefore, no disproportionate adverse impacts to these populations would occur.

5.8.5 Alternative 2a: Full Dam Removal/Natural Sediment Transport – Slurry "Reservoir Area" Fines Off Site

Socioeconomic impacts related to Alternative 2a would be similar to those described for Alternative 1, although impacts to local businesses would be less, as no materials would be sold from behind the dam. As discussed for Alternative 4b, local native plant nurseries could benefit from Alternative 2a by providing vegetation and restoration materials (**Class IV**). As this alternative does not include the sale of aggregate from behind the dam, Alternative 2a would produce neither the benefits of low-cost aggregate sales, nor the adverse impacts to businesses due to increased truck traffic on Maricopa Highway.

Alternative 2a has the potential for increased long-term sediment aggradation that could disrupt or displace residences and activities immediately downstream of the dam through raised flood levels and deposition of sediment. As a result, the flood protection measures for Alternative 2a are greater than those described for Alternative 1, but also include the purchase and removal of Matilija Hot Springs and structures along Camino Cielo. As described for Alternative 4a, the purchase and removal of these structures would result in less-than-significant impacts (**Class III**) to commercial activities and residential dwelling units as all relocations would comply with both the State and Federal Uniform Relocation Act Relocation Assistance and Real Property Acquisition Guidelines. The enlargement and construction of new levees and floodwalls would be greater under this alternative than Alternative 1. However, the impact of larger floodwalls and levees would not be substantially different than the impacts described for Alternative 1. As in Alternative 1, the downstream slurry disposal site would not impact any businesses or residences.

As discussed above for Alternative 4b, the project area does not contain concentrations of minority or low-income populations in excess of the defined Environmental Justice threshold; therefore, no disproportionate adverse impacts to these populations would occur.

5.8.6 Alternative 2b: Full Dam Removal/Natural Sediment Transport – Natural Transport of "Reservoir Fines"

The socioeconomic impacts of Alternative 2b are the same as Alternative 2a. Labor issues and housing demand resulting from the project would be much the same as Alternatives 1 and 2a. As discussed for previous alternatives, local native plant nurseries could benefit from Alternative 2b by providing vegetation and restoration materials (**Class IV**).

Similar to Alternative 2a, the flood protection measures for Alternative 2b are greater than those described for Alternative 1, and also include the purchase and removal of Matilija Hot Springs and structures along Camino Cielo. As described in Alternative 4b, the purchase and removal of these structures would result in less-than-significant impacts (**Class III**) to commercial activities and residential dwelling units as all relocations would comply with both the State and Federal Uniform

Relocation Act Relocation Assistance and Real Property Acquisition Guidelines. The enlargement and construction of new levees and floodwalls would be greater under this alternative than Alternative 1, but these resultant impacts of these activities would not be substantially different than the impacts described for Alternative 1.

As discussed above for Alternative 4b, the project area does not contain concentrations of minority or low-income populations in excess of the defined Environmental Justice threshold; therefore, no disproportionate adverse impacts to these populations would occur.

5.8.7 Alternative 3a: Incremental Dam Removal/Natural Sediment Transport - Slurry "Reservoir Area" Fines Off Site

Socioeconomic impacts resulting from Alternative 3a would be similar to those described for Alternative 2a. However, under this alternative beneficial impacts (**Class IV**) to construction contractors and businesses involved in the restoration activities would be delayed due to the extended nature of the dam removal and restoration activities. Similar to Alternative 4b, the purchase and removal of the Matilija Hot Springs and the Camino Cielo structures would result in less-than-significant impacts (**Class III**) to commercial activities and residential dwelling units, because all relocations would comply with both the State and Federal Uniform Relocation Act Relocation Assistance and Real Property Acquisition Guidelines.

As discussed above for Alternative 4b, the project area does not contain concentrations of minority or low-income populations in excess of the defined Environmental Justice threshold; therefore, no disproportionate adverse impacts to these populations would occur.

5.8.8 Alternative 3b: Incremental Dam Removal/Natural Sediment Transport - Natural Transport of "Reservoir Fines"

Socioeconomic impacts resulting from Alternative 3b are similar to those described for Alternative 2b. However, beneficial impacts (**Class IV**) to construction contractors and businesses involved in the restoration activities would be further delayed due to the extended nature of the dam removal and restoration activities. As described in Alternative 4a, the purchase and removal of the Matilija Hot Springs and the Camino Cielo structures would result in less-than-significant impacts (**Class III**) to commercial activities and residential dwelling units, because as all relocations would comply with both the State and Federal Uniform Relocation Act Relocation Assistance and Real Property Acquisition Guidelines.

As discussed above for Alternative 4b, the project area does not contain concentrations of minority or low-income populations in excess of the defined Environmental Justice threshold; therefore, no disproportionate adverse impacts to these populations would occur.

5.8.9 Alternative 4a: Full Dam Removal/Long-Term Sediment Transport - Long-Term Transport Period

Socioeconomic impacts resulting from this alternative would occur over an estimated three-year period of project activity. The socioeconomic impacts for Alternative 4a would be similar to those described for Alternative 2a.

Differences in project design under this alternative result in minimal differences in the socioeconomic impacts. Labor issues and housing demand resulting from the project would be the same as described for previous alternatives, although this alternative would result in beneficial impacts to the local economy by employing local workers for a slightly longer period than Alternatives 1, 2a, and 2b (**Class IV)**. Temporary beneficial impacts to local businesses would occur with use of nearby quarries, such as Schmidt Rock Quarry, for riprap material or native plant nurseries for vegetation restoration materials (**Class IV**). As described in Alternative 4b, the purchase and removal of the Matilija Hot Springs and the Camino Cielo structures would result in less-than-significant impacts (**Class III**) to commercial activities and residential dwelling units, because all relocations would comply with both the State and Federal Uniform Relocation Act Relocation Assistance and Real Property Acquisition Guidelines.

As discussed above for Alternative 4b, the project area does not contain concentrations of minority or low-income populations in excess of the defined Environmental Justice threshold; therefore, no disproportionate adverse impacts to these populations would occur.

5.9 TRANSPORTATION

5.9.1 Impact Significance Criteria

The transportation and traffic impacts of the Proposed Action would be considered significant if one or more of the following conditions were to occur as a result of construction or operation of the project. These criteria are based on a review of the environmental documentation for other projects in California, as well as on input from staff at the public agencies responsible for the transportation facilities. Transportation and traffic impacts would be significant under the following conditions:

- A major roadway would be closed to through traffic during construction activities and there would be no suitable alternative route available;
- An increase in vehicle trips associated with construction would result in an unacceptable reduction in level of service on the roadways in the project vicinity, as defined by each affected jurisdiction (see LOS Criteria, below);
- Construction activities would disrupt bus or rail transit service and there would be no suitable alternative routes or stops;
- Construction activities or staging activities would increase the demand for and/or reduce the supply of parking spaces and there would be no provisions for accommodating the resulting parking deficiencies; and
- An increase in roadway wear in the vicinity of the construction zone would occur as a result of heavy truck or construction equipment movements, resulting in noticeable deterioration of roadway surface.

LOS Criteria. Ventura County Level of Service (LOS) standards are applicable for any city that has not adopted its own standards. The County of Ventura assumes that a significant adverse reduction in LOS occurs on any road segment if any one of the following would result from a proposed project:

- If the project would add 10 or more peak hour trips (PHT) to a road segment that is currently operating at an acceptable LOS as defined in Table 5.9-1 below, but would cause the LOS to fall to an unacceptable level as defined in Table 5.9-1
- If the project would add one or more PHT to a roadway segment that is currently operating at less-than-acceptable LOS as defined in Table 5.9-2
- If the project would add 10 or more average daily trips (ADT) or one percent or more of the total projected ADT, whichever is greater, to a roadway that is currently operating at less-than-acceptable LOS as defined in Table 5.9-1
- If the project would add one or more AM southbound or PM northbound PHT to State Route (SR) 33 between the northerly end of the Ojai Freeway and the City of Ojai limits, the project would be considered as contributing a significant cumulative impact on SR 33.

Ventura County assumes that a significant traffic impact would occur at any intersection if the project would change vehicle per capacity (V/C) ratio or add PHT to impacted intersections that exceed the thresholds established in Table 5.9-2.

Table 5.9-1: Ventura County Minimum Acceptable LOS for Roadway Segments

Minimum LOS	Roadway Description
D	All County thoroughfares and State highways within the unincorporated area of the County, except as provided for Minimum LOS E case described below.
E	State Route 33 between the end of the freeway and the City of Ojai.
C	All County maintained local roads.
Varies	The LOS prescribed by the applicable city for all State highways, city thoroughfares, and city maintained local roads located within that city, if the city had formally adopted General Plan policies, ordinances, or a reciprocal agreement with the County, pertaining to development in the city that would individually or cumulatively affect the LOS of State highways, county thoroughfares and county-maintained local roads in the unincorporated area of the County.

Notes: At any intersection between two roads, each of which has a prescribed minimum acceptable LOS, the less stringent LOS of the two shall be the minimum acceptable LOS of that intersection.
Source: Ventura County.

Table 5.9-2: Ventura County Thresholds of Significance for Changes in LOS at Intersections

Existing Intersection LOS	V/C Increase or Peak Hour Trips
A	0.20
B	0.15
C	0.10
D	10 trips
E	5 trips
F	1 trip

Source: Ventura County.

5.9.2 No Action Alternative (Future Without-Project)

Under the No Action Alternative, the project would not be implemented, thereby eliminating all potential impacts that would have been associated with project demolition and construction activities, including impacts associated with construction equipment and material deliveries and truck haul trips for any transport of sediment fines or debris from the construction areas. Therefore, implementation of the No Action Alternative would result in no adverse transportation-related impacts.

5.9.3 Alternative 4b (Recommended Plan): Full Dam Removal/Long-Term Sediment Transport - Short-Term Transport Period

Implementation of Alternative 4b or any of the other alternatives would not result in impacts related to the direct closure of any pubic roads or parking areas. Traffic-related impacts associated with the project would result from short-term daily worker-commute trips and from heavy truck trips required to haul equipment and materials to and from the dam site and the downstream flood control protection sites. Table 5.9-3 presents the average daily and peak hour trips associated with Alternative 4b. The trips included in the table are average estimates for all of the construction activities that would affect SR 33 between the Ojai Freeway and the City of Ojai limits under Alternative 4b, including the downstream flood control protection components. See Appendix G for more detail regarding estimated trips associated with the various components of the alternatives.

It is anticipated that worker-commute trips associated with Alternative 4b would average approximately 124 trips per workday over a period of at least 24 months. Workers would be divided up into several crews that would be stationed from approximately one half mile northwest of Matilija Dam to the various downstream improvement locations along Ventura River. Half of the daily worker-commute trips would utilize SR 33 during peak hours (see Table 5.9-3). However, it is assumed that the trips would originate from the Ventura area so that the a.m. commute trips would be northbound and the p.m. commute trips would be southbound, when the LOS levels along SR 33 operate at acceptable levels. The worker-commute patterns would not contribute to an unacceptable LOS. Therefore, impacts to road or highway LOS associated with worker commutes would be less than significant (**Class III**).

In addition to worker-commute trips, Alternative 4b would require hauling using large heavy trucks. Concrete rubble from the dam would be transported to Hanson Aggregates, while non-recyclable debris would be sent to the Toland Road Landfill. All trips to haul dam demolition debris would require the use of SR 33 through Ojai. As described in Table 5.9-3, it is estimated that an average of approximately 174 equivalent trips would occur daily for at least a two year period along SR 33 between the Ojai Freeway and the City of Ojai limits and approximately 11 of the trips are estimated to occur during the peak hour.

Table 5.9-3: SR 33 Daily and Peak Hour Trips Estimated for Alternative 4b

Average Trips	Employee Vehicles	Heavy Duty Vehicles	Total
Daily Trips	124	174	298
A.M. Peak Hour Trips	62	11	73

Notes: Trip estimates are derived from Appendix G (Air Quality). Daily trips are based on a 24-month average, assuming 23 workdays a month. Each heavy duty round trip accounts for 4 daily trips (1 trip in each direction and 2 trips to account for decreased traffic flow of large trucks). Heavy duty peak hour trips are estimated by multiplying heavy duty round trips by 2 (to account for decreased traffic flow of large trucks) then dividing by 8. It is estimated that 45% of the total trips for Alternative 4b would occur on SR 33 between the Freeway and Ojai.

Encroachment or transportation permits from all affected jurisdictions (i.e., Caltrans, Ventura County, and City of Ojai) would be required to haul materials and debris on the public right-of-way (ROW). Truck hauling contractors would be required to adhere to all stipulations of the permits. However, the daily and a.m. peak hour trips estimated for heavy-duty vehicles would violate Ventura County LOS standards presented in Section 5.9.1. Therefore, traffic impacts associated with truck hauling would be significant (**Class I**) under Alternative 4b. Although impacts would not be mitigable to less-than-significant levels, Mitigation Measure T-1 (see below) is recommended to reduce impacts to the extent feasible.

T-1 **Transportation Management Plan.** The construction contractor shall submit a Transportation Management Plan to the County of Ventura's Public Works Department and to Caltrans for review and approval that demonstrates practices and safety precautions designed to minimize temporary construction traffic impacts. The detailed traffic study shall be performed by a registered civil engineer (or registered traffic engineer) who is qualified to perform traffic engineering studies and is familiar with Ventura County. The Transportation Management Plan shall cover all aspects of construction under the Proposed Action and shall include traffic control measures and other procedures that may be necessary during construction of the project. All recommendations of the Transportation Management Plan shall be incorporated into the description of the Proposed Action.

The project proponents do not expect to cause any physical damage to public roads, sidewalks, mediums, etc. However, there is the potential for unexpected damage by heavy vehicles and equipment to occur. This potentially significant impact would be reduced to less-than-significant levels (**Class II**) with implementation of Mitigation Measure T-2, presented below.

T-2 **Road repair from construction activities.** If damage to roads, sidewalks, and/or medians occurs, the construction contractor shall coordinate repairs with the affected public agencies to ensure that any impacts are adequately repaired. Roads disturbed by construction activities or construction vehicles shall be properly restored to ensure long-term protection of road surfaces. Care shall be taken to prevent damage to roadside drainage structures. Roadside drainage structures and road drainage features (e.g., rolling dips) shall be protected by regrading and reconstructing roads to drain properly.

One of the downstream flood control protection measures associated with the Recommended Plan and all of the alternatives is the replacement of the existing Santa Ana Boulevard Bridge with a re-designed, raised bridge. During bridge demolition and construction, a short span of Santa Ana Boulevard at the Ventura River would be closed to through traffic. However, a temporary road would be constructed approximately 250 feet south of the existing bridge to serve as a traffic detour until construction of the new Santa Ana Boulevard Bridge is complete (see Section 3, Figure 3.1-5 for an illustration of the temporary road). The temporary road would be constructed prior to the beginning of the bridge work at the start of the dry season in June and would be removed when the bridge work is completed, before to the end of the dry season in October. Four 60-inch RCP culverts would be provided to convey any low flow that would occur during construction to prevent overtopping of the roadway. The temporary road would be designed to allow storm flows to occur over the road if an unexpected storm occurs during the construction period. The temporary road would be equipped with gates and warning signs to close the road in the event of an unseasonable storm event. The traffic would be detoured to Hwy 150 during any closures. Because a suitable route detour would be available during the replacement of the Santa Ana Boulevard Bridge, road closure impacts would be less than significant (Class III).

5.9.4 Alternative 1: Full Dam Removal/Mechanical Sediment Transport – Dispose of Fines, Sell Aggregate

Similar to Alternative 4b, traffic-related impacts associated with Alternative 1 would result from short-term daily worker-commute trips and from heavy truck trips required to haul equipment and materials to and from the dam site and the downstream flood protection sites. Table 5.9-4 presents the average daily and peak hour trips associated with Alternative 1 that would occur for at least two years affecting SR 33 between the Ojai Freeway and the City of Ojai limits. See the Appendix G for more detail regarding estimated trips associated with the various components of the alternatives.

As discussed under Alternative 4b, worker-commute patterns would not contribute to an unacceptable LOS. Therefore, impacts to road or highway LOS associated with worker commutes would be less than significant (**Class III**). Encroachment or transportation permits from all affected jurisdictions (i.e., Caltrans, Ventura County, and City of Ojai) would be required to haul materials and debris on the

Table 5.9-4: SR 33 Daily and Peak Hour Trips Estimated for Alternative 1

Average Trips	Employee Vehicles	Heavy Duty Vehicles	Total
Daily Trips	137	640	777
Peak Hour Trips	69	40	109

Notes: Trip estimates are derived from Appendix G (Air Quality). Daily trips are based on a 24-month average, assuming 23 workdays a month. Each heavy duty round trip accounts for 4 daily trips (1 trip in each direction and 2 trips to account for decreased traffic flow of large trucks). Heavy duty peak hour trips are estimated by multiplying heavy duty round trips by 2 (to account for decreased traffic flow of large trucks) then dividing by 8. It is estimated that 47% of the total trips for Alternative 1 would occur on SR 33 between the Freeway and Ojai.

public ROW and contractors would be required to adhere to all stipulations of the permits. However, same as identified for Alternative 4b, the heavy-duty vehicle daily and a.m. peak hour trips estimated for Alternative 1 would violate Ventura County LOS standards presented in Section 5.9.1. Therefore, traffic impacts associated with truck hauling would be significant (**Class I**) under Alternative 1. Although impacts would not be mitigable to less-than-significant levels, Mitigation Measure T-1 (see above) is recommended to reduce impacts to the extent most feasible. In addition to traffic impacts, there is the potential for unexpected damage to roads, sidewalks, mediums, etc., by heavy vehicles and equipment to occur under Alternative 1. This potentially significant impact would be reduced to less-than-significant levels (**Class II**) with implementation of Mitigation Measure T-2, presented above.

5.9.5 Alternative 2a: Full Dam Removal/Natural Sediment Transport – Slurry "Reservoir Area" Fines Off Site

Similar to Alternatives 4b and 1, traffic-related impacts associated with Alternative 2a would result from short-term daily worker-commute trips and from heavy truck trips required to haul equipment and materials to and from the dam site and the downstream flood protection sites. Table 5.9-5 presents the average daily and peak hour trips associated with Alternative 2a that would occur over a period of at least 24 months affecting SR 33 between the Ojai Freeway and the City of Ojai limits. See Appendix G for more detail regarding estimated trips associated with the various components of the alternatives.

Table 5.9-5: SR 33 Daily and Peak Hour Trips Estimated for Alternative 2a

Average Trips	Employee Vehicles	Heavy Duty Vehicles	Total
Daily Trips	113	211	324
Peak Hour Trips	57	14	71

Notes: Trip estimates are derived from Appendix G (Air Quality). Daily trips are based on a 24-month average, assuming 23 workdays a month. Each heavy duty round trip accounts for 4 daily trips (1 trip in each direction and 2 trips to account for decreased traffic flow of large trucks). Heavy duty peak hour trips are estimated by multiplying heavy duty round trips by 2 (to account for decreased traffic flow of large trucks) then dividing by 8. It is estimated that 55% of the total trips for Alternative 2a would occur on SR 33 between the Freeway and Ojai.

Same as for the other alternatives, worker-commute patterns would not contribute to an unacceptable LOS. Therefore, impacts to road or highway LOS associated with worker commutes would be less than significant (**Class III**). Encroachment or transportation permits from all affected jurisdictions (i.e., Caltrans, Ventura County, and City of Ojai) would be required to haul materials and debris on the public ROW and contractors would be required to adhere to all stipulations of the permits. The heavy-duty vehicle daily and a.m. peak hour trips estimated for Alternative 2a would violate Ventura County LOS standards presented in Section 5.9.1. Therefore, traffic impacts associated with truck hauling would be significant (**Class I**) under Alternative 2a. Although impacts would not be mitigable to less-than-significant levels, Mitigation Measure T-1 (see above) is recommended to reduce impacts to the extent feasible. In addition to traffic impacts, there is the potential for unexpected damage to roads, sidewalks, mediums, etc., by heavy vehicles and equipment to occur under Alternative 2a. This potentially significant impact would be reduced to less-than-significant levels (**Class II**) with implementation of Mitigation Measure T-2, presented above.

5.9.6 Alternative 2b: Full Dam Removal/Natural Sediment Transport – Natural Transport of "Reservoir Fines"

Traffic-related impacts associated with Alternative 2b would result from short-term daily worker-commute trips and from heavy truck trips required to haul equipment and materials to and from the dam site and the downstream flood protection sites. Table 5.9-6 presents the average daily and peak hour trips associated with Alternative 2b that would occur over a period of at least 18 months affecting SR 33 between the Ojai Freeway and the City of Ojai limits. See Appendix G for more detail regarding estimated trips associated with the various components of the alternatives.

Table 5.9-6: SR 33 Daily and Peak Hour Trips Estimated for Alternative 2b

Average Trips	Employee Vehicles	Heavy Duty Vehicles	Total
Daily Trips	110	480	590
Peak Hour Trips	55	30	85

Notes: Trip estimates are derived Appendix G (Air Quality). Daily trips are based on an 18-month average, assuming 23 workdays a month. Each heavy duty round trip accounts for 4 daily trips (1 trip in each direction and 2 trips to account for decreased traffic flow of large trucks). Heavy duty peak hour trips are estimated by multiplying heavy duty round trips by 2 (to account for decreased traffic flow of large trucks) then dividing by 8. It is estimated that 95% of the total trips for Alternative 2b would occur on SR 33 between the Freeway and Ojai.

Similar to the other alternatives, worker commute patterns would not contribute to an unacceptable LOS. Therefore, impacts to road or highway LOS associated with worker commutes would be less than significant (**Class III**) under Alternative 2b. Encroachment or transportation permits from all affected jurisdictions (i.e., Caltrans, Ventura County, and City of Ojai) would be required to haul materials and debris on the public ROW and contractors would be required to adhere to all stipulations of the permits. The heavy-duty vehicle daily and a.m. peak hour trips estimated for Alternative 2b would violate Ventura County LOS standards presented in Section 5.9.1. Therefore, traffic impacts associated with truck hauling would be significant (**Class I**) under Alternative 2b. Although impacts would not be mitigable to less-than-significant levels, Mitigation Measure T-1 (see above) is recommended to reduce impacts to the extent feasible. In addition to traffic impacts, there is the potential for unexpected damage to roads, sidewalks, mediums, etc., by heavy vehicles and equipment to occur under Alternative 2b. This potentially significant impact would be reduced to less-than-significant levels (**Class II**) with implementation of Mitigation Measure T-2, presented above.

5.9.7 Alternative 3a: Incremental Dam Removal/Natural Sediment Transport - Slurry "Reservoir Area" Fines Off Site

Traffic-related impacts associated with Alternative 3a would result from short-term daily worker-commute trips and from heavy truck trips required to haul equipment and materials to and from the dam site and the downstream flood protection sites as described for the other project alternatives. Table 5.9-

7 presents the average daily and peak hour trips associated with Alternative 3a that would occur over a period of at least 18-months affecting SR 33 between the Ojai Freeway and the City of Ojai limits. See Appendix G for more detail regarding estimated trips associated with the various components of the alternatives.

Table 5.9-7: SR 33 Daily and Peak Hour Trips Estimated for Alternative 3a

Average Trips	Employee Vehicles	Heavy Duty Vehicles	Total
Daily Trips	117	307	424
Peak Hour Trips	58	20	78

Notes: Trip estimates are derived from Appendix G (Air Quality). Daily trips are based on an 18-month average, assuming 23 workdays a month. Each heavy duty round trip accounts for 4 daily trips (1 trip in each direction and 2 trips to account for decreased traffic flow of large trucks). Heavy duty peak hour trips are estimated by multiplying heavy duty round trips by 2 (to account for decreased traffic flow of large trucks) then dividing by 8. It is estimated that 64% of the total trips for Alternative 3a would occur on SR 33 between the Freeway and Ojai.

Same as the other alternatives, worker-commute patterns under Alternative 3a would not contribute to an unacceptable LOS. Therefore, impacts to road or highway LOS associated with worker commutes would be less than significant (**Class III**). Encroachment or transportation permits from all affected jurisdictions (i.e., Caltrans, Ventura County, and City of Ojai) would be required to haul materials and debris on the public ROW and contractors would be required to adhere to all stipulations of the permits. The heavy-duty vehicle daily and a.m. peak hour trips estimated for Alternative 3a would violate Ventura County LOS standards presented in Section 5.9.1. Therefore, traffic impacts associated with truck hauling would be significant (**Class I**) under Alternative 3a. Although impacts would not be mitigable to less-than-significant levels, Mitigation Measure T-1 (see above) is recommended to reduce impacts to the extent feasible. In addition to traffic impacts, there is the potential for unexpected damage to roads, sidewalks, mediums, etc., by heavy vehicles and equipment to occur under Alternative 3a. This potentially significant impact would be reduced to less-than-significant levels (**Class II**) with implementation of Mitigation Measure T-2, presented above.

5.9.8 Alternative 3b: Incremental Dam Removal/Natural Sediment Transport - Natural Transport of "Reservoir Fines"

Similar to the other alternatives, traffic-related impacts associated with Alternative 3b would result from short-term daily worker-commute trips and from heavy truck trips required to haul equipment and materials to and from the dam site and the downstream flood protection sites. Table 5.9-8 presents the average daily and peak hour trips associated with Alternative 3b that would occur over a period of at least 18 months affecting SR 33 between the Ojai Freeway and the City of Ojai limits. See Appendix G for more detail regarding estimated trips associated with the various components of the alternatives.

Table 5.9-8: SR 33 Daily and Peak Hour Trips Estimated for Alternative 3b

Average Trips	Employee Vehicles	Heavy Duty Vehicles	Total
Daily Trips	80	427	507
Peak Hour Trips	40	27	67

Notes: Trip estimates are derived from Appendix G (Air Quality). Daily trips are based on an 18-month average, assuming 23 workdays a month. Each heavy duty round trip accounts for 4 daily trips (1 trip in each direction and 2 trips to account for decreased traffic flow of large trucks). Heavy duty peak hour trips are estimated by multiplying heavy duty round trips by 2 (to account for decreased traffic flow of large trucks) then dividing by 8. It is estimated that 94% of the total trips for Alternative 3b would occur on SR 33 between the Freeway and Ojai.

Worker-commute patterns under Alternative 3b would not contribute to an unacceptable LOS. Therefore, impacts to road or highway LOS associated with worker commutes would be less than significant (**Class III**). Encroachment or transportation permits from all affected jurisdictions (i.e., Caltrans, Ventura County, and City of Ojai) would be required to haul materials and debris on the public ROW and contractors would be required to adhere to all stipulations of the permits. The heavy-duty vehicle daily and a.m. peak hour trips estimated for Alternative 3b would violate Ventura County LOS standards presented in Section 5.9.1. Therefore, traffic impacts associated with truck hauling would be significant (**Class I**) under Alternative 3b. Although impacts would not be mitigable to less-than-significant levels, Mitigation Measure T-1 (see above) is recommended to reduce impacts to the extent feasible. In addition to traffic impacts, there is the potential for unexpected damage to roads, sidewalks, mediums, etc., by heavy vehicles and equipment to occur under Alternative 3b. This potentially significant impact would be reduced to less-than-significant levels (**Class II**) with implementation of Mitigation Measure T-2, presented above.

5.9.9 Alternative 4a: Full Dam Removal/Long-Term Sediment Transport - Long-Term Transport Period

Traffic-related impacts associated with Alternative 4a would also result from short-term daily worker-commute trips and from heavy truck trips required to haul equipment and materials to and from the dam site and the downstream flood protection sites as described for the other project alternatives. Table 5.9-9 presents the average daily and peak hour trips associated with Alternative 4a that would occur over a period of at least 24 months affecting SR 33 between the Ojai Freeway and the City of Ojai limits. See Appendix G for more detail regarding estimated trips associated with the various components of the alternatives.

Table 5.9-9: SR 33 Daily and Peak Hour Trips Estimated for Alternative 4a

Average Trips	Employee Vehicles	Heavy Duty Vehicles	Total
Daily Trips	112	101	213
Peak Hour Trips	56	7	63

Notes: Trip estimates are derived from Appendix G (Air Quality). Daily trips are based on a 24-month average, assuming 23 workdays a month. Each heavy duty round trip accounts for 4 daily trips (1 trip in each direction and 2 trips to account for decreased traffic flow of large trucks). Heavy duty peak hour trips are estimated by multiplying heavy duty round trips by 2 (to account for decreased traffic flow of large trucks) then dividing by 8. It is estimated that 32% of the total trips for Alternative 4a would occur on SR 33 between the Freeway and Ojai.

As identified for the other alternatives, worker-commute patterns under Alternative 4a would not contribute to an unacceptable LOS. Therefore, impacts to road or highway LOS associated with worker commutes would be less than significant (**Class III**). Encroachment or transportation permits from all affected jurisdictions (i.e., Caltrans, Ventura County, and City of Ojai) would be required to haul materials and debris on the public ROW and contractors would be required to adhere to all stipulations of the permits. The heavy-duty vehicle daily and a.m. peak hour trips estimated for Alternative 4a would violate Ventura County LOS standards presented in Section 5.9.1. Therefore, traffic impacts associated with truck hauling would be significant (**Class I**) under Alternative 4a. Although impacts would not be mitigable to less-than-significant levels, Mitigation Measure T-1 (see above) is recommended to reduce impacts to the extent feasible. In addition to traffic impacts, there is the potential for unexpected damage to roads, sidewalks, mediums, etc., by heavy vehicles and equipment to occur under Alternative 4a. This potentially significant impact would be reduced to less-than-significant levels (**Class II**) with implementation of Mitigation Measure T-2, presented above.

5.10 LAND USE

5.10.1 Impact Significance Criteria

According to Appendix G of the Guidelines to the California Environmental Quality Act (CEQA), a project may have a significant effect on land use if a proposed project would:

- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect
- Disrupt or divide the physical arrangement of an established community
- Convert Prime Farmland, Farmland of Statewide Importance, or Unique Farmland to non-agricultural use.

A project may also have a significant impact on land use if it would create unmitigated noise, dust, public health hazard or nuisance, traffic, or visual impacts or when it precludes or unduly restricts existing or planned future uses.

5.10.2 No Action Alternative (Future Without-Project)

The No Action Alternative would leave the Matilija Dam in place, resulting in continued reduction of the dam's water storage capacity and sediment build-up behind the dam. This retention of sediment blocks one of the sources of sand replenishment to the Ventura shoreline. The City of Ventura's Comprehensive Plan Update to the Year 2010 states that Ventura should be a city "[w]hose beaches have been enhanced and maintained for all" and through the County's Coastal Area Plan, the California Coastal Act calls for the County to "[p]rotect, maintain, and where feasible, enhance and restore the overall quality of the coastal zone environment and its natural man-made resources" (County of Ventura, 1980; City of San Buenaventura, 1989). Therefore, the No Action Alternative would not help fulfill the City's Comprehensive Plan's Goals and Objectives and the County's Coastal Area Plan.

With Reaches 4, 5, and 6 designated as Wilderness or Open Space, little if any development is expected over the lifetime of the study (County of Ventura, 1988; LPNF, 1988; County of Ventura, 1995). In Reach 3, build out of the residentially designated areas in the City of Ojai General Plan and the residential areas in the Meiners Oaks, Mira Monte, Oak View and Live Oak Acres Existing Communities in the Ojai Valley Area Plan could occur during the life of the project, though should not be affected differently under the No Action Alternative (County of Ventura, 1995; City of Ojai, 1997). Residential build out is likely to increase in Casitas Springs in Reach 3 and mobile-home parks in Reaches 2a and 2b are slated to eventually be replaced with multiple-family dwellings in the case of the Las Encinas Mobile Home Park and industrial in the case of the Magnolia Mobile Home Park (County of Ventura, 1984, County of Ventura 1995). The City of Ventura Downtown Specific Plan is scheduled to improve the areas adjacent to park designations in Reaches 1 and 2a with upgraded uses or replace the existing uses with more attractive, more space-efficient land uses (City of San Buenaventura, 2000). None of the land use plans described in the General Plans applicable to the study area would be significantly affected by the No Action Alternative.

5.10.3 Alternative 4b (Recommended Plan): Full Dam Removal/Long-Term Sediment Transport - Short-Term Transport Period

The components of Alternative 4b can be categorized largely as open space restoration and installation or improvement of flood control measures. As the lands on which portions of the project would be sited are Los Padres National Forest Lands, or on lands designated by local jurisdictions as open space or floodplain, the alternative would not conflict with any applicable land use plans, regulations, or policies. Alternative 4b would not only be consistent with local plans, but could also contribute to the long-term achievement of beach replenishment goals set in the Ventura County General Plan, Ventura County Coastal Area Plan, and the City of San Buenaventura Comprehensive Plan Update to the Year 2010. In addition to sand and sediment from the headwaters of Matilija Creek, which could enter the Ventura River and contribute to beach nourishment under Alternative 4b, the stabilization of sediment in a manner allowing controlled natural erosion during storm events would also add to beach nourishment. This could be considered a beneficial impact (**Class IV**) resulting from the project.

There would be no expected disruption or division of communities from dam removal and restoration activities in the reservoir area. Excavation and stabilization of earth material from behind the dam and slurrying of materials to the proposed disposal site downstream, an open space area alongside the Ventura River off of Rice Road, would not disrupt or divide any communities.

Implementation of the high-level flood protection measures proposed in Alternative 4b, however, have the potential to adversely affect downstream communities. Flood control protection measures call for the purchase and removal of the Matilija Hot Springs retreat center and 11 residences along Camino Cielo and the relocation of the occupants. As these structures are dispersed through the Camino Cielo area and relatively isolated from other development, the removal of these structures would not constitute the division of a community. As all relocations would comply with both the State (California Government Code 33410–33418) and Federal (49 CFR Part 24) Uniform Relocation Act Relocation Assistance and Real Property Acquisition Guidelines, this would be considered a disruption, but would be a less-than-significant impact to the community (**Class III**).

The increased height and length of new levees and floodwalls required for Alternative 4b could also adversely affect communities along the Ventura River. The new Cañada Larga levee proposed for the alternative would be constructed along a stretch of the Ventura River between the river and a series of industrial sites, which should not result in any division or disruption of communities. The new Meiners Oaks levees and floodwall would be constructed along an open space area vegetated with scrub on the edge of the Meiners Oaks community and should not disrupt or divide it. The only levee that would be extended in length would be the Live Oaks levee. Improvements to the other levees and floodwalls would be made to existing levees and floodwalls. As these existing levees and floodwalls are currently located adjacent to existing communities, the increase in height of the flood protection could impact views from the communities to the Ventura River, but would not create any new disruptions or divisions. The extension to the Live Oaks levee would occur through a sparsely developed area and would not divide structures on the west from anything but open space scrub vegetation on the east side of the proposed extension. Any divisions or disruptions to communities caused by the construction or improvements of the levees and floodwalls could be adverse, but would be less than significant (**Class III**). Modifications to water supply facilities at Foster Park and Robles Diversion and the construction of the locally preferred desilting basin would occur in conjunction with or in the vicinity of existing water facilities in these locations. As these facilities are outside of established communities on the Ventura River, construction of these facilities would not disrupt or divide any nearby communities.

As the majority of the components of Alternative 4b would be sited on open space, floodplain, or Los Padres National Forest land, the potential for the alternative to convert farmland to a non-agricultural use is low. There are no agricultural lands in the vicinity of the project upstream of Matilija Dam, so reservoir material excavation and stockpiling and dam removal activities would not result in the conversion of any farmlands. Likewise, the slurry disposal site downstream is an open space area consisting primarily of degraded scrub, so activities at the disposal site would not result in any farmland conversion. Improvements to levees and floodwalls downstream would occur either to existing levees and floodwalls, or in the case of the Cañada Larga levee, the Meiners Oaks levees and floodwall, and the Live Oaks extension, would be constructed alongside the floodplain outside of agricultural areas. Although the site of the desilting basin has not been finalized, one of the potential sites would be located on a portion of agricultural land north of Baldwin Road. The area is dry farmed, but is not under Williamson Act contract or a Greenbelt Policy. The site is not considered to be Prime or Unique Farmland or Farmland of Statewide important. Although the desilting basin could potentially use up to 14 acres of this 200-acre agricultural area, because of the conditions of the land, agricultural impacts could be considered adverse, but less than significant (**Class III**).

5.10.4 Alternative 1: Full Dam Removal/Mechanical Sediment Transport – Dispose of Fines, Sell Aggregate

From a land use perspective, the impacts resulting from many of the components of Alternative 1 are the same as those described for Alternative 4b. Alternative 1 would be similar in its consistency to local land use plans, policies, and regulations to Alternative 4b. Impacts resulting from the disruption or division of established communities would be similar, but less due to a lower level of flood control protection. Similarly, impacts due to the conversion of farmland are largely the same, but less because Alternative 1 lacks a locally preferred desilting basin that could be sited on agricultural land.

As described for Alternative 4b, this alternative would not conflict with any applicable land use plans, regulations, or policies. Similar to Alternative 4b, Alternative 1 would also contribute to the long-term achievement of beach replenishment goals set in the Ventura County General Plan, Ventura County Coastal Area Plan, and the City of San Buenaventura Comprehensive Plan Update to the Year 2010, but to a slightly lesser degree. Sand and sediment from the headwaters of Matilija Creek would enter the Ventura River and contribute to beach nourishment under Alternative 1. Because sediment from behind the dam would be disposed at the Rice Road fill site or sold, however, the contribution to beach replenishment that this alternative would allow would be less than that described for Alternative 4b. This would still be considered a beneficial impact (**Class IV**) resulting from the project, but would not be as great a benefit as would be provided by Alternative 4b.

There would be no expected disruption or division of communities from dam removal and restoration activities. Sale and trucking of aggregate material from behind the dam and slurrying of materials to the proposed disposal site downstream, an open space area alongside the Ventura River off of Rice Road, would not disrupt or divide any communities.

Although Alternative 1 requires lower-level flood protection measures than Alternative 4b, Alternative 1 would also require the purchase and removal of the Matilija Hot Springs retreat center and 11 residences along Camino Cielo and the relocation of the occupants. Impacts would be identical to those described for Alternative 4b. Removal of the structures would not be considered a division, but the disruption due to relocation of the occupants could be considered an adverse, but less-than-significant impact (**Class III**).

Impacts resulting from the increased height and length of new levees and floodwalls required for Alternative 1 would be less than those described for Alternative 4b, because of the lower level of flood protection under this alternative. Increases in levee and floodwall heights would be less than the improvements in Alternative 4b, and also do not include the Cañada Larga levee. Although the heights of the Meiners Oaks levee and floodwall construction and levee improvements at other locations would be less than for Alternative 4b, the impacts of the flood protection on dividing and disrupting established communities would be the same. Any divisions or disruptions to communities caused by the construction or improvements of the levees and floodwalls could be adverse, but would be less than significant (**Class III**). Modifications to water supply facilities at Foster Park and Robles Diversion would occur in conjunction with or in the vicinity of existing water facilities in these locations. As these facilities are outside of established communities on the Ventura River, construction of these facilities would not disrupt or divide any nearby communities.

As with Alternative 4b, the majority of the components of Alternative 1 would be sited on open space, floodplain, or Los Padres National Forest land. The potential for the alternative to convert farmland to a non-agricultural use in these areas is, therefore, low. The lower-level flood control measures in Alternative 1 do not include the Cañada Larga levee or the locally preferred desilting basin, so Alternative 1 would have a lower potential for farmland conversion than Alternative 4b. Reservoir material excavation and stockpiling, slurry disposal activities, and dam removal would not result in the conversion of any farmlands. Improvements to levees and floodwalls downstream would occur either to existing levees and floodwalls, or in the case of the Meiners Oaks levees and floodwall and the Live Oaks extension, would be constructed alongside the floodplain outside of agricultural areas. Under Alternative 1, any conversion of farmland to non-agricultural uses could be considered adverse, but would result in less-than-significant impacts (**Class III**).

5.10.5 Alternative 2a: Full Dam Removal/Natural Sediment Transport – Slurry "Reservoir Area" Fines Off Site

From a land use perspective, the impacts resulting from Alternative 2a are similar to impacts resulting from Alternative 4b. Alternative 2a would be identical to Alternative 4b in its consistency with land use plans, policies, and regulations and would provide similar contributions to beach nourishment. As both require a higher level of flood control protection, impacts resulting from the division or disruption of established communities would be the same. Impacts due to the conversion of farmland are largely the same, but as with Alternative 1, because Alternative 2a lacks the locally preferred desilting basin these impacts would be less.

As described for Alternative 4b, Alternative 2a would not conflict with any applicable land use plans, regulations, or policies. As the sediment remaining after the reservoir area fines had been slurried downstream would be allowed to erode naturally under Alternative 2a, this alternative would also contribute to the County and City of Ventura beach replenishment goals. This would still be considered a beneficial impact (**Class IV**).

Although Alternative 2a lacks the locally preferred desilting basin, the impacts resulting from the project disrupting or dividing established communities, including the purchase and removal of the Matilija Hot Springs and Camino Cielo structures and the construction and improvements to levees and floodwalls, would be identical to those described for Alternative 4b.

Because of the similar nature of the components in Alternative 2a to Alternative 4b, impacts to farmland would be nearly identical. The only difference between the two is the lack of the locally preferred desilting basin under Alternative 2a. Because of this, Alternative 2a would have less impact to farmlands than Alternative 4b. With the exception of this, impacts resulting from farmland conversion to non-agricultural uses under Alternative 2a would be the same as those described for Alternative 4b.

5.10.6 Alternative 2b: Full Dam Removal/Natural Sediment Transport – Natural Transport of "Reservoir Fines"

Impacts resulting from project activities under Alternative 2b are largely the same as Alternative 2a, except that Alternative 2b lacks the 94-acre slurry disposal site included in Alternative 2a. As there are no land use impacts that have been associated with the 94-acre slurry site, land use impacts for Alternative 2a would be identical to Alternative 2b.

5.10.7 Alternative 3a: Incremental Dam Removal/Natural Sediment Transport - Slurry "Reservoir Area" Fines Off Site

Land use impacts for Alternative 3a would be identical to those described for Alternative 2a. While project activities would be spread out over a longer period, activities that would result in significant land uses would occur in the same time period as Alternative 2a.

5.10.8 Alternative 3b: Incremental Dam Removal/Natural Sediment Transport - Natural Transport of "Reservoir Fines"

Land use impacts for Alternative 3b would be identical to those described for Alternative 2b. While project activities would be spread out over a longer period, activities that would result in significant land uses would occur in the same time period as Alternative 2b.

5.10.9 Alternative 4a: Full Dam Removal/Long-Term Sediment Transport - Long-Term Transport Period

Consistency with land use plans, policies, and regulations would be nearly identical to Alternative 4b, although contributing to the City and County of Ventura beach nourishment goals would take longer in Alternative 4a because the sediments would be stabilized for a longer period.

Alternative 4a requires the same low level of downstream flood protection as described in Alternative 1, including the lack of the locally preferred desilting basin, so all impacts associated with these flood control measures in Alternative 4a are identical to those described for Alternative 1. As such, impacts resulting from the division and disruption of established communities and conversion of farmland would be identical under Alternative 4a to Alternative 1.

Land use impacts resulting from activities at the dam, in the reservoir area, and at the slurry disposal site, however, would be identical to those described for Alternative 4b. As described for Alternative 4b, reservoir material excavation and stockpiling, slurrying operations, and dam removal activities would not result in any divisions or disruptions to established communities, nor would it result in the conversion of farmland to a non-agricultural use.

5.11 RECREATION

5.11.1 Impact Significance Criteria

In accordance with NEPA and CEQA, the effects of a project are evaluated to determine if they would result in a significant adverse impact on the environment. This EIS/EIR focuses on the potential effects of the Proposed Action and offers mitigation measures to reduce or avoid any significant impacts. Activities of the Proposed Action would be considered significant if:

- There is a permanent loss, degradation, or displacement of existing recreational facilities
- Existing recreational activities are permanently disrupted
- Construction activities cause a significant risk to the safety of recreational users
- Construction activities cause the closure of a public recreational facility for an extended period of time.

5.11.2 No Action Alternative (Future Without-Project)

The No Action Alternative would not adversely affect any existing or proposed recreational facilities. Parks, trails, or other recreational amenities located within the study area would continue to function as they currently do. The Ventura County population is projected to increase by approximately 240,000 individuals between 2000 and 2020 (DOF, 2001), which would place an increased demand on existing recreational facilities. This increased demand would likely necessitate the expansion of existing facilities or the construction of new facilities. The types of recreational uses under the No Action Alternative would likely be similar to those described in Section 4.10 of this report, although some uses may change in popularity.

The No Action Alternative would result in negative impacts to recreation in Los Padres National Forest as well as at Ventura beaches. Under the No Action Alternative, the Lake Matilija would eventually fill and giant reed would spread through the filled reservoir basin, detracting from the view of recreationists traveling on Matilija Road to the Los Padres National Forest Matilija Wilderness area. The Matilija Dam currently acts to prevent sediments from reaching beaches downstream, under the No Action Alternative, the dam would continue to contribute to Ventura beach erosion, and accordingly negatively impacting beach recreation. This would continue until 2017 when the reservoir area would be full and sediments would begin to pass normally over the top of the dam.

5.11.3 Alternative 4b (Recommended Plan): Full Dam Removal/Long-Term Sediment Transport Short-Term Transport Period

In large part, Alternative 4b would result in no permanent losses, degradations, or displacements of existing recreational facilities. Project activities at the dam and in the reservoir area would serve to permanently enhance and create recreation facilities. Project components downstream of the dam, however, could result in some degradation to trails along the Ventura River. Additionally, the project would enhance beach nourishment and could potentially contribute to improving beach recreation.

The proposed activity behind the dam in the reservoir area would serve to enhance the natural qualities of the Matilija Canyon, and develop trail facilities and interpretive areas along the canyon to create a high-quality recreational experience at the entrance to the Matilija Wilderness Area. The excavation of material from behind the reservoir, removal of Matilija Dam, and landscaping of the reservoir area to stockpile sediments alongside a more naturally flowing stream channel would return the lake to a more natural, canyon-like landscape than the wide floodplain currently emptying into the reservoir. Additionally, the removal of giant reed, which has established on the growing banks of Lake Matilija, as part of the alternative and the re-vegetation of the area with native species, would substantially improve the natural environment of Matilija Canyon for recreational users. A pair of trails would be used to link SR 33 and the Matilija Wilderness Area and provide a shorter loop trail. Three interpretive areas with comfort stations, shelters, picnic areas, drinking fountains, and interpretive signs and markers would be created: one at the existing dam site, one at Hanging Rock, and one at the northern end of the project area where the proposed trails would converge. The improvement of the Matilija Canyon environment and development of recreation facilities in the canyon would be a beneficial impact (**Class IV**).

The majority of the downstream components of the project would not affect any nearby recreation facilities. The levees and floodwalls at Camino Cielo, Live Oaks, Casitas, and Cañada Larga would not conflict with any existing recreational facilities, although, as described below, construction could potentially result in temporary restrictions to recreation facilities. The levee and floodwall planned for Meiners Oaks, however, could result in long-term restrictions of access to and conflicts with the OVLC Rice Canyon Trail. In its proposed alignment, the Meiners Oaks flood protection would block street access to a pedestrian trailhead with a barrier up to 17 feet in height. The disruption of access to the Rice Canyon Trail would be considered a significant (**Class II**), but mitigable impact. Implementation of Mitigation Measure R-1, which would require the construction of an access ramp over the flood protection, would reduce impacts to less-than-significant levels. Additionally, the introduction of a large, man-made structure into the dominantly natural environment adjacent to the Rice Canyon Trail would reduce the quality of the recreational experience at this location. This degradation of recreational value would also be considered a significant (**Class II**) impact, but could be mitigated to a less-than-significant level through the implementation of Mitigation Measure AE-2 that would screen the flood protection from the trail with planted vegetation.

R-1 **Construct a ramp to provide access over the Meiners Oaks flood protection.** The Corps shall design and construct a ramp from Meyer Road on the east side of the Meiners Oaks flood protection over to the trails on the west side of the flood protection. The OVLC shall be consulted on the design of the ramp. This ramp shall be constructed in conjunction with construction of the Meiners Oaks levee and floodwall. The ramp shall be designed to ensure that pedestrians and equestrians can continue to utilize the Rice Canyon Trail, but designs may also include measures to ensure that the levee itself is not used as a recreation trail.

Although the placement of the slurry disposal site at the north of Baldwin Road or Highway 150 locations would not interfere with any recreation areas, use of the Rice Road slurry disposal site would bury OVLC trails on the east side of the Ventura River. Portions of the East/West River Bottom Loop Trails would be buried by up to 15 feet of sediment and access to these and other trails from the

Riverview Trailhead would be blocked. The elimination of these trails and blockage of access to other trails would result in serious repercussions to trail users and would be considered a significant (**Class II**), but mitigable impact. Mitigation Measure AE-3 in Section 5.5, Aesthetics, would require that prior to completion of slurry activities and site re-vegetation the Corps, in consultation with the OVLC, shall design a system of trails integrated with a re-vegetation plan to be constructed and implemented after the site has been settled and dewatered. Final trail designs and re-vegetation plans for the site would be subject to the OVLC's approval at least 60 days prior to the commencement of re-vegetation activities. Trail construction would occur at the same time and would be completed to the level of quality of the current trails or better. With the implementation of Mitigation Measure AE-3, impacts would be reduced to less-than-significant levels.

None of the other components, including the locally preferred desilting basin or purchase of the Camino Cielo structures, would permanently affect existing recreation facilities. The purchase and removal of the Matilija Hot Springs facility would eliminate an established recreational facility, but due to the limited number of users and because the facilities are a privately owned business, impacts to Matilija Hot Springs are addressed in Sections 5.8, Socioeconomics, and 5.10, Land Use.

Although the return of sediment from Matilija Creek and materials stored behind Matilija Dam to the Ventura River would assist in beach nourishment, according to Appendices D and E of the Feasibility Study, it is unclear how this additional sediment will affect Ventura County beaches. This increased sediment to Ventura County beaches would be a beneficial impact (**Class IV**) resulting from this project, but it is unclear the degree to which this would occur.

Some construction activities associated with the project could cause risk to the safety of recreational users. Of the activities associated with the project, disposal of slurry materials at the Rice Road site, improvement of downstream levees and floodwalls and modifications to water supply facilities at Foster Park would occur in locations where there would be a potential risk to recreation users. Disposal of the slurry materials at either the North of Baldwin Road or Highway 150 sites would result in no recreation impacts. Slurry disposal at the Rice Road site would require the closure of portions of the East/West River Bottom Loop Trails and the Riverview Trailhead. Most of the downstream levees and floodwalls to be raised are not in the vicinity of recreation areas and recreation facilities, but the Ojai Valley Trail and Rice Canyon Trail could be used to access the construction sites for the Cañada Larga and Casitas Springs flood protection. While it is unlikely that construction at these locations would result in risks to the safety of its users, the implementation of Mitigation Measure R-2 would ensure that any significant impacts (**Class II**) due to risk would be reduced to a less-than-significant level.

R-2 **Parks agency coordination, notification, and signage.** All construction activities, including temporary trail closures, affecting parklands or trail systems along the project route shall coordinate with the respective jurisdictional agency at least 30 days before construction begins in these areas. Signs directing vehicles to alternative park access and parking shall be posted in the event construction temporarily obstructs parking areas near trailheads. The Corps shall also post signs alerting park users to construction activities at least a week in advance of construction near recreation facilities. Signs advising recreation users of construction activities and directing them to alternative trails or bikeways will be posted on both sides of all trail intersections or as determined through Corps coordination with the respective jurisdictional agencies.

Construction of water supply wells at Foster Park could also potentially conflict with use by recreationists. As with construction along the Ojai Valley and Rice Canyon Trails, it is unlikely that construction along at Foster Park would result in risks to the safety of its users, the implementation of Mitigation Measure R-2 would ensure that any significant impacts (**Class II**) due to risk would be reduced to a less-than-significant level.

Activities associated with the project, including giant reed removal, reservoir material excavation, dam demolition, bridge replacement, installation and improvement of downstream flood protection measures, installation of the locally preferred desilting basin, and modifications to water supply facilities at Robles Diversion and Foster Park could result in the closure of public recreational facilities for the duration of the activity at a specific location. Dam demolition activities and reservoir material excavation and stabilization activities could occasionally necessitate that access to Matilija Road, and with it Murietta and Matilija Canyon Trails. It is unlikely that access to these facilities would be blocked for more than a short period. As Matilija Road is the sole access route to many residences in Matilija Canyon and Matilija Canyon Ranch, it is unlikely that access restrictions would be allowed for more than a few hours at a time. As described above, construction activities along the Ojai Valley and Rice Canyon Trails and Foster Park could also require that access be restricted for safety purposes. In the cases of these facilities, access could be restricted for a longer period, but it is unlikely that construction would cause the facilities to be closed or restricted for longer than one or two months. If construction activities would result in the closure of a park, trail, or other recreation facility, Mitigation Measure R-2 would ensure that any significant impacts (**Class II**) would be reduced to a less-than-significant level.

Temporary closures of recreation facilities would not occur if the North of Baldwin Road and Highway 150 sites were used for slurry disposal, but use of the Rice Road site could require a closure of the East/West River Bottom Loop Trails and Riverview Trailhead for at least 12 months. These facilities would likely remain closed to the public until completion of re-vegetation activities. While the implementation of Mitigation Measure AE-3 would create new trails over the slurry disposal site and Mitigation Measure R-2 could help reduce impacts by redirecting trail users to other facilities, the closure of these recreation facilities for over a year would be considered a significant, unmitigable impact (**Class I**).

5.11.4 Alternative 1: Full Dam Removal/Mechanical Sediment Transport – Dispose of Fines, Sell Aggregate

Alternative 1 would have similar permanent losses, degradations, and displacements of existing recreation facilities to Alternative 4b. Like Alternative 4b, completion of project activities at the dam and in the reservoir area would enhance and create recreation facilities. Project components downstream of the dam, in particular the disposal of the slurry materials and improvements to the levees and floodwalls, could potentially result in degradations to trails along the Ventura River. The improvements to the levees and floodwalls under Alternative 1, however, are lower in height than those described for Alternative 4b and so impacts resulting from these activities would not be as great. Slurry disposal activities under Alternative 4b would be similar to Alternative 1, but would require the disposal and storage of an additional 770,000 cubic yards of material. Completion of the project would enhance beach nourishment and could potentially improve beach recreation.

Permanent impacts resulting from activity behind the dam under Alternative 1 would be the same as those described for Alternative 4b. The restoration of Matilija Canyon and the creation of trails and interpretive areas in conjunction with the restoration would be considered a beneficial (**Class IV**) impact.

Downstream of the dam, permanent impacts resulting from the project would also be similar to those described for Alternative 4b. Permanent impacts to recreation facilities would result from the use of the Rice Road slurry disposal site and installation of the Meiners Oaks flood protection.

Use of the Rice Road slurry disposal site would bury OVLC trails on the east side of the Ventura River under Alternative 1. Portions of the East/West River Bottom Loop Trails would be buried by up to 20 feet of sediment and access to these and other trails from the Riverview Trailhead would be blocked. The elimination of these trails and blockage of access to other trails would be considered a significant (**Class II**) impact, but would be mitigated to a less-than-significant level through the implementation of Mitigation Measure AE-3 in Section 5.5, Aesthetics, which would replace the buried trails.

Although flood control protection would be lower under Alternative 1, impacts due to access restrictions and deteriorated recreational values would be similar to Alternative 4b. As described for Alternative 4b, the levees and floodwalls at Camino Cielo, Live Oaks, and Casitas would not conflict with any existing recreational facilities, although construction could potentially result in temporary restrictions to recreation facilities. As described above, the levee and floodwall planned for Meiners Oaks could restrict access to and conflict with the OVLC Rice Canyon Trail. Although the flood protection under Alternative 1 would be approximately 12 feet tall instead of 17 feet, the disruption of access to the Rice Canyon Trail would still be considered a significant (**Class II**), but mitigable impact. Implementation of Mitigation Measure R-1 would reduce impacts to less-than-significant levels. The degradation of recreational value due to the introduction of a man-made feature into the natural environment along the trail would also be considered a significant (**Class II**) impact, but could be mitigated to a less-than-significant level through the implementation of Mitigation Measure AE-2.

None of the other downstream components, including the other slurry disposal sites, levees and floodwalls, or purchase and removal of the Camino Cielo structures would permanently affect existing recreation facilities. Purchase and removal of the Matilija Hot Springs facilities are discussed as impacts to a business and are discussed in Sections 5.8, Socioeconomics, and 5.10, Land Use.

Although the majority of sediment currently trapped behind the dam would be excavated and removed from the reservoir area, either sold or stabilized at the slurry disposal site, completion of the project would allow the return of sediment from Matilija Creek to the Ventura River. The returning sediment would assist in beach nourishment, but according to Appendices D and E of the Feasibility Study, it is unclear how this additional sediment will affect Ventura County beaches. This increased sediment to Ventura County beaches would be a beneficial impact (**Class IV**) resulting from this project, but it is unclear the degree to which this would occur. Benefits from Alternative 1, however, would be less than Alternative 4b.

Impacts resulting from construction activities causing risk to the safety of recreational users would be similar to those described for Alternative 4b, with the exception that no flood protection construction would occur at Cañada Larga under Alternative 1. Construction activities could pose a significant (**Class II**) risk to the safety of recreational users, but implementation of Mitigation Measure R-2 would ensure that any impacts are reduced to less-than-significant levels.

The impacts associated with the closure of public recreational facilities for Alternative 1 would largely be the same as for Alternative 4b, although, as described above, no construction would occur at Cañada Larga under this alternative, so the Ojai Valley Trail would not be affected at that location. Project-related activities could result in the temporary closure of recreational facilities. Dam demolition and reservoir material removal activities could restrict access to the Murietta and Matilija Canyon Trails. Removal of reservoir area materials under Alternative 1 would require large numbers of truck trips hauling aggregate material from behind the dam. Although this would be a temporary degradation to recreationists wanting to access the Murietta and Matilija Canyon Trails, it is unlikely that these activities would require that access to these trails be closed for any extended period. Levee construction at Casitas Springs and Rice Canyon Trail and well-drilling activities at Foster Park could also require that recreation access be restricted for safety purposes. Construction activities could require that these facilities be closed for an extended period, resulting in a significant (**Class II**), but mitigable impact. Implementation of Mitigation Measure R-2 would ensure that any significant impacts would be reduced to a less-than-significant level.

As described for Alternative 4b, use of the Rice Road slurry disposal site could require a closure of the East/West River Bottom Loop Trails and Riverview Trailhead for 12 months or more. While the implementation of Mitigation Measure AE-3 would create new trails over the slurry disposal site and Mitigation Measure R-2 could help reduce impacts by redirecting trail users to other facilities, the closure of these recreation facilities for over a year would be considered a significant, unmitigable impact (**Class I**).

5.11.5 Alternative 2a: Full Dam Removal/Natural Sediment Transport - Slurry "Reservoir Area" Fines Off Site

Completion of Alternative 2a would result in the same permanent impacts to recreational facilities as described for Alternative 4b. As Alternative 2a would include the restoration of Matilija Canyon and construction of recreation trails and interpretative areas along Matilija Creek in the same manner as Alternative 4b, Alternative 2a would also result in beneficial (**Class IV**) permanent recreation impacts above the dam. Alternative 2a includes the same downstream components as Alternative 4b, so permanent impacts to recreation facilities downstream would also be the same as described in Alternative 4b.

As described for Alternative 4b, the levees and floodwalls at Camino Cielo, Live Oaks, Casitas, and Cañada Larga would not conflict with any existing recreational facilities. The levee and floodwall planned for Meiners Oaks, however, could result in long-term restrictions of access to and conflicts with the OVLC Rice Canyon Trail. The disruption of access to the Rice Canyon Trail would be considered a significant (**Class II**), but mitigable impact with the implementation of Mitigation Measure R-1 that would reduce impacts to less-than-significant levels. The degradation of recreational value due to the introduction of a man-made feature into the natural environment along the trail would also be considered a significant (**Class II**) impact, but could be mitigated to a less-than-significant level through the implementation of Mitigation Measure AE-2. Use of the Rice Road slurry disposal site would bury portions of the East/West River Bottom Loop Trails with up to 15 feet of sediment and access to these and other trails from the Riverview Trailhead would be blocked. The elimination of these trails and blockage of access to other trails would be considered a significant (**Class II**) impact, but could be mitigated to a less-than-significant level through the implementation of Mitigation Measure AE-3 in Section 5.5, Aesthetics, which would replace the buried trails.

Like Alternative 4b, Alternative 2a would allow a large portion of the sediment currently trapped behind the dam to erode naturally into the Ventura River and, it is expected, eventually to Ventura County beaches. According to Appendices D and E of the Feasibility Study, however, it is unclear how this additional sediment will affect beach nourishment. An increase in sediment to beaches would be considered a beneficial (**Class IV**) impact for coastal recreation in Ventura County.

Impacts resulting from construction activities causing risk to the safety of recreational users would be identical to those described for Alternative 4b. Construction activities could pose a significant (**Class II**) risk to the safety of recreational users, but implementation of Mitigation Measure R-1 would ensure that any impacts are reduced to less-than-significant levels.

The impacts associated with the closure of public recreational facilities for Alternative 2a would be the same as for Alternative 4b. Project-related activities could result in the temporary closure of recreational facilities. Dam demolition and reservoir material removal activities could restrict access to the Murietta and Matilija Canyon Trails. Levee construction at Casitas Springs and Rice Canyon and well-drilling activities at Foster Park could also require that access be restricted for safety purposes. Construction activities could require that these facilities be closed for an extended period, resulting in a significant (**Class II**), but mitigable impact. Implementation of Mitigation Measure R-2 would ensure that any significant impacts would be reduced to a less-than-significant level.

Temporary impacts resulting from the use of the Rice Road slurry disposal site would be the same as described for Alternatives 4b and 1. Use of this site could require a closure of the East/West River Bottom Loop Trails and Riverview Trailhead for 12 months or more. Although Mitigation Measure AE-3 would create new trails over the slurry disposal site and Mitigation Measure R-2 would help reduce impacts by redirecting trail users to other facilities, the closure of these recreation facilities for over a year would be considered a significant, unmitigable impact (**Class I**).

5.11.6 Alternative 2b: Full Dam Removal/Natural Sediment Transport – Natural Transport of "Reservoir Fines"

Recreation impacts resulting from Alternative 2b are nearly identical to those described for Alternative 2a. The primary differences in Alternative 2a and 2b are due to Alternative 2b relying upon storm events to naturally erode fine sediments from behind the dam into the Ventura River instead of these sediments being slurried to a 94-acre disposal site. Because of this, none of the permanent or temporary impacts associated with slurry activities at the Rice Road disposal site would occur under this alternative. While Alternative 2b allows a greater amount of sediment into the Ventura River than the alternatives described above, the fine sediments, which would be eroded downstream under this alternative, do not contribute to beach nourishment. As with the other previously described alternatives, however, the contribution of sediment from Matilija Creek into the Ventura River would help improve beach conditions to an unknown degree, and thus benefit beach recreation. All other impacts resulting from Alternative 2b are also the same as those described for Alternative 2a.

5.11.7 Alternative 3a: Incremental Dam Removal/Natural Sediment Transport – Slurry "Reservoir Area" Fines Off Site

Alternative 3a is largely similar to Alternative 2a, although the period of disturbance for the area behind the dam and at the chosen slurry disposal site would be longer. Permanent impacts to recreation facilities under Alternative 3a resulting from the loss, degradation, or displacement of facilities would be identical to those described for Alternative 2a. Although the total period of project activity for Alternative 3a would be longer than Alternative 2a, because the activity would occur in two, shorter separate phases instead of one longer phase, recreation impacts related to construction activities for Alternative 3a would be similar to Alternative 2a, but the temporary closure of trails at the Rice Road slurry site would be extended over a period of three years or more. This would be a greater impact than described for Alternative 2a and would be significant and unmitigable. Although other impacts would occur at different times than as described in Alternative 2a, these other recreation impacts under Alternative 3a would be identical to those described for Alternative 2a.

5.11.8 Alternative 3b: Incremental Dam Removal/Natural Sediment Transport – Natural Transport of "Reservoir Fines"

Alternative 3b is largely similar to Alternative 2b, although the period of disturbance for the area behind the dam would be longer. Permanent impacts to recreation facilities under Alternative 3b resulting from the loss, degradation, or displacement of facilities would be identical to those described for Alternative 2b. As with Alternative 2b, Alternative 3b would not result in the significant impacts associated with slurry activities at the Rice Road slurry disposal site. Although the total period of project activity for Alternative 3b would be longer than Alternative 2b, because the activity would occur in two, shorter separate phases instead of one longer phase, other recreation impacts related to construction activities for Alternative 3b would also be the same as Alternative 2b. Although these impacts would occur at different times than as described in Alternative 2b, these other recreation impacts under Alternative 3b would be identical to those described for Alternative 2b.

5.11.9 Alternative 4a: Full Dam Removal/Long-Term Sediment Transport – Long-Term Transport Period

Alternative 4a requires the same low level of downstream flood protection as described in Alternative 1, so all impacts associated with these flood control measures in Alternative 4a are identical to those described for Alternative 1.

Use of the Rice Road slurry disposal site would bury OVLC trails on the east side of the Ventura River under Alternative 4a. Portions of the East/West River Bottom Loop Trails would be buried by up to 15 feet of sediment and access to these and other trails from the Riverview Trailhead would be blocked. The elimination of these trails and blockage of access to other trails would be considered a significant (**Class II**) impact, but would be mitigable to a less-than-significant level through the implementation of Mitigation Measure AE-3 in Section 5.5, Aesthetics, which would replace the buried trails.

As with Alternative 1, flood control protection would be lower than Alternative 4b, but impacts due to access restrictions and deteriorated recreational values would be similar. The levees and floodwalls at Camino Cielo, Live Oaks, Casitas, and Cañada Larga would not conflict with any existing recreational facilities, although construction could potentially result in temporary restrictions to recreation facilities. The levee and floodwall planned for Meiners Oaks could restrict access to and conflict with the OVLC Rice Canyon Trail. Although the flood protection under Alternative 4a would be approximately 12 feet tall instead of 17 feet, the disruption of access to the Rice Canyon Trail would still be considered a significant (**Class II**), but mitigable impact. Implementation of Mitigation Measure R-1 would reduce impacts to less-than-significant levels. The degradation of recreational value due to the introduction of a man-made feature into the natural environment along the trail would also be considered a significant (**Class II**) impact, but could be mitigated to a less-than-significant level through the implementation of Mitigation Measure AE-2.

Temporary impacts due to potential access restrictions or because of risks to the users of Foster Park, the Ojai Valley Trail, or Rice Canyon Trail would be considered significant (**Class II**), but could be reduced to a less than significant impact with implementation of Mitigation Measure R-2.

Impacts resulting from dam demolition and reservoir area restoration, including the enhancement and creation of recreation facilities in Matilija Canyon would be the same as impacts described for Alternative 4b. The impacts would be significant (**Class II**), but mitigable to a less-than-significant level with implementation of Mitigation Measure R-2.

Temporary impacts resulting from the use of the Rice Road slurry disposal site would be the same as described for previous alternatives. Use of this site could require a closure of the East/West River Bottom Loop Trails and Riverview Trailhead for 12 months or more. Although Mitigation Measure AE-3 would create new trails over the slurry disposal site and Mitigation Measure R-2 would help reduce impacts by redirecting trail users to other facilities, the closure of these recreation facilities for over a year would be considered a significant, unmitigable impact (**Class I**).

Completion of Alternative 4a would result in permanent beneficial (**Class IV**) improvements to recreational opportunities in Matilija Canyon. Alternative 4a would also contribute an unknown amount to beach replenishment and with it provide a long-term benefit (**Class IV**) to beach recreation in Ventura County.

5.12 COMPLIANCE WITH ENVIRONMENTAL REGULATIONS AND REQUIREMENTS

5.12.1 Environmental Statutes and Regulations

The Proposed Action and its alternatives have been designed and evaluated in accordance with the requirements of applicable federal, State, and regional standards and regulations. This section presents how the project is either compliant with applicable regulations or will achieve compliance before the project is implemented.

National Environmental Policy Act of 1969, Public Law 91-190, and California Environmental Quality Act. This EIS/EIR has been prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, Public Law 91-190, and the California Environmental Quality Act (CEQA). The report was developed consistent with Article 9 Section 15120 to 15132 of the CEQA Guidelines and in accordance with the following NEPA requirements:

- Section 102 of the NEPA requires that all federal agencies use a systematic, interdisciplinary approach to protection of the human environment; this approach will ensure the integrated use of the natural and social sciences in any planning and decision making that may have an impact upon the environment. The NEPA also requires the preparation of a detailed EIS on any major federal action that may have a significant impact on the environment. This EIS must address any adverse environmental effects that cannot be avoided or mitigated, alternatives to the proposed action, the relationship between short-term uses and long-term productivity of the environment, and any irreversible and irretrievable commitments of resources involved in the project.
- Council of Environmental Quality (CEQ) Regulations on Implementing NEPA Procedures (40 CFR 1500 et seq.). These regulations provide for the use of the NEPA process to identify and assess the reasonable alternatives to proposed actions that avoid or minimize adverse effects of these actions upon the quality of the human environment. "Scoping" is used to identify the scope and significance of important environmental issues associated with a proposed federal action through coordination with federal, State, and local agencies; the public; and any interested individual or organization prior to the development of an impact statement. The process is also intended to identify and eliminate, from further detailed study, issues that are not significant or that have been covered by prior environmental review.
- U.S. Army Corps of Engineers (Corps) Environmental Quality Procedures for Implementing NEPA (33 CFR Parts 230 and 325) provides guidance for implementation of the procedural provisions of NEPA for the Civil Works Program of the Corps. It supplements Council on Environmental Quality (CEQ) Regulations 40 C.F.R. 1500-1508, November 29, 1978, in accordance with 40 C.F.R. 1507.3, and is intended to be used in conjunction with the CEQ regulations. This regulation is applicable to all Corps personnel responsible for preparing and processing environmental documents in support of civil works programs.

As specified in NEPA and CEQA, reasonable alternatives were identified and evaluated, as presented in Sections 3 and 5. Potential environmental effects were identified and mitigation measures proposed to reduce any potentially significant impacts to a less-than-significant level where feasible.

In addition, the Draft EIS/EIR will be circulated for a 45-day period for public and resource agency review and comment. After the 45-day public review period, a Final EIS/EIR will be prepared in accordance with both NEPA and CEQA requirements.

Clean Water Act of 1977, as Amended. Impacts affecting water resources of the United States, as defined under the Clean Water Act, have been considered in this Draft EIS/EIR. The Federal Water Pollution Control Act Amendment of 1972, as amended by the Clean Water Act of 1977 requires an assessment of impacts associated with the discharge of dredged or fill materials into the Waters of the United States. Appendix D of this EIS/EIR provides an evaluation of these impacts. Section 230.10 (a)(2) of the 404(b)(1) guidelines state that "an alternative is practicable if it is available and capable of being done after taking into consideration costs, existing technology, and logistics in light of overall project purposes." A 404(b)(1) evaluation for the Proposed Action has been prepared to ensure that the project is in compliance with the Clean Water Act (see Appendix D).

The Corps has determined that this project as proposed is consistent or otherwise in compliance with the Section 404(b)(1) guidelines of the Clean Water Act and meets the exemption criteria of Section 404(r). Although this document meets the requirements of Section 404(r) of the Clean Water Act (Public Law 92-500, as amended), as addressed in Appendix D, the Corps will request a Section 401 State water quality certificate during subsequent phases of this project. Project construction will not commence until after Section 401 State Water Quality certification is obtained. Should the project require either a National Pollution Discharge Elimination System (NPDES) permit or Waste Discharge Requirements (WDR) permit, it shall be obtained by the project's construction contractor.

Clean Air Act of 1970, as Amended. Potential air quality impacts have been assessed in this Draft EIS/EIR. Both short and long-term emissions of criteria pollutants resulting from the construction and operation of the Proposed Action were evaluated. The Proposed Action has the potential to contribute air pollutant emissions during the construction of the project. The annual NOx emissions would exceed the General Conformity Rule *de minimis* emission threshold of 25 tons per year (ROC emission would not exceed 25 tons per year for any project alternative). However, it is assumed through Mitigation Measure AQ-5 that NOx offsets would be obtained to fully mitigate the NOx emissions during all project years with emissions greater than 25 tons per year. Therefore, with this mitigation measure the Proposed Action would be able to comply with General Conformity Rule requirements, a comprehensive Air Quality Conformity Analysis would not be required, and the project impacts would be less than significant with mitigation. These findings are similar for all of the project alternatives; however, the quantity of required emission offsets would vary for each project alternative.

The current General Conformity Rule requirements will change as of June 15, 2005. At that time the 8-hour ozone designation will become the applicable conformity standard. Ventura County has been designated as a moderate non-attainment area for the 8-hour ozone NAAQS, effective June 15, 2004, and will have until June 2010 to attain the standard. The NOx and VOC *de minimis* emission thresholds for General Conformity in a moderate ozone non-attainment area are 100 tons per year. It is expected that a revised General Conformity finding will be made for this project sometime after June 15, 2005; and at that time it will be found that no additional offset mitigation, per Mitigation Measure AQ-5, will be required for any project alternatives except Alternative 1.

Appendix G of this EIS/EIR provides a complete description of the General Conformity analysis the estimated emissions that would be generated by each alternative.

CERCLA. The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) provides USEPA with the authority to identify and clean up contaminated hazardous waste sites. CERCLA also contains enforcement provisions for the identification of liable parties; it details the legal claims, which arise under the statute, and provides guidance on settlements with the USEPA. Section 120 of this Act addresses hazardous waste cleanups at Federal facilities and requires the creation of a Federal Agency Hazardous Waste Compliance Docket, which lists facilities that have the potential for hazardous waste problems. In addition, a Hazardous Substance Superfund was established to pay USEPA's cleanup and enforcement costs and certain natural resource damages, but also to pay for certain claims of private parties.

Individual states may implement hazardous waste programs under RCRA with USEPA approval. California has not yet received this USEPA approval; instead, the California Hazardous Waste Control Law (HWCL) is administered by the California Environmental Protection Agency (CALEPA) to regulate hazardous wastes. While the HWCL is generally more stringent than RCRA, until the USEPA approves the California program, both the State and Federal laws apply in California.

The HWCL lists approximately 790 chemicals and about 300 common materials that may be hazardous; establishes criteria for identifying, packaging and labeling hazardous wastes; prescribes the management controls; establishes permit requirements for treatment, storage, disposal and transportation; and identifies some wastes that cannot be disposed of in landfills. Conformance with this law would only be engaged if unforeseen waste was found or was abandoned on site in the future.

Fish and Wildlife Coordination Act (16 U.S.C. Section 661 et seq.). This statue requires federal agencies to coordinate with the U.S. Fish & Wildlife Service (USFWS), applicable state agencies, and the National Marine Fisheries Service (NMFS), as appropriate, when a stream or body of water is proposed to be modified. The intent is to give fish and wildlife conservation equal consideration with other purposes of water resources development projects. Coordination with the USFWS, the NMFS, and the California Department of Fish and Game has been ongoing throughout the planning process. Representatives of these agencies were members of the Environmental Working Group (EWG) that was established to assist in the planning activates relative to this feasibility study.

Numerous coordination meetings were held with the EWG throughout the planning process. The EWG participated in the planning decisions that determined the scope of biological surveys performed, the scope of the vegetation surveys performed, and all aspects of the habitat valuation performed for this project.

USFWS prepared a Planning Aid Report on July 2003 and a Draft Coordination Act Report (CAR) on June 2004. The Draft CAR appears as Appendix B of the Draft EIS/EIR. Comments by the Corps on the Draft CAR and documentation on which recommendations will be adopted by the Corps will be provided in the Final EIS/EIR.

The Corps is continuing coordination with the USFWS, NMFS, and CDFG as part of the public review of the Draft EIS/EIR and will continue coordination through the finalization of the CAR.

Magnuson-Stevens Fishery Management and Conservation Act, as amended. No aspect of the recommend plan is expected to have an impact on Essential Fish Habitat (per Magnuson-Stevens Fishery Management and Conservation Act, as amended).

Endangered Species Act (ESA) of 1973, as Amended (Public Law 93-205) and the Fish and Wildlife Coordination Act of 1958 (Public Law 85-624). The Corps received a list of threatened and endangered species that potentially could occur in the study area on April 8, 2004, from the National Marine Fisheries Service (NMFS) and on May 11, 2004 from the U.S. Fish & Wildlife Service (USFWS). The southern California steelhead is the only species identified by the NMFS. The USFWS identified the following species in their species list letter: southwestern willow flycatcher, least Bell's vireo, yellow-billed cuckoo, California red-legged frog, arroyo toad, western snowy plover, brown pelican, California least tern, and tidewater goby, and California condor

Section 7 (c) of the Endangered Species Act requires consultation with the USFWS to determine if a Federal action may affect threatened or endangered species, and to ensure that any action does not jeopardize the continued existence or result in the destruction or adverse modification of designated critical habitat of any threatened or endangered species.

A Biological Assessment was prepared to comply with the regulations on interagency cooperation regarding compliance with the Endangered Species Act (as per 50 CFR 402) (see Appendix C1 and C2.). These regulations require that a Biological Assessment be prepared to assess the potential impacts of federal projects which are "major construction activities" on listed or proposed threatened and endangered species (50 CFR 402.12).

The Biological Assessment concludes that the proposed project will have a beneficial affect on most of the threatened and endangered species in the study area. The steelhead may experience short-term adverse affects from high sediment concentrations (turbidity) associated with the erosion of sediment from behind the dam. Significant, long-term beneficial effects are expected to steelhead from the removal of an impassible barrier (Matilija Dam) to allow steelhead to reoccupy 17 miles of high quality steelhead habitat, the restoring of a more natural sediment regime to the ecosystem, and the removal of exotic plants and vertebrates from the feasibility study area. (See details in Appendix C1 or the summary in Section VII of Appendix C1.)

For species under the jurisdiction of the USFWS, the BA concludes that no effect will occur to the California Condor or to coastal endangered species (i.e., western snowy plover, brown pelican, California least tern, and tidewater goby).

The Recommended Plan has certain components that are expected to affect riparian endangered or candidate birds (i.e., southwestern willow flycatcher, least Bell's vireo, yellow-billed cuckoo) and threatened or endangered amphibians (California red-legged frog and arroyo toad) (i.e., may affect). In general, impacts are not likely to be adverse and beneficial effects are expected to occur to these species. The increased sediment concentration (turbidity) caused by eroding dam-sequestered sediment could have significant, short-term adverse affects on aquatic resources and adversely affect threatened or endangered amphibian species (especially the California red-legged frog, if present in the study area); no long-term adverse affects are expected, however. (See details in Appendix C2 or the summary in Section VII of Appendix C2.)

The Corps is pursuing formal consultation with the USFWS and NMFS per 50 CFR 402.

National Historic Preservation Act of 1966, as Amended. The Proposed Action has the potential to impact archeological resources. To address potential resources, the Corps proposes to conduct pre-construction surveys for archaeological resources within the proposed project area and would implement mitigation measures to reduce impacts to less than significant levels prior to proceeding with the project.

Once the final alternative for removal of Matilija Dam has been determined and archaeological testing has been completed, the proposed alternative will be re-coordinated with the California SHPO in accordance with the National Historic Preservation Act. Results of the any archival studies and the proposed archeological surveys (when completed), along with the Corps' determinations of eligibility and effect, will be sent to the California SHPO for review and comment. All documentation will also be provided to interested Native American groups. If the Corps determines that the project and its alternatives will have an adverse effect on National Register eligible properties, and the SHPO concurs, the Advisory Council will be notified per 36 CFR 800.6.

In accordance with 36 CFR 800, regulations implementing Section 106 of the National Historic Preservation Act, a records search and an archeological survey of the land portion of the study area have been performed. An archival search will be performed regarding the proposed deslitation and sediment disposal sites. Until the surveys of the proposed alternative sites have been completed, the Corps cannot make determinations of National Register eligibility and effect as required by the Act.

Coastal Zone Management Act (16 U.S.C. Sections 1451 et seq.) and California Coastal Act (California Public Resources Code, Division 20, Section 30000 et seq.). The Coastal Zone Management Act preserves, protects, develops where possible, and restores and enhances the Nation's coastal zone resources. It additionally encourages and assists states in their responsibilities in the coastal zone through development and implementation of management programs. The California Coastal Act of 1976, as amended, protects and enhances coastal resources within the California Coastal Zone, including, but not limited to public coastal access, recreation, the marine environment, land resources and development. Appendix I of this Draft EIS/EIR provides a Coastal Consistency Determination for review by the CCC in order to comply with the requirements of these acts.

Wild and Scenic Rivers Act (Public Law 90-542). In accordance with the Wild and Scenic Rivers Act, certain selected rivers in the United States are to be protected and preserved in free-flowing condition because of their "outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values…." Every wild, scenic, or recreational river in a free-flowing condition, or upon restoration of this condition, is eligible for inclusion in the national wild and scenic rivers system. Although Matilija Creek has been designated as a Study River under the Wild and Scenic River Act, which could potentially lead to the creek's designation as a Wild and Scenic River and withdraws the creek from appropriation under mining laws, Matilija Creek is not yet been approved for a Wild and Scenic designation. Therefore, the Wild and Scenic Rivers Act would not yet apply to this project.

Farmland Protection Policy Act (7 U.S.C. Section 4201). The purpose of the Farmland Protection Policy Act is to minimize the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to nonagricultural uses. It additionally directs federal programs to be compatible with State, and local policies for the protection of farmlands. In accordance with the Act, the Corps prepared a Prime and Unique Farmlands Assessment that determined the Proposed Action would not effect any designated prime or unique farmland, or farmland of statewide importance. Therefore, the Farmland Protection Policy Act is not applicable to the proposed project. See the Prime and Unique Farmlands Assessment in Appendix H.

Migratory Bird Conservation Act (16 U.S.C Section 715 to 715a). The Migratory Bird Conservation Act establishes a federal commission that is authorized to acquire land, water or transitional areas for the conservation of migratory birds. The Proposed Action could result in the taking, killing, or possession of any migratory birds listed under this act. However, mitigation would be implemented to reduce impacts to less than significant levels and the Proposed Action would ultimately provide beneficial impacts to migratory birds. Additionally, the Proposed Action would provide for the restoration of natural stream processes and the removal of non-native vegetation on the Ventura River and Matilija Creek, which would increase opportunities for nesting habitat, including habitat that potentially may be used by migratory birds. Therefore, the project is in compliance with and supports the intent of this act.

Estuary Protection Act (16 U.S.C Section 1221 et Seq.). The Estuary Protection Act requires federal agencies, in planning for the use or development of water and related land resources, to give consideration to estuaries and their natural resources. Although the southern most end of the project is located in the Ventura River Estuary, the biological resources impact analysis in the Draft EIS/EIR concludes that the Proposed Action would not impact, and may ultimately enhance conditions, in this estuary. Consequently, the Proposed Action would be in compliance with this act.

Executive Order 11990, Protection of Wetlands. Executive Order 11990, dated May 24, 1977 is intended to support NEPA by directing federal agencies and programs to avoid to the extent possible the long and short-term adverse impacts associated with the destruction or modification of wetlands, and to avoid direct or indirect support of new construction in wetlands whenever a practicable alternative exists. New construction is defined as including dredging and filling activities. The Proposed Action would result in the removal of artificially supported wetlands in the Matilija reservoir. The Act directs federal agencies to avoid unnecessary alteration or destruction of wetlands and requires federal agencies to prepare wetland assessments for proposed projects which are located in, or which affect wetlands. Implementation of the Proposed Action would restore natural stream process and would provide beneficial impacts to the Ventura River and Matilija Creek. In addition, removing Matilija Dam would result in beneficial impacts to sensitive wildlife known to occur in the Ventura River and Matilija Creek. As the removal of the Dam has been deemed necessary, and all practical measures to reduce impacts to wetlands would be implemented, the Proposed Action would be in compliance with this Executive Order.

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. The objectives of this executive order include identifying and addressing disproportionately high and/or adverse impacts of federal programs, policies, or activities on minority and/or low-income populations. No disproportionately high and/or adverse impacts to minority and/or low-income populations have been identified if the Proposed Action is implemented. In fact, this Proposed Action would improve the aesthetic quality of the project area by restoring native riparian vegetation and would provide protection from storm events. The project is therefore in compliance with the directives and objectives of this executive order.

Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks. On April 21, 1997, President Clinton signed Executive Order 13045 that requires federal agencies to identify and assess environmental health risk and safety risks, which may disproportionately affect children. The Proposed Action would not disproportionately impact children. The Proposed Action would restore habitat for spawning steelhead and reduce potential impacts from storm events. No unavoidable, significant impacts are identified in this Draft EIS/EIR. Potential impacts were identified with regard to biology, air quality, aesthetics, noise, transportation, and recreational uses. Environmental commitments were identified to reduce these potential impacts to less-than-significant levels. While there was no specific study conducted to assess impacts to children, there is no indication that any impacts would disproportionately affect children.

Los Padres National Forest Land and Resource Management Plan, County of Ventura General Plan, Coastal Area Plan, City of San Buenaventura Comprehensive Plan Update to the Year 2010, and City of Ojai General Plan. The Proposed Action and its alternatives fall within the jurisdictional boundaries of the Cities of San Buenaventura and Ojai, the County of Ventura, and Los Padres National Forest. Pursuant to California State Law (Government Code § 65301), the cities and county have adopted General Plans to guide long-term development within its boundaries and sphere of influence. Pursuant to the California Coastal Act, the County of Ventura additionally has an adopted the Coastal Area Plan to serve as its Local Coastal Plan to guide development and protect resources within the Coastal Zone. The Los Padres National Forest Land and Resource Management Plan acts as the overall guide for land and resource protection and development in the Los Padres National Forest. Applicable policies of the various jurisdictions' land use plans are provided in Sections 4.10.3.1, 4.10.3.2, 4.10.3, and 4.10.3.4. The Proposed Action and its alternatives would comply with all applicable land use policies of the cities, county, and National Forest and would provide a net benefit in all jurisdictions the action would be located in. It is additionally noted that the County of Ventura, as the project's Local Sponsor, fully supports the Proposed Action and has concurred with the findings of this EIS/EIR.

The environmental impacts of the proposed Matilija Dam Ecosystem Restoration Project are described in Section 5 (Environmental Consequences of Proposed Action and Alternatives). Impacts that are significant and cannot be reduced to less-than-significant levels through the application of feasible mitigation measures have been characterized as Class I impacts. All significant and unavoidable Class I impacts resulting from the Proposed Action are summarized below. Complete descriptions of these impacts are presented in Section 5.

BIOLOGICAL RESOURCES

- Significant impacts to wildlife as a result of increased human disturbance may include avoidance of preferred habitat areas and reduced reproductive success in local wildlife populations, including special status species such as red-legged frogs. Indirect effects to terrestrial fauna using habitats adjacent to the area may result from reduced food sources, increased predation, increased noise, and decreased habitat.
- Wildlife movement in Matilija Canyon and along Matilija Creek would be temporarily disrupted by dam and sediment removal activities for a period of up to ten years. Vegetation, including giant reed, would be removed during the early stages, thereafter disrupting wildlife habitat and movement corridors for the duration of the construction. Impacts to wildlife movement would be significant.
- The Proposed Action would result in the removal of approximately 46 acres of open water and emergent wetland habitat artificially created by development of the Matilija Reservoir. Impacts to wetlands and open water would be long-term, permanent, and significant.
- Direct impacts to steelhead may result from the dispersion of sediments into the water column during dam removal and sediment stabilization activities. The majority of fine sediments of silt and clay would be transported to the downstream 94-acre slurry site and stabilized to a 50-year event, and it is expected that after two or three storms the turbidity levels would be no more than twice the natural levels. However, the short-term effects of aggradation during the first two storm events may result in significant impacts to steelhead.
- Allowing sand and gravel to be sold as aggregate over an approximate ten-year period would require the removal of vegetation, including giant reed, during the early stages. Aggregate sales would disrupt wildlife habitat and movement corridors. Impacts to wildlife during the ten-year duration would be significant.
- The demolition and construction activities associated with dam removal, sediment slurrying, and aggregate sale activities would result in the potential loss of individuals of protected and sensitive wildlife species inhabiting the Matilija Dam reservoir area. Impacts would occur for a period of up to 12 years and would be considered significant.

AESTHETICS

- The levees and floodwall along the Live Oaks portion of the river would be raised between 4 and 13 feet. Increasing the height of the levee to nearly 13 feet would result in a substantial blockage of views for a small number of property owners. Because there is little flexibility in shifting the location of the proposed levee and floodwall further from the property lines, the levee and floodwall at this location would result in significant, unmitigable impacts.

- The flood control improvements along Casitas Springs would cross through the west end of a mobile home park. An increase in the levee height to over 13 feet would substantially impact views for the residents of the mobile home park. Due to the proximity of the residences to the river channel, it is unlikely that the alignment of the levee and floodwall could be moved to avoid substantially damaging views from the back of the park, resulting in significant and unmitigable impacts.
- Activities associated with the excavation and sale of aggregate materials from the reservoir area would result in temporarily obstructed views to the Ventura River and temporary deterioration in the aesthetic value of the project area for a period up to ten years. Users of Matilija Road, particularly residents of Matilija Canyon, would contend with approximately 420 trips by large haul trucks per day, degrading the scenic value of this two-lane road that winds through largely pristine wilderness. Temporary impacts resulting from project activities would be significant and unmitigable.

AIR QUALITY

- The Proposed Action would create PM_{10} emissions that could potentially cause new or contribute substantially to existing PM_{10} CAAQS violations. On-site emissions would be generated from construction equipment and vehicles, as well as fugitive dust generated by earth movement and the operation of vehicles on unpaved surfaces. Off-site emissions would also be generated from vehicles transporting workers to and from the job site and from heavy diesel truck trips required to haul equipment and materials to and from the various project construction sites. The air quality impacts from PM_{10} emissions are considered to be significant and unavoidable.

NOISE

- Noise generated from construction, trucking, and giant reed removal activities, as well as operation and maintenance activities, would impact potentially sensitive receptors located upstream of Matilija Dam, along the truck routes, in the vicinity of the flood protections control measures, along the slurry and fresh water pipeline routes, and nearby Robles Diversion Dam, Foster Park, the disposal site, and the desilting basin. Impacts from noise would be significant and unavoidable.

TRANSPORTATION

- The Proposed Action would require hauling dam demolition debris with the use of large heavy trucks. All haul trips would utilize SR 33 through Ojai. The daily and a.m. peak hour trips estimated for heavy-duty vehicles would violate Ventura County LOS standards presented in Section 5.9.1, resulting in significant and unmitigable traffic impacts.

RECREATION

- The use of the Rice Road site for slurry disposal could require a closure of the East/West River Bottom Loop Trails and Riverview Trailhead for at least 12 months. These facilities would likely remain closed to the public until the completion of re-vegetation activities, thereby resulting in significant and unmitigable impacts to recreation facilities.

7.1 INTRODUCTION

Cumulative environmental impacts result from the relationship of the Proposed Action to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from minor, but collectively significant actions undertaken over a period of time and by various agencies or persons. In accordance with the National Environmental Policy Act (NEPA) regulations and the California Environmental Quality Act (CEQA) Guidelines, a discussion of cumulative impacts resulting from actions and projects that are proposed, under implementation, or reasonably anticipated to be implemented in the near future is required.

Federal regulations implementing NEPA (40 C.F.R. §§ 1500-1508) require that the cumulative impacts of a Proposed Action be assessed. NEPA defines a cumulative impact as an "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions" (40 C.F.R. § 1508.7).

CEQA Guidelines require a discussion of significant environmental impacts that would result from project-related actions in combination with "closely related past, present, and probable future projects" located in the immediate vicinity (CEQA Guidelines, § 15130 [b][1][A]). These cumulative impacts are defined as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts" (CEQA Guidelines, § 15355).

Potential cumulative environmental impacts associated with the Proposed Action in conjunction with the other past or reasonably foreseeable projects are discussed in Section 7.3. The discussion addresses the issue areas discussed in Sections 4 and 5 of this EIS/EIR.

7.2 CUMULATIVE ACTIONS

Projects considered to have the potential of creating cumulative impacts in association with the Proposed Action are described briefly below. In each instance, the assessment focuses on addressing two fundamental questions: (1) Does a relationship exist such that the impacts from the Proposed Action might affect or be affected by impacts from other actions? (2) If such a relationship exists, then does an assessment reveal any potentially significant impacts not identified when the Proposed Action is considered alone?

The discussion of cumulative impacts need not provide as great detail as is provided for the project impacts alone, and the discussion should be guided by standards of practicality and reasonableness (CEQA Guidelines §15130[b]). The CEQA Guidelines state that the cumulative effects of related projects may be identified by presenting either (1) a list of past, present, and probable future projects producing related or cumulative impacts, or (2) a summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area-wide conditions contributing to the cumulative impact (CEQA Guidelines §15130[b][1]).

Although the use of either method would satisfy CEQA and NEPA requirements, both options have advantages and disadvantages with respect to use in this EIS/EIR. A list of "related" projects is typically derived from project lists maintained by local jurisdictions and regional agencies. Although such lists can provide a basis for identifying specific impacts at specific locations, a list has a limited lifespan usually extending only into the recent past and near future. Adopted plans on the other hand have the advantage of a longer planning horizon. Although certified environmental documents have been reviewed and considered by the certifying body, the analysis may have become outdated, may no longer be accurate due to changed circumstances or approval of subsequent projects, or may be based on a planning horizon that does not correspond to that of the Proposed Action. Therefore, preparation of the cumulative analysis for this EIS/EIR includes a combination of methods to determine potential cumulative effects:

- A list of regionally significant projects (to assure that known and contemplated projects with the potential for impacts that are cumulatively considerable are analyzed and considered); and
- A summary of projections based on local general plans (and/or an EIR as appropriate) and regional plans.

List of Related Projects

Related projects consist of projects that are reasonably foreseeable and that would be constructed or operated during the life of the Proposed Action. The related projects considered in this environmental analysis consist of land development or public works projects that are planned, approved, or under construction, and could potentially contribute to the same environmental effects as the Proposed Action.

Table 7-1 provides a summary of projects in the general vicinity of the Proposed Action that are either under construction, recently approved, or pending approval from local jurisdictions. This list was compiled based on information obtained from the County of Ventura, City of San Buenaventura, City of Ojai, and other agencies. These projects were included in the list due to their physical proximity to the various improvements along the Ventura River and Matilija Creek associated with the Proposed Action. However, the potential for the impacts of any of these projects to combine with the impacts of the Proposed Action varies depending on the nature of the impacts and the characteristics of the projects.

Projections of Future Growth

Population, housing, and employment growth projections through the year 2025 prepared by the Southern California Association of Governments (SCAG) for Census tracts in the Ventura River watershed area are presented Table 7-2. SCAG is the federally mandated Metropolitan Planning Organization for Los Angeles, Orange, San Bernardino, Riverside, Ventura, and Imperial Counties. SCAG encourages and promotes the coordination and integration of local general plans, subregional plans, and regional plans. To that end, SCAG prepares regional growth projections, among other data, for use by regional decision-makers and to provide consistency of assumptions. SCAG information is useful in policy consistency analysis for regional projects in that it provides a consistent review and evaluation of planning documents and demographic data across multiple jurisdictional boundaries. SCAG's official growth projections for the Ventura River watershed area provide a general indication of the long-term changes that can be expected to occur in the study area over the next twenty years.

Table 7-1: List of Related Projects

Project Name	Location	Description	Status
Ventura River Arundo Removal Demonstration Project	The project is located along the east bank of the Ventura River in Casitas Springs, in Ventura County. Its specific location is in a five-acre linear swath approximately 20 feet west of an existing flood control levee. The area is owned by VCWPD and the City of Ventura	This project evaluates four different Arundo removal techniques within a five-acre parcel of the Ventura River. Removal methods include mechanical removal of the biomass with herbicide application to the stumps, foliar spray application of the biomass, removal of above-ground biomass with herbicide treatment on re-growth only, and mechanical removal of biomass with excavation of root mass. The site is approximately 50 feet wide, and 4,500 feet long.	Construction has been delayed to either Spring or Fall of 2004. Initial Arundo removal would occur with repeat removal treatments and native plant establishment over the following seven years.
Ventura River Bank Protection Upgrade Project	Project is located in an unincorporated area of Ventura County. Specifically, it is located immediately west of the community of Casitas Springs. State Route 33 is parallel to the project site.	Improvements to approximately 5,350 feet of the existing Ventura River levee including raising the levee height by three feet, re-establishing the access road on top of the levee, adding a vehicle turn around at the northern terminus, relocating 210 feet of the Ojai Valley Trail, and installing a flood wall along the levee adjacent to the Arroyo Mobile Home Park.	Construction is estimated to begin in March 2004 and would take (approximately) 6 months to complete. All impacts were reduced to a less than significant level with mitigation measures, except for construction related noise.
Dent Drain Modification Project	Project is located approximately 2.5 miles north of the Pacific Ocean along the east bank of the Ventura River (this is a Ventura County Public Works Project).	This project consisted of operations and maintenance, including relocation of the Dent Drain headwall and flap gate by approximately 56 linear feet east (landward) of its previous location, to prevent future erosion damage to the facility.	Completed in October 2003. All impacts were temporary and no mitigation was required.
Robles Diversion Fish Passage and Facility	The area affected by this project included the following sections of the Ventura River: ▪ 16 miles of mainstream Ventura River from the confluence of North Fork (NF) Matilija Creek and Matilija Creek to the Pacific Ocean ▪ 2 miles of Matilija Creek between its confluence with NF Matilija Creek and the Matilija Dam ▪ 4 miles of lower NF Matilija Creek below the Wheeler George Campground crossing ▪ San Antonio Creek Watershed (approx. 8 miles of habitat)	The Bureau of Reclamation authorized Casitas Municipal Water District to modify the design and operation of the Robles Diversion to allow fish passage through the facility and maintain downstream steelhead habitat. The District intends to implement 1) fish passage facility construction; 2) future operation of the diversion and Fish Passage Facility; 3) diversion and Fish Passage Facility maintenance; 4) interim diversion operation for the 2003 steelhead migration season; 5) implement of a monitoring and evaluation program for the diversion and Fish Passage Facility; and 6) formation of a Cooperative Decision Making Process.	In channel construction is/was schedule to occur seasonally between June 1st and October 31st, and are expected to last two summer seasons, 2003 & 2004.
Thacher Creek	Project is located approximately 400 feet downstream of Avenida del Recreo to approximately 300 feet upstream of Avenida de la Vereda in the Siete Robles Housing Tract.	The proposed project would consist primarily of channel improvements to the existing deteriorating facility.	No information available on construction timeline.
Surfers Point Managed Shoreline Retreat Project	The project is located in the Seaside Park, near the Ventura River estuary, in the City of Ventura.	The proposed project would consists of ▪ the relocation of an erosion-damaged shorefront bike path along 1,800-foot stretch of beach to about 65 feet inland ▪ removal of an erosion-damaged shorefront parking lot and replacement with on-street parking along both sides of Shoreline Drive ▪ restoration of the 65-foot "retreat zone" to a more natural condition	Project is in final design stage. There is no funding yet for construction, however, there is funding for final design and permitting. The final EIR has been certified.
US 101Freeway at California Street Drainage	US 101 at California Street	The project consists of upgrading the California Street/US 101 Freeway drainage facilities, which would include the installation of a clarifier to capture pollution before it reaches the beach. The city would redirect the California Street storm drain to another outfall (no known).	Still in proposal stage(s).

Project Name	Location	Description	Status
Utility Undergrounding – Ojai Avenue	Project is along East Ojai Avenue, between Montgomery Street and Gridley Street (City of Ojai).	The project boundary is approximately 4,800 linear feet. The project will underground existing utilities along E. Ojai Avenue including 17 existing wood power poles and conversion of mounted streetlights. Streetlights will be replaced with concrete marbelites in the same approximate location. Also, 15 overhead service connections will be converted to the new system.	Project was completed 1/2004.
Bryant Street Improvements	Project is located in the City of Ojai, at the intersection of Bryant Avenue at Ojai Avenue and along Bryant Street south of Ojai Avenue.	Control of traffic at the intersection of Ojai Avenue and Bryant Street. Increased traffic along Ojai Avenue makes turning left onto Ojai Avenue from the Industrial Center (Bryant Street) sometimes difficult. Additionally, storm drainage is inadequate and must be upgraded to remedy a safety problem. Lastly, the project will underground existing utilities on Bryant Street.	Project is schedule to be completed sometime during 2004 (no further detail provided by the City of Ojai)
Fulton Street Extension	Fulton Street, in Ojai, CA	The Fulton Street Extension consists of the actual extension of Fulton Rd. from Pearl Street to Bryant Street.	Project is schedule for September 2004.
Willow Street Extension	Willow Street, in Ojai, CA	The project would extend Willow Street, from Fox Street to Montgomery Street.	Project is schedule for September 2004.
Community Pool Planning	Project is located at Libbey Park in the City of Ojai.	Preliminary planning for construction of a community sports and recreation pool.	Project is schedule to be completed sometime during 2004 (no further detail provided by the City of Ojai).
Los Arboles Townhomes	Montgomery Street, in Ojai, CA	The project entails the development of 23 single/multi-family units.	The project is schedule to be completed on September 2004.
State Route 33 – Casitas Springs	State Route 33, at Casitas Springs.	California Department of Transportation proposes to widen the current State Route to four lanes. A possible bypass has also been proposed.	The project has not yet been approved.
US 101 Freeway – Ventura	US 101 Freeway, between Padre Juan and Punta Gorda.	California Department of Transportation proposes to do payment rehabilitation along the US 101 Freeway in Ventura County, between Padre Juan and Punta Gorda. This project is funded under the State Highway Operation and Protection Program.	The project has been approved and it is currently under design. The design is schedule to be completed Summer 2004.
US 101 Freeway – Ventura	US 101 Freeway, Mussel Shoals/ La Conchita.	California Department of Transportation proposes to complete access improvements along US 101 Freeway at Mussels Shoals/ La Conchita. This project is partially funded under the State Transportation Improvement Program.	The project has been approved and it is under design. The design is schedule to be completed Spring 2006.
State Route 150	State Route 150, at Santa Ana Canyon Road & Loma Drive, in Ventura County.	California Department of Transportation proposes to do payment rehabilitation along State Route 150, between Santa Ana Canyon Road and Loma Drive. This project is funded State Highway Operation and Protection Program.	This project has been approved and is it currently under design. The design is scheduled to be completed Spring 2006.
State Route 150	State Route 150, at Coyote Creek Bridge, in Ventura County.	California Department of Transportation proposes to upgrade the bridge rails of the Coyote Creek Bridge, along State Route 150. This project is funded un the State Highway Operation and Protection Program.	This project has been approved and is it currently under design. The design is scheduled to be completed Fall 2004.
State Route 150	State Route 150, at Santa Ana Creek Bridge, in Ventura County.	California Department of Transportation proposes to widen and install bridge rails at Santa Ana Creek Bridge, located along State Route 150. This project is funded under the State Highway Operation and Protection Program.	This project has been approved and is it currently under design. The design is scheduled to be completed Fall 2004.
State Route 150	State Route 150, at San Antonio Creek Bridge, in Ventura County.	California Department of Transportation proposed to replace and upgrade the San Antonio Creek Bridge, located along State Route 150. This project is funded under the State Highway Operation and Protection Program.	This project has been approved and is it currently under design. The design is scheduled to be completed Spring 2005.
State Route 150	State Route 150, at Lion Canyon Creek Bridge, in Ventura County.	California Department of Transportation proposes to replace the bridge, located along State Route 150. This project is funded under the State Highway Operation and Protection Program.	This project has been approved and is it currently under design. The design is scheduled to be completed Fall 2005.

Table 7-2: Regional Growth Projections

	1997	2000	2005	2010	2015	2020	2025	Percent Increase (2005 to 2025)
Total Population	56,167	57,221	58,985	62,525	65,503	67,731	70,046	19%
Total Households	20,597	21,007	21,689	22,597	23,539	24,524	25,344	17%
Total Employment (Persons)	15,011	15,901	17,295	18,804	19,630	20,269	21,051	22%

Source: Southern California Association of Governments.

7.3 DISCUSSION OF POTENTIAL CUMULATIVE EFFECTS

Potential cumulative impacts associated with the construction and operation of the Matilija Dam Ecosystem Restoration Project are discussed below for each issue area.

Earth Resources

The types of Earth Resources impacts that would occur with the Matilija Dam Ecosystem Restoration Project would mostly be related to project construction. The likelihood of soil instability, erosion, and sediment deposition would increase with additional construction of all projects listed in Table 7-1 due to earth movement and soil disturbance associated with construction activities.

If contaminated soils were discovered at the project site, any cleanup and disposal of contaminated soil and/or groundwater resulting from construction of the Proposed Action and from other projects would be a beneficial impact. Clean up of contaminated sites related to other projects could become an adverse impact if the combined volume of contaminated soil requiring treatment from the Matilija Dam Ecosystem Restoration Project and other projects exceeds the capacity of the available treatment facilities.

Identifying the available capacity of treatment facilities that would be used by the Proposed Action if contamination is discovered at the time of project construction and determining the volume of contaminated material that would be handled by these facilities is difficult. Additional approved and pending projects not listed in the cumulative scenario due to distance from the project could also impact the capacity of hazardous waste treatment facilities during construction of the Proposed Action. However, initial testing and geotechnical field investigations performed by the U.S. Bureau of Reclamation in March 2002 did not find any contaminated soil behind the dam, and so with implementation of the mitigation measures in this EIS/EIR, effects of the Proposed Action would not be cumulatively considerable.

Hydrology and Water Resources

Although the Proposed Action could contribute to water quality, erosion, or flood hazard impacts along with a number of projects along the Ventura River, including the following:

- Ventura River Arundo Removal Demonstration Project
- Ventura River Bank Protection Upgrade Project
- Dent Drain Modification
- Robles Diversion Fish Passage Facility

The majority of these projects will be completed by the time construction on the Proposed Action commences, so water quality impacts resulting from construction activities would not be cumulatively considerable. It is not expected that any of the listed projects would result in permanent or long-term water quality impacts following the completion of their construction. As the impacts resulting from the Proposed Action would be less than significant or mitigated to less-than-significant levels, the project would not contribute to considerable cumulative impacts.

The Proposed Action would result in impacts to groundwater and surface water supplies, but includes features that would ensure that these impacts would be less than significant. While the projects listed above along the Ventura River could contribute to water supply impacts due to degradations in water quality or interference with water conveyance, most of the other projects listed are infrastructure projects away from the Ventura River that would not impact water supplies. The construction and operation of the Los Arboles Townhomes, however, could contribute to depletion of local water supplies. As impacts to groundwater and surface water supplies under the Proposed Action would be less than significant, the Proposed Action would not contribute to cumulatively significant impacts.

Biological Resources

Construction projects that reduce the quantity of riparian, wetland and upland habitat simultaneously have the potential to increase impacts to species region wide. Multiple projects within a watershed may also limit movement of wildlife or interfere with breeding activities. Species that utilize riparian habitat for nesting including least Bell's vireo and yellow-breasted chat could be most directly affected by multiple projects. Activities that disrupt the channel such as the construction of the Robles Diversion Dam Fish Ladder and possibly giant reed removal may pose potential cumulative impacts to species such as Steelhead, red-legged frog and southwestern pond turtles.

Disturbance and loss of habitat caused by construction adjacent to the channel or local maintenance of roads and utilities identified in Table 7.1, in addition to that caused by giant cane clearing would be a constant and unavoidable occurrence. Although disturbances within the channel would not occur in areas occupied during the breeding or nesting season by special status species, they can have indirect effects by disturbing or removing vegetation in addition to that affected by the Proposed Action. Repeated disturbance within the channel would likely have an additional effect on local populations; however all of these activities are temporary, localized and of short duration. Revegetation is a minimum compensation requirement for these projects. As long as there is suitable adjacent habitat, repopulation of affected areas is likely to occur as rapidly as vegetation reaches suitable structural and cover characteristics. In addition, most of these projects will have concluded several years prior to Dam removal and some, including giant reed removal and the Robles Diversion Dam Fish Ladder, will ultimately lead to beneficial impacts habitat and aquatic species in the Ventura River.

Cumulative impacts to the least Bell's vireo, southwestern willow flycatcher, and other special status birds are not likely to result in significant impacts to these species. Southwestern willow flycatcher has not been identified within this watershed and current populations of least Bell's vireo and yellow-breasted chat are minimal. Giant reed removal and other projects associated with riparian habitats would be scheduled outside the breeding season and the giant reed removal project is specifically designed to remove exotic riparian vegetation and enhance the establishment of native species. Although temporary impacts to adjacent riparian habitat may occur there are many areas that may provide sufficient habitat for the species to compensate for the losses induced by the project and other sources of disturbance within the channel.

Cumulative impacts to steelhead, California red-legged frogs, southwestern pond turtle, arroyo chub, and tidewater goby, may occur through short-term loss of habitat or incremental disturbance through human encroachment, noise or reduction in water quality. However, as discussed above, giant reed removal and the Robles Diversion Dam Fish Ladder are enhancement projects and would provide either net ecological benefits to many of these species or result in no additional significant impacts over time. The levee maintenance and expansion project and the repairs to Dent Drain identified in Table 7.1 are not likely to result in additional cumulative impacts to these species as these sites are located adjacent to the main channel of the Ventura River. Therefore, the Proposed Action would not contribute to cumulatively significant impacts to biological resources.

With regard to the overall development trends within the Ventura River watershed, the removal of the Matilija Dam, The Robles diversion dam fish ladder, and the giant can removal project are actions that would be expected to result in long-term benefits to biological resources in the area. Specifically, the removal of up and downstream barriers to anadromy for the endangered steelhead, the establishment of a continuous wildlife corridor past Matilija Dam, and the return of mature riparian vegetation within the Ventura river and Matilija Creek would help restore the biological functions and values associated with a more natural riverine system. Thus, from a cumulative impact standpoint, the Proposed Action would incrementally help offset the adverse effects of previous activities and other construction within the River. Therefore, the Proposed Action would not contribute to cumulatively significant impacts to biological resources.

Cultural Resources

The loss or degradation of individual cultural sites and resources diminishes the cumulative scientific and cultural value of such resources in the region. Various prehistoric and historic cultural resources are known to exist in the Ventura River watershed and the potential exists for the discovery of additional cultural resource sites in the future. Therefore, the Proposed Action and other projects in the watershed have the potential to result in the disturbance of cultural resource sites. The loss of additional resources, either by the Proposed Action or other projects, could result in significant adverse cumulative impacts on cultural resources, especially for any sites that have not been fully evaluated and recorded. The impact on cultural resources from the implementation of the Proposed Action would be reduced to a less-than-significant level through the application of the mitigation measures presented in Section 5.4. Therefore, the Proposed Action would not contribute to cumulatively significant impacts to cultural resources.

Aesthetics

The Proposed Action could potentially contribute cumulatively with the projects listed in Table 7-1 to local aesthetic resources in a negative manner. The Proposed Action, along with a number of the other projects in the study area would cumulatively enhance the aesthetics of the region. The giant reed eradication proposed as part of the Proposed Action would provide a beneficial contribution along with the Ventura River Arundo Removal Demonstration Project. The combination of the actions taken together to eliminate giant reed from along the Ventura River would help to return open space along the river to a more natural state, enhancing the aesthetic qualities of the riverbanks.

The levee and floodwall improvements under the Proposed Action would increase the height of a number of levees and floodwalls adjacent to residential properties, resulting in significant impacts. The significant impacts resulting from the raising of the Casitas Springs levee would combine with the Ventura River Bank Protection Upgrade Project which would also raise the Casitas Springs levee. Although the Upgrade Project includes mitigation to reduce the aesthetic impacts to less-than-significant levels, taken together, these projects would be cumulatively considerable.

Although the Proposed Action would result in significant, unmitigable impacts on its own, none of the other projects listed in Table 7-1 would cumulatively combine with the Proposed Action to affect the aesthetic quality in the study area, largely because of their locations outside the study area. For the other projects within the study area, such as the Dent Drain Modification Project, located on the banks of Ventura River, and the Robles Diversion Fish Passage Facility, in the immediate vicinity of Robles Diversion, the project activities are largely screened from the views of residential and recreational viewers and so would not result in any significant aesthetic impacts combined with the Proposed Action.

Air Quality

Although the majority of the cumulative projects listed in Table 7-1 have or will have been completed by the time the Proposed Action would be implemented, there is a potential that cumulative air quality impacts could occur if the other construction projects would be active near any of the active project sites that make up the Proposed Action. Of the air quality significance criteria being evaluated, the only one with a potential cumulative effect is the first significance criteria concerning the causing or contributing to ambient air quality standards. There would be the potential of cumulative near-field PM_{10} impacts adjacent to the project sites and adjacent to the primary transportation routes used to haul materials. All feasible PM_{10} mitigation has already been proposed and the PM_{10} impacts from the project would be significant and unavoidable; therefore, any additional impact from the cumulative projects would be considered significant.

Noise

Cumulative noise impacts would occur if other construction projects adjacent to the Proposed Action sites were to be implemented simultaneously with the construction of the Proposed Action. Additionally, roadway construction projects occurring during the construction of the Proposed Action could potentially affect the flow of project-related traffic and would therefore contribute to cumulative noise impacts. Refer to Table 7-1 for a list of projects identified in the vicinity of the Proposed Action. Of those projects identified, only the Ventura River Arundo Removal Demonstration Project (VRARDP) would potentially occur simultaneously to the proposed project and within the vicinity of the project, specifically the Casitas Springs levee/floodwall/levee site. However, construction of the Casitas Springs levee/floodwall/levee would be short-term in nature and would be expected to occur several years after the start of the VRARDP, when only intermittent repeat arundo removal treatments and native plant establishment would occur. As such, construction/maintenance activities associated with the VRARDP would not be likely to occur simultaneously to the construction of the Casitas Springs levee/floodwall/levee. Therefore, cumulative noise impacts as a result of construction associated with the proposed project would not be expected to occur.

Operations and maintenance activities associated with the proposed project would occur in Matilija Creek, Robles Diversion Dam, along the levees and floodwalls, and the slurry disposal site and desilting basin. None of the projects identified in Table 7-1 would occur in these areas, therefore cumulative noise impacts from operations and maintenance activities would not occur.

Socioeconomics

Although the majority of the projects listed in Table 7-1 would likely be completed by the time the proposed action begins in 2007, construction on the Proposed Action could occur at the same time as construction for the Surfers Point Managed Shoreline Retreat Project, the US 101 Freeway at California Street Drainage, or other potential future projects. Overlapping construction schedules could create a demand for workers, but the large number of available workers in Ventura, Santa Barbara, and Los Angeles Counties would be able to accommodate the demand. It is not expected that this demand for labor would displace people or housing. The Proposed Action would not contribute to a cumulatively considerable impact.

Although a few commercial operations would be affected and a number of residences would be displaced by the construction and operation of the proposed action, these impacts to were found to be less than significant. The projects listed in Table 7-1 are largely restoration and infrastructure improvement projects. While these projects could temporarily disrupt or displace local homes or businesses, most of the projects would benefit local businesses and residents. Although the projects could potentially result in impacts, the proposed action’s contribution to any cumulative impacts would be less than significant.

The environmental justice analysis for the Proposed Action found that, based on the demographic information for the study area, no environmental justice impacts would occur. Based on the demographics for Ventura County, it is unlikely that the other projects listed in Table 7-1 would result in environmental justice impacts. While it is possible than an environmental justice impact could occur as a result of one of the projects listed, the Proposed Action would not contribute to any cumulatively significant impacts.

Transportation

Although the majority of the cumulative projects listed in Table 7-1 have or will have been completed by the time the Proposed Action would be implemented, there is a potential that traffic impacts would occur if other construction projects that would utilize the SR 33 corridor were to be implemented at the same time as the Proposed Action. Additionally, roadway construction projects occurring during the construction of the Proposed Action could potentially affect the flow of project-related traffic and would therefore contribute to cumulative traffic impacts. According to the Ventura County Level of Service standards, if a project would add one or more a.m. southbound or p.m. northbound peak hour trips to SR 33 between the northerly end of the Ojai Freeway and the City of Ojai limits, the project would be considered as contributing a significant cumulative impact on SR 33. Because all of the action alternatives would result in one or more a.m. southbound or p.m. northbound peak hour trips to SR 33 between the northerly end of the Ojai Freeway and the City of Ojai limits, cumulative impacts associated with the Proposed Action would be considered significant.

Land Use

The Proposed Action is consistent with all land use plans, policies, and regulations, and combined with the other projects listed in Table 7-1, would not be cumulatively inconsistent with the land use plans, policies, and regulations adopted for the region.

The Proposed Action includes a number of components which have the potential to divide or disrupt established communities, including the improvements to the levees and floodwalls, purchase and removal of the Matilija Hot Springs and Camino Cielo structures, installation of the locally preferred desilting basin, and installation of the slurry disposal site. Impacts from all of these are considered to be less than significant, and taken with the projects listed in Table 7-1, would not be cumulatively considerable. Although the Proposed Action builds on to the Ventura River Bank Protection Upgrade Project, as this levee is located on the outskirts of Casitas Springs, the proposed action and upgrade project combined would not result in a cumulatively considerable disruption or division of the community. None of the other projects listed could combine with the components of the Proposed Action to disrupt or divide a community.

No significant impacts resulting from the conversion of Prime or Unique Farmland or Farmland of Statewide Importance to non-agricultural uses were identified for the Proposed Action. While it is possible that other projects in the area could result in these impacts to farmland, the Proposed Action would not considerably contribute to a cumulatively significant impact.

Recreation

The Proposed Action would eventually result in the long-term beneficial impacts to the study area, but would contribute to short-term significant, temporary disruptions of recreational activities. The Proposed Project would not, however, contribute to a cumulatively significant degradation, loss, or displacement of recreation facilities. To the contrary, the Proposed Action would combine with a number of the other projects listed in Table 7-1, including the Surfers Point Managed Shoreline Retreat Project and the Community Pool Planning to provide a beneficial impact to regional recreation resources.

Construction for the Proposed Action is to scheduled to begin in 2007, approximately three years after construction for the projects listed in Table 7-1. Due largely to this difference in construction schedules, the Proposed Action would not contribute cumulatively to any impacts resulting from risks to recreation users caused by the listed projects. Although the Proposed Action would result in significant, unmitigable impacts due to facility closures because of construction, it would not contribute cumulatively to any significant facility closure impacts caused by construction of the listed projects.

8. MITIGATION MEASURES/ENVIRONMENTAL COMMITMENTS

The mitigation measures presented in Section 5 (Environmental Consequences of Proposed Action and Alternatives) to reduce or avoid the potentially significant impacts of the Proposed Action are listed below. These mitigation measures are also presented in the Mitigation Monitoring Plan in Appendix J.

EARTH RESOURCES

ER-1 **Implement Best Management Practices (BMPs).** An erosion control and sediment transport control plan shall be prepared in association with the SWPPP and the revegetation plan. This plan shall be prepared in accordance with RWQCB guidelines and other applicable BMPs. Implementation of the plan will help to reduce erosion and sediment degradation. The plan will designate BMPs that will be followed during construction activities. Erosion-minimizing efforts may include measures such as avoiding excessive disturbance of steep slopes; using drainage control structures (e.g., coir rolls or silt fences) to direct surface runoff away from disturbed areas; strictly controlling vehicular traffic; implementing a dust-control program during construction; restricting access to sensitive areas; using vehicle mats in wet areas; and revegetating disturbed areas following construction.

ER-2 **Reduce off site erosion.** During excessive wet and muddy site conditions, the contractor shall implement wheel washing strategies and street cleaning in the project vicinity to reduce off-site erosion from construction vehicles leaving the sites.

ER-3 **Observe exposed soil.** During trenching, grading, or excavation work for the project, the contractor shall observe the exposed soil for visual evidence of contamination. If visual contamination indicators are observed during construction, the contractor shall stop work until the material is properly characterized and appropriate measures are taken to protect human health and the environment. The contractor shall comply with all local, State, and federal requirements for sampling and testing, and subsequent removal, transport, and disposal of hazardous materials. In the event that evidence of contamination is observed, the contractor shall document the exact location of the contamination and shall immediately notify the Corps of Engineers' construction manager. The Corps shall be responsible for formulating and implementing plans to characterize and remediate any contamination encountered during construction. These plans shall specify procedures for monitoring, identifying, handling, and disposing of hazardous waste in accordance with federal and State regulations.

ER-4 **Hazardous substance control.** The Corps of Engineers, or its construction contractor, shall prepare a Hazardous Substance Control and Emergency Response Plan that will include preparations for quick and safe cleanup of accidental spills. The Plan will prescribe hazardous-materials handling procedures to reduce the potential for a spill during construction, and will include an emergency response program to ensure quick and safe cleanup of accidental spills. The plan will identify areas where refueling and vehicle-maintenance activities and storage of hazardous materials, if any, will be permitted.

BIOLOGICAL RESOURCES

B-1 **Pre-Construction biological surveys.** The Corps shall conduct pre-construction protocol-level surveys for Least Bell's Vireo and Southwestern Willow Flycatcher. In addition, pre-construction surveys shall be conducted for sensitive birds, active nests or roosts in riparian areas that would be subject to project disturbance. If active nests are located, birds shall be flushed prior to construction activities or nests shall be avoided until the young have fledged. Qualified biologists familiar with species known to inhabit the Ventura River shall be utilized to conduct the surveys.

B-2 **Pre-Construction plant surveys.** The Corps shall conduct pre-construction surveys for special-status plant species within all areas subject to project disturbance.

B-3 **Capture and relocate.** The Corps shall design and implement a capture and relocation program for California red-legged frog, southwestern pond turtle, and two-striped garter snake prior to construction activities in Matilija Lake, Matilija Creek, and the Ventura River.

B-4 **Agency coordination.** The Corps shall immediately contact the appropriate regulatory agencies (Corps, VCWPD, CDFG, and USFWS) if federally- or State-listed or otherwise sensitive flora and fauna are identified during pre-construction surveys. The Corps shall coordinate with the appropriate agencies to develop and institute avoidance, minimization, and mitigation measures prior to proceeding with project construction.

B-5 **Restricted initial clearing.** The Corps shall conduct initial clearing of open water, freshwater marsh, and riparian habitats in Reach 7 outside of the breeding season (September 15 through March 15). Clearing of riparian vegetation for levee construction shall be conducted between September 15 and March 15.

B-6 **Fueling.** The construction contractor shall conduct all fueling and maintenance activities a minimum of 100 feet from riparian and wetland habitats or in areas where accidental fuel spills may flow into waters of the state.

B-7 **Construction monitoring.** The Corps shall have a qualified biologist present when conducting clearing and grading operations at Matilija Lake, slurry disposal sites, levee locations, and during the removal of giant reed in riparian habitat. The monitor shall move or flush non-sensitive wildlife away from project construction to the extent practicable.

B-8 **Downstream monitoring.** The USACE shall conduct monitoring of downstream reaches of Matilija Creek and the Ventura River on a quarterly basis during the first two years of construction activity and twice annually for the duration of construction. Monitoring shall be conducted to document riparian and wetland habitat, and shall note the presence of benthic invertebrates, amphibians, reptiles, fishes, birds, and mammals.

B-9 **Worker training and Best Management Practices.** The USACE shall conduct a Worker Environmental Awareness Plan (WEAP) prior to construction and implement related best management practices (BMPs) to reduce downstream impacts from sediment-laden water. The WEAP shall identify any sensitive biological or cultural resources known to occur in the project area, the appropriate BMPs required to reduce water quality impacts, and appropriate trash disposal and maintenance locations.

B-10 **Trash removal.** The Contractor shall ensure that food and trash are stored in sealed containers and removed from the job site on a weekly basis.

B-11 **Giant Reed Eradication.** The Corps shall develop and execute a giant reed eradication program that includes monitoring during post deconstruction restoration activities. Eradication efforts shall begin prior to the dam removal in Reach 7, 8, and 9, continuing throughout the downstream reaches immediately afterwards. The Giant Reed Eradication Plan shall be submitted to the CDFG and USFWS for review and comment prior to implementation. The plan shall include measures to prevent permanent or temporary impacts to wetlands and associated sensitive vegetation and wildlife during herbicide treatments of giant reed. The plan shall ensure that all activities requiring herbicide treatment would:

- Ensure that herbicides are not applied during the wet season (November 1st to April 15th) to avoid potential impacts to downstream vegetation where feasible, and to avoid impacts to fish and wildlife species.
- Ensure that only water-safe and surfactant-free herbicides are used. Treatments shall use a glyphosate-based herbicide including Rodeo® and/or Aquamaster®, both of which are labeled for use within water
- Ensure that herbicides are applied at concentrations that are considered safe for biological resources within and adjacent to the project area.
- Ensure that herbicides are mixed with a non-toxic water soluble dye of low toxicity that highlights treated areas
- Minimize overspray of herbicides onto non-target species by restricting herbicide spraying when wind velocities exceed 6 mph
- Minimize trampling of native vegetation by establishing marked trails prior to project implementation
- Remove dead giant reed material that was foliar treated and left in place to avoid fire hazard potential prior to the beginning of the fire season. Material shall be removed when spring access is permitted and before the ensuing fire season begins (between April 15 and the beginning of the fire season)
- Have a licensed professional conduct or oversee herbicides applications

B-12 **Predator removal plan.** The Corps shall develop and implement a predator eradication plan in consultation with the CDFG and USFWS. The plan shall include specific measures to reduce the number of aquatic predators in Matilija Reservoir and minimize the potential for release of these species downstream during dam removal.

B-13 **Restoration plan.** The Corps shall develop and implement a Habitat Restoration Program for all areas disturbed by project construction including giant reed removal.

B-14 **Oak and walnut replanting.** The Contractor shall replace any native oaks or California black walnut trees removed during project construction.

B-15 **Pre-Construction bat surveys.** The Corps shall conduct pre-construction surveys for sensitive bats at the Santa Ana Bridge and any other structures that may house suitable roosting habitat for this species. If bats are located in the structure, construction would be scheduled to occur outside of the breeding season.

B-16 **Development of an Operations and Maintenance Program.** The Corp shall develop and execute an Operation and Maintenance Program limiting the potential of long-term and short-term impacts to sensitive flora and fauna. The Maintenance Program would be submitted to the CDFG and USFWS for review and comment prior to implementation. At a minimum the following items shall be included in the maintenance program:

- Utilize existing access roads and ramps for all maintenance activities unless by foot or authorized by the appropriate regulatory agencies
- Ensure that only water-safe and surfactant-free herbicides are used. Treatments would use a glyphosate-based herbicide including Rodeo® and/or Aquamaster®, both of which are labeled for use within water
- Ensure that herbicides are applied at concentrations that are considered safe for biological resources within and adjacent to the project area.
- Ensure that herbicides are mixed with a non-toxic water soluble dye of low toxicity that highlights treated areas
- Minimize overspray of herbicides onto non-target species by restricting herbicide spraying when wind velocities exceed 6 mph
- Have a licensed professional conduct or oversee herbicides applications
- Ensure that herbicides are not applied to ponded features within the 15-feet width to avoid potential impacts to fish and wildlife species.
- Remove trash and debris cleared from culverts from the streambed to avoid potential direct impacts from debris being dislodged and carried downstream or by creating water quality impacts for aquatic species
- Maintain access roads outside of breeding season when repair areas are within 300-feet of known breeding pairs of least Bell's vireo, southwestern flycatcher, California gnatcatcher or other sensitive nesting species.
- Use proper BMPs when maintaining access roads and ramps including regrading and repaving
- Inspect levees, roads, and ramps on a regular basis and repair small problems to limit the possibly of a large failure that would require extensive repair and potential damage to sensitive habitat.

CULTURAL RESOURCES

CR-1 **Survey for historic or prehistoric resources**. A field survey of the slurry line, disposal site, levee sites, bridge removal locations, and other previously unsurveyed features will be conducted. If any historic or prehistoric resources are found, additional National Register of Historic Places evaluations will be made.

CR-2 **National Register of Historic Places Evaluation.** A test excavation and National Register of Historic Places evaluation shall be conducted of historic/prehistoric site COE#1, COE#2, and others that may be identified by additional surveys. If any are evaluated, and determined to be eligible for the National Register of Historic Places, mitigation measures shall be developed and agreed to in a memorandum of agreement. This document would be developed between the California State Historic Preservation Officer, the Corps and local sponsors. Federally Recognized Tribes and interested Native American groups would be invited to participate as concurring parties to the agreement. These procedures shall follow the requirements of Section 106 of the National Historic preservation Act, as implemented by 36 CFR 800.

CR-3 **Develop discovery plan for previously unknown resources.** A discovery plan shall be developed in consultation with the State Historic Preservation Officer pursuant to 36 CFR

800.13(b) to treat previously unknown resources found during implementation of the project. It shall include procedures to monitor and treat cultural resources discovered during mechanical and natural removal of sediment behind Matilija Dam. It would also include procedures for discoveries made during grading and earth moving activities.

CR-4 **Consultation with Native American Tribes.** Consultation shall be conducted with Native American Tribes and groups to obtain their concerns with the potential to impact Traditional Cultural Places, and other resources of importance to them.

AESTHETICS

AE-1 **Adjust alignment of levees and floodwalls to allow vegetative screening of flood control improvements.** Final levee and floodwall alignments along residential properties at Meiners Oaks and along SR 33 at Camino Cielo shall be designed to be set back from the properties and road ROW to allow vegetation to screen views of the flood control improvements. The distance of the setback would be determined at each location based on site feasibility, but shall be such that views of the levees and floodwalls are partially to completely obscured by intervening vegetation.

AE-2 **Screen levees and floodwalls with vegetation planting.** Levees and floodwalls adjacent to SR 33 at Camino Cielo and the Rice Canyon Trail in Meiners Oaks shall be screened from view by the planting of native vegetation. Vegetation selected for screening shall consist native species appropriate to the location and approved by a qualified biologist familiar with species known to inhabit the Ventura River. Species selected must be chosen and maintained to achieve a height as tall or taller than the levee/floodwall height at maturity. Planting of screening vegetation shall be initiated as soon as possible during levee/floodwall construction and shall achieve a minimum of 50% screening of the levee/floodwall within 10 years of project initiation. The goal of the screening should be to maintain the natural character of the remaining area and to screen the levees and floodwalls to the maximum feasible extent. An aesthetic screening plan would be submitted to the Corps by the construction contractor at least 90 days prior to construction and would include, but not be limited to:

- A list of proposed tree and shrub species and sizes and a discussion of the suitability of the plants for the site conditions and mitigation objectives;
- Maintenance procedures, including any needed irrigation; and
- A procedure for replacing unsuccessful plantings.

AE-3 **Create trails over the Rice Road slurry disposal site following re-vegetation of site.** Prior to completion of slurry disposal activities and re-vegetation of the site, the Corps shall design a system of trails over the completed, re-vegetated site along with a re-vegetation plan for the site. The Ojai Valley Land Conservancy shall be consulted on appropriate trail routes to replace the trails covered by the slurry. Final trail designs and re-vegetation plans shall be submitted to the Ojai Valley Land Conservancy for approval at least 60 days prior to commencement of revegetation activities. Trail route construction shall commence in tandem with revegetation activities and shall be completed to the same level of quality as currently exist on the site or better.

AE-4 **Reduce visibility of project activities and equipment.** If visible from nearby residences, roadways, or recreation facilities, project construction sites, as well as all staging, material, and equipment storage areas shall be visually screened with temporary screening fencing. Fencing shall be of an appropriate design and color for each specific location. All evidence of project activities, including ground disturbance due to staging or storage areas, shall be removed and all disturbed areas shall be returned to an original or improved condition upon completion of project activities including the replacement of any vegetation or paving removed during construction.

AIR QUALITY

A-1 **Limit engine idling.** Prohibit private vehicle engine idling in excess of two minutes, restrict diesel engine idle time, to the extent practical, to no more than 10 minutes.

A-2 **Low-emission diesel engines.** Require the use of certified low emission diesel engines (i.e., CARB/EPA Tier 1, 2, 3, or 4 certified off-road equipment) for diesel off-road equipment and cutterhead dredge pump engines, with the minimum requirement being CARB/EPA Tier 1 engines.

A-3 **Limit use of internal combustion engines.** Utilize electrical power from the grid rather than internal combustion engines or internal combustion electric power generators for all stationary equipment, such as, the stationary water pumps, and slurry pumps (except the dredge engines).

A-4 **Low-emission vehicles.** Utilize low-emission on-road construction fleet vehicles, if available.

A-5 **NO_x emission offset.** Provide NO_x emission offset to fully offset the project emissions when they are predicted to be more than 25 tons per year.

A-6 **Watering areas to reduce dust.** Pre-grading/excavation activities shall include watering the area to be graded or excavated before commencement of grading or excavation operations. Application of water (preferably reclaimed, if available) should penetrate sufficiently to minimize fugitive dust during grading activities.

A-7 **Controlling fugitive dust.** Fugitive dust produced during grading, excavation, and construction activities shall be controlled by the following activities:

- All trucks shall be required to cover their loads as required by California Vehicle Code §23114.
- Sweep streets at the end of the day if visible soil material is carried onto adjacent public paved roads (recommend water sweepers with reclaimed water)
- Install wheel washers where vehicles enter and exit unpaved roads onto paved roads, or wash off trucks and any equipment leaving the site each trip
- Pave construction roads that have a traffic volume of more than 50 daily trips by construction equipment, 150 daily trips for all vehicles
- Pave all construction access roads for at least 100 feet from the main road to the project site
- Pave construction roads that have a daily traffic volume of less than 50 vehicular trips

- All graded and excavated material, exposed soil areas, and active portions of the construction site, including unpaved on-site roadways, shall be treated to prevent fugitive dust. Treatment shall include, but no necessarily be limited to, periodic watering, application of environmentally safe soil stabilization materials, and/or roll-compaction as appropriate. Watering shall be done as often as necessary and reclaimed water shall be used whenever possible.

A-8 **Dust stabilization.** Graded and/or excavated inactive areas of the construction site shall be monitored by the construction contractor at least weekly for dust stabilization. Soil stabilization methods, such as water and roll-compaction, and environmentally safe dust control materials, shall be periodically applied to portions of the construction site that are inactive for over four days. If no further grading or excavation operations are planned for the area, the area should be seeded and watered until grass growth is evident, or periodically treated with environmentally-safe dust suppressants, to prevent excessive fugitive dust.

A-9 **Traffic signs.** Signs shall be posted onsite that limit traffic to 15 miles per hour or less.

A-10 **Excessive winds.** During period of high winds (i.e., wind speed sufficient to cause fugitive dust to impacts adjacent properties), all clearing, grading, earth moving, and excavation operations shall be curtailed to the degree necessary to prevent fugitive dust created by on-site activities and operations from being a nuisance or hazard, either off-site or on-site activities and operations from being a nuisance or hazard, either off-site or on-site. The site superintendent/ supervisor shall use his/her discretion in conjunction with the APCD in determining when winds are excessive.

A-11 **Street sweeping.** Adjacent streets and roads shall be swept at least once per day, preferably at the end of the day, if visible soil material is carried over to adjacent streets and roads.

A-12 **Respiratory protection.** Personnel involved in grading operations, including contractors and subcontractors, should be advised to wear respiratory protection in accordance with California Division of Occupational Safety and Health regulations.

A-13 **Valley Fever.** Valley Fever mitigation measures shall be implemented to the extent necessary and feasible. An assessment of the various project areas and their construction activities will be performed by a qualified medical professional or toxicologist prior to ground disturbance and appropriate feasible mitigation, including the consideration of the Valley Fever mitigation measures recommended in the 2003 Ventura County Air Quality Assessment Guidelines, shall be implemented as deemed necessary to mitigate potentially significant impacts.

NOISE

N-1 **Limit hours of hand-held equipment use.** Use of loud hand-held construction equipment, such as chain saws, heavy-duty construction equipment, and trucks shall not occur between the hours of 7:00 p.m. and 7:00 a.m., except for dredging, slurrying, and associated water conveyance activities, which are planned to occur 24 hours a day, 7 days a week.

N-2 **Limit hours of heavy-duty equipment use.** Within the City of Ojai, use of heavy-duty construction equipment or trucks shall not occur between the hours of 7:00 p.m. and 10:00 a.m.

N-3 **Use of muffler equipment.** Construction equipment shall be operated with standard factory silencer and/or muffler equipment. Equipment engine covers shall be in place and mufflers shall be in proper working order.

N-4 **Locate haul routes away from sensitive receptors.** Haul routes, staging areas, and construction activities shall be located to avoid noise impacts to sensitive receptors (schools, hospitals, residential areas, etc.), whenever possible. If necessary, noise curtains or shields shall be implemented to reduce noise levels to the extent feasible.

N-5 **Use of electric motors.** The construction contractor shall use electric motors to the extent feasible for all stationary equipment (i.e., pumps). Stationary equipment located at Lake Casitas shall be enclosed to limit impacts to recreational users.

N-6 **Controlled blasts.** All blasts at Matilija Dam shall be controlled. Records detailing each individual blast shall be maintained and available onsite.

N-7 **Use of hearing protection.** Hearing protection shall be provided to all worksite personnel during blasting operations, and as needed for general construction activities to meet the requirements of OSHA standards (29 CFR 1910.95, Subpart G) and U.S. EPA standards. In the event of complaints by worksite personnel, a Noise Monitoring Program shall be implemented as discussed in OSHA 29 CFR 1910.95, Subpart G, Appendix G.

N-8 **Public notice of construction.** The construction contractor shall provide advance notice of the start of construction for the project to all residences within one mile of the main construction area (i.e., Matilija Dam), and those residences adjacent to the downstream flood protection improvements (levees, floodwalls, and bridges). The announcement shall state specifically where and when construction will occur and provide contact information for public questions or comments. The construction contractor shall serve as the contact person in the event that noise levels during construction become disruptive to local residents. A sign shall be posted at the various sites with the contact phone number, and include general contact information for public questions or comments.

N-9 **Noise monitoring.** In the event of complaints by local residents, the construction contractor shall monitor noise from construction activity. Noise shall be measured at the exterior wall(s) of those residents filing a complaint or a representative location. In the event that construction noise exceeds the specified limits (1-hour L_{eq} of 55 dBA), the responsible construction activity shall cease until appropriate measures are implemented to reduce noise levels to the extent feasible.

TRANSPORTATION

T-1 **Transportation Management Plan.** The construction contractor shall submit a Transportation Management Plan to the County of Ventura's Public Works Department and to Caltrans for review and approval that demonstrates practices and safety precautions designed to minimize temporary construction traffic impacts. The detailed traffic study shall be performed by a registered civil engineer (or registered traffic engineer) who is qualified to perform traffic engineering studies and is familiar with Ventura County. The Transportation Management Plan shall cover all aspects of construction under the Proposed Action and shall include traffic control measures and other procedures that may be necessary during construction of the project. All recommendations of the Transportation Management Plan shall be incorporated into the description of the Proposed Action.

T-2 **Road repair from construction activities.** If damage to roads, sidewalks, and/or medians occurs, the construction contractor shall coordinate repairs with the affected public agencies to ensure that any impacts are adequately repaired. Roads disturbed by construction activities or construction vehicles shall be properly restored to ensure long-term protection of road surfaces. Care shall be taken to prevent damage to roadside drainage structures. Roadside drainage structures and road drainage features (e.g., rolling dips) shall be protected by regrading and reconstructing roads to drain properly.

RECREATION

R-1 **Construct a ramp to provide access over the Meiners Oaks flood protection.** The Corps shall design and construct a ramp from Meyer Road on the east side of the Meiners Oaks flood protection over to the trails on the west side of the flood protection. The OVLC shall be consulted on the design of the ramp. This ramp shall be constructed in conjunction with construction of the Meiners Oaks levee and floodwall. The ramp shall be designed to ensure that pedestrians and equestrians can continue to utilize the Rice Canyon Trail, but designs may also include measures to ensure that the levee itself is not used as a recreation trail.

R-2 **Parks agency coordination, notification, and signage.** All construction activities, including temporary trail closures, affecting parklands or trail systems along the project route shall coordinate with the respective jurisdictional agency at least 30 days before construction begins in these areas. Signs directing vehicles to alternative park access and parking shall be posted in the event construction temporarily obstructs parking areas near trailheads. The Corps shall also post signs alerting park users to construction activities at least a week in advance of construction near recreation facilities. Signs advising recreation users of construction activities and directing them to alternative trails or bikeways will be posted on both sides of all trail intersections or as determined through Corps coordination with the respective jurisdictional agencies.

9. RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The National Environmental Policy Act (NEPA) (40 C.F.R. §1502.16) requires that an EIS consider the relationship between short-term uses of the environment and the impacts that such uses may have on the maintenance and enhancement of long-term productivity of the affected environment. This section compares the short- and long-term environmental effects of the Proposed Action. Although projects traditionally result in short-term gains and long-term losses, the removal of the Matilija Dam and restoration of the Ventura River ecosystem would do the opposite.

Short-term impacts would result from removal of the dam, construction of downstream improvements, and transport or disposal of sediment. These actions would result in temporary adverse impacts to hydrology and water resources, wildlife, air quality, aesthetics, noise, recreation, and transportation. Temporary impacts to hydrology and water resources include an increase in turbidity in Matilija Creek during construction. Impacts to wildlife include the potential loss of habitat for protected and sensitive species inhabiting the Matilija Dam reservoir area, loss of habitat during demolition and construction, and disruption of wildlife movement in Matilija Canyon and Matilija Creek. Short-term air quality impacts would result from fugitive dust generated during demolition and construction. Aesthetic impacts include temporary disruption of visual conditions that would last throughout the period of project construction and until natural vegetation is re-established. Noise generated from demolition, construction, and trucking activities would affect sensitive receptors in the Matilija Dam and Reservoir area. Construction activities would restrict access or temporarily close recreation facilities in the study area. There would also be a reduction in roadway levels of service (LOS) due to heavy truck trips for hauling sediment, etc.

Long-term adverse impacts would result from dam removal and construction of downstream improvements. These would include impacts to earth resources, hydrology and water resources, biological resources, aesthetics and recreation. With regard to earth resources, portions of Matilija Creek and the Ventura River would experience a change in topography due to erosion/deposition of sediment. Impacts to hydrology and water resources include an increase in flood hazard risk to adjacent properties. The elimination of Lake Matilija results in the elimination of a scenic resource and the raising of flood control measures would degrade views along the river. Construction of the Rice Road slurry disposal site and flood control measures would permanently reduce the recreational value of trail facilities. These adverse impacts would be tolerated in order to achieve the greater benefit of restoring the natural ecosystem of the Ventura River.

Long-term beneficial impacts resulting from dam removal, ecosystem restoration, and downstream improvements include returning the site to a more natural state (similar to pre-dam conditions), providing sediment for beach replenishment, reviving passages for aquatic species (i.e., steelhead), improving habitat with removal of invasive vegetative species (i.e., *Arundo donax*), improving flood protection, and augmenting recreational and tourism opportunities. With the project, the ecosystem would function as a more natural system, thus these long-term gains appear to outweigh the previously mentioned short- and long-term losses.

10. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The National Environmental Policy Act (NEPA) (40 C.F.R. §1502.16) and CEQA Guidelines (Section 15126.2[c]) require analysis of significant irreversible and irretrievable effects. *Irreversible commitments* include permanent damage to the environment that cannot be reversed. *Irretrievable commitments* include those that are temporarily lost but can be replaced either on site or off site after the project has been undertaken. This section is meant to convey any resources that would be lost either temporarily or permanently as a result of undertaking the Proposed Action.

This Proposed Action includes the permanent loss of Lake Matilija. Although it appears that the permanent loss of these resources would be detrimental, in actuality these resources would be exchanged for others that are considered much more valuable. For example, removal of the dam and thus the loss of Lake Matilija is an irreversible commitment of a resource that would eventually be eliminated through sediment deposition in the future. Removing the dam and releasing the water that forms Lake Matilija would return the Ventura River watershed to a more natural condition, which is considered more valuable than not implementing the project and waiting for the lake to fill with sediment in the future.

Other resources that would be permanently lost include lacustrine (lake) habitat, prime farmland and the resources used for demolition and construction activities (e.g., energy, sand and gravel, and fuel resources). These resources, with the exception of those used for demolition and construction, would also be replaced with more valuable resources. Some of the lacustrine habitat characteristic of Lake Matilija would be replaced with highly preferred wetland and riparian habitats. Prime farmland would be compromised for flood protection to ensure the safety of affected residences. The resources used for demolition and construction, represent a commitment and reduction of nonrenewable and slowly renewable resources. Dam removal and downstream improvements provided by the project would avoid or substantially reduce the amounts of energy and other resources that would need to be committed to address sediment aggradation within Lake Matilija and the need for flood protection in the future.

The sediment trapped behind the dam is considered an irretrievable resource. The sediment would be either naturally or mechanically transported from behind the dam with beneficial sediments used for beach replenishment and downstream improvements and remaining sediments disposed off site. This resource would not be permanently lost, but would be shifted to other locations and used for other beneficial purposes.

11. GROWTH-INDUCING EFFECTS

The National Environmental Policy Act (NEPA) (40 C.F.R. §1508.8) defines *indirect effects* as those that include growth-inducing effects or other effects related to induced changes in population density or growth rate. CEQA Guidelines Section 15126.2(d) requires a discussion of growth-inducing impacts of the proposed project. The Proposed Action would not result in direct growth inducing impacts, but could facilitate growth in the project area and indirectly induce growth through increased development of recreational resources.

Improving flood protection downstream would accommodate future development of mixed uses (e.g., agriculture, residential, commercial, recreation). Most of the development surrounding the project site has occurred in the cities of Ojai and San Buenaventura. While the proposed project could help facilitate growth in the area by reducing a potential development constraint (flood hazard), the resultant growth would be consistent with the land use policies of the applicable general plans for this area.

While the project would not directly induce growth, the removal of Matilija Dam and restoration of the Ventura River ecosystem would indirectly accommodate future development of recreational resources. Restoration of the Ventura River watershed to a more natural condition could increase the aesthetic value of the area, which may lead to increased development of recreational resources. Additional recreational resources may then lead to increased tourism or demand for housing in a highly valued area.

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14.1 GLOSSARY

100-year flood. A stream flow caused by a discharge that is exceeded, on the average, only once in 100 years. A 100-year flood has a 1% chance of occurrence in any given year.

500-year flood. A flood that has a 0.2% change of occurring in a given year.

Acre foot. The amount of water necessary to cover an acre (43,560 sq. feet) to a depth of one foot, or 43,560 cubic feet, which is equivalent to 325,828 gallons.

Adfluvial. Migration between lakes and rivers or streams.

Aggradation (of a stream channel bed). Raising of stream bed elevation, caused by sediment supply in excess of sediment-transport capacity.

Air quality standard. The specified average concentration of an air pollutant in ambient air during a specified time period, at or above which level the public health may be at risk; equivalent to AAQS.

Air toxics. Any air pollutant for which a national ambient air quality standard (NAAQS) does not exist (i.e., excluding ozone, carbon monoxide, PM_{10}, sulfur dioxide, nitrogen oxide) that may reasonably be anticipated to cause cancer; respiratory, cardiovascular, or developmental effects; reproductive dysfunctions, neurological disorders, heritable gene mutations, or other serious or irreversible chronic or acute health effects in humans.

Algae. A collective term for several taxonomic groups of primitive chlorophyll-bearing plants which are widely distributed in fresh and salt water and moist lands. This term includes the seaweeds, kelps, diatoms, pond scums, and stoneworts.

Alkalinity. The capacity of bases to neutralize acids. An example is lime added to lakes to decrease acidity.

Alluvial. Deposited by running water.

Alluvium. Soil, sand, gravel, and other material which has been transported and deposited by flowing water. An alluvial feature is formed by material which has been deposited by water.

Ambient air. Any unconfined portion of the atmosphere; the outside air.

Ambient Noise Level. Noise from all sources, near and far. ANL constitutes the normal or existing level of environmental noise at a given location.

Anadramous. Pertaining to fish that spend a part of their life cycle in the sea and return to freshwater streams to spawn (e.g., salmon, steelhead trout, and shad).

Aquifer. A permeable geologic unit such as sand or gavel that contains water and transmits it readily.

Armoring. Forming an armor layer, or application of various materials to protect stream banks from erosion.

Artificial nourishment. The process of replenishing a beach with material (usually sand) obtained from another location.

Attainment Area. An area having air quality as good as or better than the national ambient air quality standards as defined in the Clean Air Act. An area may be an attainment area for one pollutant and a non-attainment area for others.

Average. As a measure, the sum of the measurements (over a specified period) divided by the number of measurements.

Average discharge. The arithmetic average of all complete water years of record whether or not they are consecutive. Average discharge is not published for less than 5 years of record. The term “average” is generally reserved for average of record and “mean” is used for averages of shorter periods, namely, daily mean discharge.

Avifauna. Birds.

Backfill. Earth that is replaced after a construction excavation.

Background level. The concentration of a substance in an environmental media (air, water, or soil) that occurs naturally or is not the result of human activities. In exposure assessment, the concentration of a substance in a defined control area, during a fixed period of time before, during, or after a data-gathering operation.

Base flow. The fair-weather or sustained flow of streams; that part of stream discharge not attributable to direct runoff from precipitation, snowmelt, or a spring. Discharge entering stream channels as effluent from the groundwater reservoir. Also referred to as groundwater flow.

Baseline. A set of existing conditions against which change is to be described and measured.

Beach. The zone of unconsolidated material that extends landward from the low water line to the place where there is marked change in material or physiographic form, or to the line of permanent vegetation (usually the effective limit of storm waves). The seaward limit of a beach—unless otherwise indicated—is the mean low water line.

Beach erosion. The carrying away of beach materials by wave action, tidal currents, littoral currents, or wind.

Beach width. The horizontal dimension of the beach measured normal to the shoreline.

Bed forms. Local topographical interruptions to the uniformity of a channel bed occurring during the passage of a stream flow. Antidunes are an example of bed forms.

Bed load. Sediment particles resting on or near the channel bottom that are pushed or rolled along by the flow of water.

Berm. A narrow shelf, path, or ledge typically at the top or bottom of a slope; also, an earthen, mounded wall.

Best available control technology (BACT). For any specific source, the currently available technology producing the greatest reduction of air pollutant emissions, taking into account energy, environmental, economic, and other costs.

Best management practice (BMP). Methods that have been determined to be the most effective, practical means of preventing or reducing pollution from non-point sources.

Biodegradable. Capable of decomposing under natural conditions.

Biodiversity. Refers to the variety and variability among living organisms and the ecological complexes in which they occur. Diversity can be defined as the number of different items and their relative frequencies. For biological diversity, these items are organized at many levels, ranging from complete ecosystems to the biochemical structures that are the molecular basis of heredity. Thus, the term encompasses different ecosystems, species, and genes.

Biomass. All of the living material in a given area; often refers to vegetation.

Biota. Living organisms.

Brackish. Pertaining to water, generally estuarine, in which the salinity ranges from 0.5 to 17 parts per thousand by weight.

Chaparral. Dense thicket of shrubs and small trees, characteristic of southwestern U.S.

Channel lining. Artificial hardening of the sides and/or bed of a stream channel to prevent erosion. Concrete, soil cement and rock riprap are typical channel linings.

Clay soil. Soil material containing more than 40 percent clay, less than 45 percent sand, and less than 40 percent silt.

Coastal block. Geologic term describing area adjacent to the coast, which may be faulted or fractured.

Coastal currents. One of the offshore currents flowing generally parallel to the shoreline in the deeper water beyond and near the surf zone; these are not related genetically to waves and resulting surf, but may be related to tides, winds, or distribution of mass.

Coastal zone. Lands and waters adjacent to the coast that exert an influence on the uses of the sea and its ecology, or whose uses and ecology are affected by the sea. Also, coastal land under the jurisdiction of the California Coastal Act.

Colluvium. Rock detritus and soil accumulated at the foot of a slope.

Community. In ecology, an assemblage of populations of different species within a specified location in space and time. Sometimes, a particular subgrouping may be specified, such as the fish community in a lake or the soil arthropod community in a forest.

Concentration. The relative amount of a substance mixed with another substance. An example is five ppm of carbon monoxide in air or 1 mg/l of iron in water.

Concentration point. A downstream convergence point for storm runoff in a drainage area. See Concentration time.

Concentration time. The period of time required for storm runoff to flow from the most remote point of a catchment or drainage area to the outlet or point under consideration. Concentration time varies with depth of flow and channel condition.

Confined aquifer. An aquifer in which ground water is confined under pressure which is significantly greater than atmospheric pressure.

Conglomerate. Consolidated (sedimentary) stone composed primarily of large, gravel-sized particles.

Consumptive water use. Water removed from available supplies without return to a water resources system, e.g., water used in manufacturing, agriculture, and food preparation.

Contaminant. Any physical, chemical, biological, or radiological substance or matter that has an adverse effect on air, water, or soil.

Contamination. Introduction into water, air, and soil of microorganisms, chemicals, toxic substances, wastes, or wastewater in a concentration that makes the medium unfit for its next intended use.

Corrosion. The dissolution and wearing away of metal caused by a chemical reaction such as between water and the pipes, chemicals touching a metal surface, or contact between two metals.

Corrosive. A chemical agent that reacts with the surface of a material causing it to deteriorate or wear away.

Criteria Pollutants. The 1970 amendments to the Clean Air Act required EPA to set National Ambient Air Quality Standards for certain pollutants known to be hazardous to human health. EPA has identified and set standards to protect human health and welfare for six pollutants: ozone, carbon monoxide, total suspended particulates, sulfur dioxide, lead, and nitrogen oxide. Criteria pollutants derives from the requirement that EPA must describe the characteristics and potential health and welfare effects of these pollutants. It is on the basis of these criteria that standards are set or revised.

Crustal. Of or relating to the crust of the earth.

Decibel (dB). A logarithmic unit that describes the wide range of sound intensities to which the human ear is sensitive.

Decibel A-weighted (dBA). Decibel unit scale that is modified to better represent the relative insensitivity of the human ear to low-pitched sounds.

Degradation (of a stream channel bed). Lowering of streambed elevation, caused by sediment-transport capacity in excess of the sediment supply. Degradation can be long-term (after the passage of many stream flows) or short-term (caused by a single stream flow).

Diffusion. The movement of suspended or dissolved particles (or molecules) from a more concentrated to a less concentrated area. The process tends to distribute the particles or molecules more uniformly.

Diffusion model. A model, calculated by formula, graphs, or computer, that estimates the dilution of an air pollutant as it is carried downwind. The models are based on physical principles with various simplifications to aid solvability.

Discharge. Flow of surface water in a stream or canal or the outflow of ground water from a flowing artesian well, ditch, or spring. Can also apply to discharge of liquid effluent from a facility or to chemical emissions into the air through designated venting mechanisms.

Diversion dam (or structure). A barrier built to divert part or all of the water from a stream into a different course. The diversion dam is commonly constructed on a natural river channel and is designed to check or elevate the water level for diversion into a main canal system.

Dredging. Removal of mud from the bottom of water bodies. Dredging activities may be subject to regulation under Section 404 of the Clean Water Act.

Ecology. The relationship of living things to one another and their environment, or the study of such relationships.

Ecosystem. The interacting system of a biological community and its non-living environmental surroundings.

Ecotonal. Biological term describing the geographic boundary between two ecological habitats.

Ecotone. A habitat created by the juxtaposition of distinctly different habitats; an edge habitat; or an ecological zone or boundary where two or more ecosystems meet.

Effluent. Wastewater—treated or untreated—that flows out of a treatment plant, sewer, or industrial outfall. Generally refers to wastes discharged into surface waters.

Emission. Unwanted substances released by human activity into air or water.

Emission inventory. A listing, by source, of the amount of air pollutants discharged into the atmosphere of a community; used to establish emission standards.

Emission, primary. An emission that is treated as inert (non-reactive).

Emission, secondary. Unwanted substances that are chemical byproducts of reactive primary emissions.

Endangered Species. Animals, birds, fish, plants, or other living organisms threatened with extinction by anthropogenic (man-caused) or other natural changes in their environment. Requirements for declaring a species endangered are contained in the Endangered Species Act.

Environmental Assessment (EA). An environmental analysis prepared pursuant to the National Environmental Policy Act to determine whether a federal action would significantly affect the environment and thus require a more detailed environmental impact statement.

Environmental/ecological risk. The potential for adverse effects on living organisms associated with pollution of the environment by effluents, emissions, wastes, or accidental chemical releases; energy use; or the depletion of natural resources.

Environmental justice. Equal protection from environmental hazards for individuals, groups, or communities regardless of race, ethnicity, or economic status. This applies to the development, implementation, and enforcement of environmental laws, regulations, and policies, and implies that no population of people should be forced to shoulder a disproportionate share of negative environmental impacts of pollution or environmental hazard due to a lack of political or economic strength levels.

Environmental exposure. Human exposure to pollutants originating from facility emissions. Threshold levels are not necessarily surpassed, but low-level chronic pollutant exposure is one of the most common forms of environmental exposure

Environmental Impact Report (EIR). A document required of state and local agencies by the California Environmental Quality Act for public or private projects that have the potential to significantly affect the physical environment.

Environmental Impact Statement (EIS). A document required of federal agencies by the National Environmental Policy Act for major projects or legislative proposals significantly affecting the environment. A tool for decision making, it describes the positive and negative effects of the undertaking and cites alternative actions.

Environmentally superior alternative. Alternative selected by the CEQA lead agency that provides an overall environmental advantage over the other alternatives.

Erosion. The wearing away of the land surface by running water, wind, ice, or other geological agents, including such processes as gravitational creep.

Estuary. Widening area at seaward end of river where its current is met and influenced by ocean tides.

Ethnohistoric. Ethnological information collected during historic times, for instance, that from the Spanish mission registers.

Eutrophication. The slow aging process during which a lake, estuary, or bay evolves into a bog or marsh and eventually disappears. During the later stages of eutrophication the water body is choked by abundant plant life due to higher levels of nutritive compounds such as nitrogen and phosphorus. Human activities can accelerate the process.

Exotic species. A species that is not indigenous to a region.

Fault. A fracture or zone of fractures in rock strata which have undergone movement that displaces the sides relative to each other, usually in a direction parallel to the fracture. Abrupt movement on faults is a cause of most earthquakes.

Fill. Man-made deposits of natural soils or rock products and waste materials.

Fish ladder. A series of small pools arranged in an ascending fashion to allow the migration of fish upstream past construction obstacles, such as dams. Also, an inclined trough which carries water from above to below a dam so that fish can easily swim upstream. There are various types, some with baffles to reduce the velocity of the water and some consisting of a series of boxes with water spilling down from one box to the next.

Flood capacity. The flow carried by a stream or floodway at bankfull water level. Also, the storage capacity of the flood pool at a reservoir.

Flood frequency. A statistical expression or measure of how often a hydrologic event of a given size or magnitude should, on an average, be equaled or exceeded. For example, a 50-year frequency flood (2 percent change of occurrence) should be equaled or exceeded, on the average, once in 50 years.

Floodplain. A strip of relatively smooth land bordering a stream, built of sediment carried by the stream and dropped in the slack water beyond the influence of the swiftest current. The lowland that borders a stream or river, usually dry but subject to flooding.

Flora. Plants or plant life.

Fluvial. Produced by the action of a river or stream.

Forebay. The main area of recharge to a ground water basin.

Freeboard. Vertical distance from the normal water surface to the top of a confining wall.

Fugitive dust. Airborne pulverized soil particles.

Geomorphology. The geographical study of the form of the earth. Geomorphic means of or pertaining to the shape of the earth or its topographic features.

Geophysical survey. General term for survey of land forms using geologic mapping, trenching, soil testing, percolation testing, echo sounding, or other techniques.

Groin. A shore protection structure built (usually perpendicular to the shoreline) to trap littoral drift or retard erosion of the shore.

Ground water. The supply of fresh water found beneath the Earth's surface, usually in aquifers, which supply wells and springs.

Habitat. The place where a population (e.g., human, animal, plant, microorganism) lives and its surroundings, both living and non-living.

Hazardous substance. Any material that poses a threat to human health and/or the environment. Typical hazardous substances are toxic, corrosive, ignitable, explosive, or chemically reactive. Also, any substance designated by EPA to be reported if a designated quantity of the substance is spilled in the waters of the U.S. or is otherwise released into the environment.

Hazardous waste. By-products of society that can pose a substantial or potential hazard to human health or the environment when improperly managed. Possesses at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity), or appears on special EPA lists.

Herbicide. A chemical pesticide designed to control or destroy plants, weeds, or grasses.

Herbivore. An animal that feeds on plants.

Heterogeneous. Consisting of dissimilar elements or parts; not homogeneous.

High tide, high water (HW). The maximum elevation reached by each rising tide.

Higher high tide (HHW). The higher of the two high waters of any tidal day. The single high water occurring daily during periods when the tide is diurnal is considered to be a higher high water.

Homogeneous. Of the same or similar nature or kind; uniform in structure or composition throughout.

Hydrocarbons. Compounds composed principally of carbon and hydrogen; they occur in petroleum, natural gas, coal, and bitumens.

Hydrocarbons, nonmethane. Mixture or concentration of hydrocarbons with the methane fraction ignored. One of many formulations for reactive hydrocarbons.

Hydrocarbons, reactive. Mixture or concentration of hydrocarbons with fraction assumed to be nonreactive removed from consideration. See VOC.

Hydrogeological cycle. The natural process recycling water from the atmosphere down to (and through) the earth and back to the atmosphere again.

Hydrogeology. The geology of ground water, with particular emphasis on the chemistry and movement of water.

Hydrologic cycle. Movement or exchange of water between the atmosphere and earth.

Hydrology. The science dealing with the properties, distribution, and circulation of water.

Igneous. Igneous refers to a type of rock that is formed from the cooling and solidification of molten rock. Molten rock (magma) is produced due to the high internal core temperature of the earth. Upon cooling, magma becomes igneous rock. Granite and basalt are two common forms of igneous rock.

Infiltration. The penetration of water through the ground surface into sub-surface soil or the penetration of water from the soil into sewer or other pipes through defective joints, connections, or manhole walls.

Infiltration rate. The quantity of water that can enter the soil in a specified time interval.

Inselberg. An isolated hill of solid rock.

Inventory, emission. A list of daily or annual emissions, listed by pollution source category (e.g., trains, refineries, agriculture, etc.).

Inversion. A layer of air in the atmosphere in which the temperature increases with altitude at a rate greater than normal (adiabatic). Pollutants tend to be trapped below the inversion.

Invertebrate. Animals that lack a spinal column.

Leachate. Water that collects contaminants as it trickles through wastes, pesticides or fertilizers. Leaching may occur in farming areas, feedlots, and landfills, and may result in hazardous substances entering surface water, ground water, or soil.

Leaching. The process by which soluble constituents are dissolved and filtered through the soil by a percolating fluid.

Limnology. The study of the physical, chemical, hydrological, and biological aspects of fresh water bodies.

Liquefaction. The process of making or becoming liquid (soils).

Lithology. Mineralogy, grain size, texture, and other physical properties of granular soil, sediment, or rock.

Littoral. Of or pertaining to, a shore, especially of the sea.

Littoral drift. The sedimentary material moved in the littoral zone under the influence of waves and currents.

Littoral transport. The movement of littoral drift in the littoral zone by waves and currents. Includes movement parallel (longshore transport) and perpendicular (on-offshore transport) to the shore.

Littoral zone. In beach terminology, an indefinite zone extending seaward from the shoreline to just beyond the breaker zone.

Local scour. Lowering of a channel bed as a result of a local disturbance to flow, such as bridge piers, a sudden drop or a sharp channel bend.

Low flow. Low rate of water flow due to scant rainfall and low runoff.

Low-flow channel. Formation of a local, small channel inside a larger stream channel as a result of low-discharge flows.

Longshore. Parallel to and near the shoreline.

Longshore transport rate. Rate of transport of sedimentary material parallel to the shore. Usually expressed in cubic m (cubic yards) per year.

Low tide (low water, LW). The minimum elevation reached by each falling tide.

Macroinvertebrate. Pertaining to invertebrates that are visible to the naked eye.

Macroalgae. Pertaining to large algae, such as kelp, as distinguished from microscopic algae.

Marsh. A type of wetland that does not accumulate appreciable peat deposits and is dominated by herbaceous vegetation. Marshes may be either fresh or saltwater, tidal or non-tidal.

Maximum probable flood. The largest flood for which there is any reasonable expectancy.

Mean higher high water (MHHW). The average height of the higher high waters over a 19-year period. For shorter periods of observation, corrections are applied to eliminate known variations and reduce the result to the equivalent of a mean 19-year value.

Mean lower low water (MLLW). The average height of the lower low waters over a 19-year period. For shorter periods of observations, corrections are applied to eliminate known variations and reduce the results to the equivalent of a mean 19-year value.

Mean sea level. The average height of the surface of the sea for all stages of the tide over a 19-year period, usually determined from hourly height readings.

Median. The mid-value is a series of values, with half having greater value and half lower value. To be distinguished from "average."

Metamorphic. Metamorphic refers to rocks that have been altered from their original form by heat and pressure.

Methane. A colorless, nonpoisonous, flammable gas created by anaerobic decomposition of organic compounds. A major component of natural gas used in the home.

Microclimate. Distinctive climate within a small geographic area.

Micron. One millionth of a meter.

Mixing height. The distance from the ground to a daytime (temperature) inversion layer.

Mobile source. Any non-stationary source of air pollution such as cars, trucks, motorcycles, buses, airplanes, and locomotives.

Monitoring station. A mobile or fixed site equipped to measure instantaneous or average ambient air pollutant concentrations.

Morphology. The branch of geology that studies the characteristics and configuration and evolution of rocks and land forms.

National Ambient Air Quality Standards (NAAQS). Standards established by EPA that apply for outdoor air throughout the country.

National Estuary Program. A program established under the Clean Water Act Amendments of 1987 to develop and implement conservation and management plans for protecting estuaries and restoring and maintaining their chemical, physical, and biological integrity, as well as controlling point and nonpoint pollution sources.

National Pollutant Discharge Elimination System (NPDES). A provision of the Clean Water Act which prohibits discharge of pollutants into waters of the United States unless a special permit is issued by EPA, a state, or, where delegated, a tribal government on an Indian reservation.

National Priorities List (NPL). EPA's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action under Superfund. The list is based primarily on the score a site receives from the Hazard Ranking System. EPA is required to update the NPL at least once a year. A site must be on the NPL to receive money from the Trust Fund for remedial action.

Navigable waters. Traditionally, waters sufficiently deep and wide for navigation by all, or specified vessels; such waters in the United States come under federal jurisdiction and are protected by certain provisions of the Clean Water Act.

New Source Review (NSR). A Clean Air Act requirement that State Implementation Plans must include a permit review that applies to the construction and operation of new and modified stationary sources in nonattainment areas to ensure attainment of national ambient air quality standards.

Nitrate. A compound containing nitrogen that can exist in the atmosphere or as a dissolved gas in water and which can have harmful effects on humans and animals. Nitrates in water can cause severe illness in infants and domestic animals. A plant nutrient and inorganic fertilizer, nitrate is found in septic systems, animal feed lots, agricultural fertilizers, manure, industrial waste waters, sanitary landfills, and garbage dumps.

Nitrogen oxides. A gaseous mixture of nitric oxide (NO) and nitrogen dioxide (NO_2) and symbolically represented as NO_3.

Noise level, median. The level of noise exceeded 50 percent of the time. Usually specified as either the daytime or the nighttime median noise level. Also given the designation L_{50}.

Non-attainment area. Area that does not meet one or more of the National Ambient Air Quality Standards for the criteria pollutants designated in the Clean Air Act.

Non-point sources. Diffuse pollution sources (i.e., without a single point of origin or not introduced into a receiving stream from a specific outlet). The pollutants are generally carried off the land by storm water. Common non-point sources are agriculture, forestry, urban, mining, construction, dams, channels, land disposal, saltwater intrusion, and city streets.

Nourishment. The process of replenishing a beach. It may be brought about naturally by longshore transport, or artificially by the deposition of dredged materials.

Nephelometric. An apparatus used to measure the size and concentration of particles in a liquid by analysis of light scattered by the liquid.

Nutrient. Any substance assimilated by living things that promotes growth. The term is generally applied to nitrogen and phosphorus in wastewater, but is also applied to other essential and trace elements.

Oligotrophic lakes. Deep clear lakes with few nutrients, little organic matter and a high dissolved-oxygen level.

Organic. Referring to or derived from living organisms. In chemistry, any compound containing carbon.

Organic chemicals/compounds. Naturally occuring (animal or plant-produced or synthetic) substances containing mainly carbon, hydrogen, nitrogen, and oxygen.

Organic matter. Carbonaceous waste contained in plant or animal matter and originating from domestic or industrial sources.

Organism. Any form of animal or plant life.

Outfall. The place where effluent is discharged into receiving waters.

Oxidant. A mixture of chemically oxidizing compounds formed from ultraviolet stimulated reactions in the atmosphere, with ozone a principal fraction.

Ozone. A molecule of three oxygen atoms -- O_3. A principal component of "oxidant" in photochemically polluted atmospheres.

Particulate matter (particulates). Very fine sized solid matter or droplets, typically averaging one micron or smaller in diameter. Also called "aerosol."

Peak flow. The maximum instantaneous discharge of a stream or river at a given location. It usually occurs at or near the time of maximum stage.

Perched water. Zone of unpressurized water held above the water table by impermeable rock or sediment.

Percolation. The movement of water downward and radially through subsurface soil layers, usually continuing downward to ground water. Can also involve upward movement of water.

Periphyton. Microscopic underwater plants and animals that are firmly attached to solid surfaces such as rocks, logs, and pilings.

pH. An expression of the intensity of the basic or acid condition of a liquid; may range from 0 to 14, where 0 is the most acid and 7 is neutral. Natural waters usually have a pH between 6.5 and 8.5.

Photochemical pollutant. Reactive organic compounds (ROC) and nitrogen oxides (NOx), photochemical pollutants that absorb energy from the sun and react chemically to form ozone (O_3).

Photosynthesis. The manufacture by plants of carbohydrates and oxygen from carbon dioxide mediated by chlorophyll in the presence of sunlight.

Physiography. The earth's exterior physical features, climate, life, etc., and the physical movements or changes on the earth's surface.

Phytoplankton. Microscopic plants that form the base of the marine/aquatic food chain.

Plankton. Tiny plants and animals that live in water.

Plume. A visible or measurable discharge of a contaminant from a given point of origin. Can be visible or thermal in water, or visible in the air as, for example, a plume of smoke.

Point source. A stationary location or fixed facility from which pollutants are discharged; any single identifiable source of pollution; e.g., a pipe, ditch, ship, ore pit, factory smokestack.

Pollutant. Generally, any substance introduced into the environment that adversely affects the usefulness of a resource or the health of humans, animals, or ecosystems.

Preferred alternative. Alternative selected by the NEPA lead agency considering all environmental and economic information associated with the project and alternatives.

Recharge. The process by which water is added to a zone of saturation, usually by percolation from the soil surface; e.g., the recharge of an aquifer.

Reservoir. Any natural or artificial holding area used to store, regulate, or control water.

Riparian. Area along the banks of a river or lake supporting specialized plant and animal species.

Riprap. A protective layer or facing of quarrystone, usually well graded within wide size limit, randomly placed to prevent erosion, scour, or sloughing of an embankment of bluff; also the stone so used. The quarrystone is paced in a layer at least twice the thickness of the 50 percent size, or 1.25 times the thickness of the largest size stone in the gradation.

River basin. The land area drained by a river and its tributaries.

Salinity. The percentage of salt in water.

Sediment yield. The quantity of sediment arriving at a specific location.

Sedimentation. Letting solids settle out of wastewater by gravity during treatment.

Sediment. Soil, sand, and minerals washed from land into water, usually after rain. They pile up in reservoirs, rivers and harbors, destroying fish and wildlife habitat, and clouding the water so that sunlight cannot reach aquatic plants. Careless farming, mining, and building activities will expose sediment materials, allowing them to wash off the land after rainfall.

Sedimentary. Sedimentary refers to a type of rock that is formed by the consolidation of rock particles. These particles are usually transported from their source by forces of erosion, such as wind, water, and glaciers. Over time, the particles become cemented or consolidated into rock. Shale and sandstone are two forms of sedimentary rock.

Seedbank. The layer of topsoil containing native plant seed material, which is frequently used as a "seed bank" for revegetation of native plants.

Seismicity. The relative frequency and distribution of earthquakes.

Senescence. The aging process. Sometimes used to describe lakes or other bodies of water in advanced stages of eutrophication. Also used to describe plants and animals.

Sensitive receptor. That segment of the population that because of age or weak health is more susceptible to the effects of air pollution, noise, oil spill, etc., than the population at large.

Shoreline. The intersection of a specified plane of water with the shore or beach (e.g., the high water shoreline would be the intersection of the plane of mean high water with the shore or beach). The line delineating the shoreline on National Ocean Service nautical charts and surveys approximates the mean high water line.

Shrink-swell potential. The expansion or contraction of primarily clay-rich soils during alternating wetting and drying cycles.

Silt. Sedimentary materials composed of fine or intermediate-sized mineral particles.

Slough. A place of deep mud or mire; bog. A stagnant swamp, backwater, bayou inlet, or pond in which water backs up.

Spawning. The depositing and fertilizing of eggs (or roe) by fish and other aquatic life.

Standard project flood (SPF). The flood that may be expected from the most severe combination of meteorological and hydrological conditions considered reasonably characteristic of the geographical area in which the drainage basin is located, excluding extremely rare combinations.

Stationary source. A fixed-site producer of pollution, mainly power plants and other facilities using industrial combustion processes.

Stream scour. Lowering of a streambed during the passage of a single stream flow. Stream scour can be local in nature or more widespread.

Substrate. Geologic term describing soil or geologic layers underlying a project site or construction area.

Sulfates. Compounds in air or water that contain four oxygen atoms for each sulfur atom. See SOx.

Sulfur oxides. A gaseous mixture of sulfur dioxide (SO_2) and sulfur trioxide (SO_3) and symbolically represented as SOx. Can include particulate species such as sulfate compounds (-SO_4).

Surf. The wave activity in the area between the shoreline and the outermost limit of breakers.

Surface water. All water naturally open to the atmosphere (rivers, lakes, reservoirs, ponds, streams, impoundments, seas, estuaries, etc.).

Surfzone. The area between the outermost breaker and the limit of wave uprush.

Tectonic. Relating to, causing, or resulting from structural deformation of the earth's crust.

Terrestrial. Related to or living on land. Terrestrial biology deals with upland areas as opposed to shorelines or coastal habitats.

Thalweg. The lowest thread along the axial part of a valley or stream channel.

Tidal marsh. Low, flat marshlands traversed by channels and tidal hollows, subject to tidal inundation; normally, the only vegetation present is salt-tolerant bushes and grasses.

Topography. The physical features of a surface area including relative elevations and the position of natural and man-made (anthropogenic) features.

Toxic substance. A chemical or mixture that may present an unreasonable risk of injury to health or the environment.

Toxic waste. A waste that can produce injury if inhaled, swallowed, or absorbed through the skin.

Transpiration. The process by which water vapor is lost to the atmosphere from living plants. The term can also be applied to the quantity of water thus dissipated.

Tsunami. A long gravity oceanic wave generated by sudden movements of the ocean bottom during submarine earthquakes, landslides, or volcanic activity.

Turbidity. Cloudiness or muddiness of water or ocean, resulting from suspended or stirred up particles.

Utility corridor. A strip of land, or an easement, on which utility or pipelines are constructed.

Vapor recovery. Air pollution control methods, which reduce emissions by capturing vapors to avoid their release into the atmosphere.

Vapor transfer. An emission control device, which recovers volatile pollutants, such as hydrocarbons, and relocates them to a location for recovery or destruction.

Vector. An organism, often an insect or rodent, that carries disease.

Vehicle miles traveled (VMT). A measure of the extent of motor vehicle operation; the total number of vehicle miles traveled within a specific geographic area over a given period of time.

Visual sensitivity. Consideration of people's uses of various environments and their concerns for maintenance of scenic quality and open-space values; examples of areas of high visual sensitivity would be areas visible from scenic highways, wilderness areas, parks, recreational water bodies, etc.

Wastewater. The spent or used water from a home, community, farm, or industry that contains dissolved or suspended matter.

Water table. The level of groundwater.

Watershed. The land area that drains into a stream; the watershed for a major river may encompass a number of smaller watersheds that ultimately combine at a common point.

Wave period. The time for a wave crest to traverse a distance equal to one wavelength. The time for two successive wave crests to pass a fixed point.

Weir. A wall or plate placed in an open channel to measure the flow of water.

Wetland. Lands transitional between obviously upland and aquatic environments. Wetlands are generally highly productive environments with abundant fish, wildlife, aesthetic, and natural resource values. For this reason, coupled with the alarming rate of their destruction, they are considered valuable resources, and several regulations and laws have been implemented to protect them.

Zooplankton. Microscopic marine/aquatic animals generally carried within a water mass.

14.2 ACRONYMS

AAQS
Ambient Air Quality Standards

ADT
Average Daily Trip

APCD
Air Pollution Control District

AQMD
Air Quality Management District

AQMP
Air Quality Management Plan

BA
Biological Assessment

BACT
Best Available Control Technology

BLM
Bureau of Land Management

BMPs
Best Management Practices

BO
Biological Opinion

BOR
U.S. Bureau of Reclamation

C
Celsius

CAA
Clean Air Act (federal)

CAAQS
California Ambient Air Quality Standards

Cal/EPA
California Environmental Protection Agency

Caltrans
California Department of Transportation

CARB
California Air Resources Board

CCAA
California Clean Air Act

CDF
California Department of Forestry

CDFG
California Department of Fish and Game

CDSD
California Department of Water Resources' Division of Safety of Dams

CEQ
Council on Environmental Quality

CEQA
California Environmental Quality Act

CERCLA
Comprehensive Environmental Response, Compensation and Liability Act or Superfund

cfs
Cubic feet per second

CHRIS
California Historical Resources Information System

CNDDB
California Natural Diversity Database

CNEL
Community Noise Equivalent Level

CNPS
California Native Plant Society

CO
Carbon Monoxide

Corps
United States Army Corps of Engineers

CSC
California Species of Special Concern

CTR
California Toxic Rule

CWA
Clean Water Act (federal)

c.y.
cubic yard

dB
decibel

dBA
decibel (A-weighted)

DO
Dissolved oxygen

DOSH
Department of Occupational Safety and Health

DDT
Bichlorophenyl Trichloroethane

EA
Environmental Assessment

EFH
Essential Fish Habitat

EIR
Environmental Impact Report

EIS
Environmental Impact Statement

ESU
Evolutionary Significant Unit

EWG
Environmental Working Group

F
Fahrenheit

FSOC
Federal Species of Concern

GIS
Geographic Information System

HCP
Habitat Conservation Plan

HEP
Habitat Evaluation Procedure

HSWA
Hazardous and Solid Waste Act

HWCL
Hazardous Waste Control Law

IR
Institutional Recreational

kph
Kilometers per hour

LAFCO
Local Area Formation Commission

LCP
Local Coastal Program

L_{dn}
Day/Night Average Noise Level

L_{eq}
Noise Equivalent Level

L_{max}
Maximum Noise Level

L_{min}
Minimum Noise Level

LOS
Level of Service

LPNF
Los Padres National Forest

LPNF-ORD
Los Padres National Forest, Ojai Ranger District

m^2
Square meters

MESA
Matilija Environmental Science Area

mg/L
Milligrams per liter

MOU
Memorandum of Understanding

mph
Miles per hour

MRVD
One thousand Recreation Visitor Days

MWD
Municipal Water District

NAAQS
National Ambient Air Quality Standards

NED
National Economic Development

NER
National Ecosystem Restoration

NEPA
National Environmental Policy Act

NESHAP
National Emission Standards for Hazardous Air Pollutants

NFMA
National Forest Management Act

NGO
Non-government Organization

NH_3
Ammonia

NMFS
National Marine Fisheries Services

NOAA
National Oceanic and Atmospheric Administration

NOI
Notice of Intent

NOP
Notice of Preparation

NO_X
Nitrogen Oxides

NO_2
Nitrogen Dioxide or Nitrite

NO_3
Nitrate

N_2
Nitrogen

NPDES
National Pollution Discharge Elimination System

NPL
National Priorities List

NRCS
Natural Resources Conservation Service

NRHP
National Register of Historic Places

NTU
Nephelometric Turbidity Unit

O_3
Ozone

OSHA
Occupational Safety and Health Administration

OVLC
Ojai Valley Land Conservancy

PAH
Polycyclic aromatic hydrocarbon

PCB
Polychlorinated biphenyl

PFG
Plan Formulation Group

PHT
Peak Hour Trip

$PM_{2.5}$
Fine particulate matter

PM_{10}
Suspended or respirable particulate matter

PO_3
Phosphorus

PO_4
Phosphates

RCRA
Resource Conservation and Recovery Act

RM
River Mile

ROC
Reactive Organic Compound

ROD
Record of Decision

ROS
Recreation Opportunity Spectrum

ROW
right-of-way

RWQCB
Regional Water Quality Control Board

SCAT
South Coast Area Transit

SCCAB
South Central Coast Air Basin

SCCIC
South Central Coastal Information Center

SHC
State Highway Code

SHPO
State Historic Preservation Officer

SMP
Stormwater Monitoring Plan

SO_X
Sulfur Oxides

SO_2
Sulfur Dioxide

SO_4
Sulfates

SR
State Route

SWPPP
Stormwater Pollution Prevention Plan

TAC
Toxic air contaminants

TDS
Total Dissolved Solids

TMDL
Total Maximum Daily Load

TOC
Total organic carbon.

TRPH
Total Recoverable Petroleum Hydrocarbons

UBC
Uniform Building Codes

USACE
United States Army Corps of Engineers

USCS
Unified Soil Classification System

USDA
United States Department of Agriculture

USEPA
United States Environmental Protection Agency

USFWS
United States Fish and Wildlife Service

USFS
U.S. Department of Agriculture - National Forest Service Forestry Service

USGS
United States Geologic Survey

VCAPCD
Ventura County Air Pollution Control District

VCFCD
Ventura County Flood Control District

VCWPD
Ventura County Watershed Protection District

VOC
Volatile Organic Compound

WEAP
Worker Environmental Awareness Plan

WSRA
Wild and Scenic Rivers Act

μS
microsiemens

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